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

AS OF DATE: December 31, 1987

A-20 PATRIOT

87-039

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Concur in classification as marked
MAR 27 1988 23
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

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

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

3. (U) Responsible Office and Telephone Number:

Program Executive Office
High/Medium Air Defense
ATTN: AMCPEO-HIP
Redstone Arsenal, AL 35898-5620

PM: COL Bruce M. Garnett
Assigned: February 12, 1987
AV 742-3240; COMM (205) 895-3240

4. (U) Program Elements:

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

Concur in Classification as marked
23 MAR 1988
SECURITY REVIEW, ODCSINT, HQDA

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

6. (U) Mission and Description:

(U) PATRIOT replaced NIKE HERCULES and some of the Improved HAWK units. Deployment of the PATRIOT System significantly reduces manpower and logistical costs and provides an improved Army air defense. In the field Army, PATRIOT defenses are complemented by short range, low altitude forward area air defense weapons and are integrated with the U.S. Air Force in the overall air defense of the theater of operations. The advanced features of PATRIOT provide an increased capability against saturation attacks, electronic countermeasures (ECM), and maneuvering targets.

CLASSIFIED BY: [redacted] SECURITY CLASSIFICATION GUIDE
DECLASSIFY: OADR

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

OASD(PA) DFOISR 88-F-0775

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

(U) PATRIOT uses an advanced surface-to-air guided missile system with a high single-shot kill probability capable of operation in an Electronic Countermeasures environment (ECM) and is able to conduct multiple simultaneous engagements against the high-performance air-breathing targets (ABT) likely to be encountered by deployed United States forces. To cope with the threat, PATRIOT utilizes a trainable, multifunction, electronically-scanned, phased array radar. In addition, a digital computer is used to automatically control the system functions and provide the operator, through various displays, the ability to control and monitor operations. The guidance system combines command guidance and homing guidance (track via-missile [TVM]) systems. A listing of the principal items of the PATRIOT weapon system is provided in paragraph 11.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The PATRIOT (formerly SAM-D) Weapon System development program began in 1965 when the Secretary of Defense authorized Concept Definition (CD). In May 1967, CD was completed and a contract for Advanced Development (AD) was awarded to Raytheon Company, the prime contractor. On January 10, 1974, the Deputy Secretary of Defense directed the Army to redirect the SAM-D Program to permit early flight verification of the TVM guidance system and emphasize greater austerity. As a result, the SAM-D development effort was restructured by letter contract modification dated February 11, 1974. ASARC/DSARC decisions in January 1976 approved the program to resume full-scale Engineering 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 deployed European units showed PATRIOT to be exceeding the operational readiness requirements of the system.

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

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

(U) During 1987, 28 flight tests were conducted. Of these, four were successfully conducted against tactical missiles and 19 against airbreathing targets. Five PATRIOT missiles were used as targets for other PATRIOT flight tests. PATRIOT ATM capability (PAC-2) was successfully tested in Nov 87. Search, track, and post deployment software tests were successfully conducted during 1987. Funds for production of the ATM capability are included in this report.

(U) The FY87-FY91 PATRIOT Production Multiyear contract for 4,491 missiles and 45 fire units was awarded to Raytheon Company in the firm-fixed-price amount of $3,550,000,000. The US portion of this contract is for 34 fire units and 3,862 missiles. Deliveries of fire units and missiles are on contract schedule.

(b)(1)

[redacted]

(U) Throughout 1987, a great deal of interest was directed toward the PATRIOT missile system by foreign nations. The second Netherlands fire unit was delivered in Apr 87. Dialogue continues on the Italian PATRIOT program. An MOU between the US and Italy is expected to be concluded in early 1988. The Japan Defense Agency signed an FMS agreement in Nov 87 providing for contract administrative services on direct commercial sales contracts in support of the Japan PATRIOT program. Korean interest in PATRIOT [redacted]ntinues. Raytheon is in the process of forming a teaming agreement with a Korean company in anticipation of a Korean PATRIOT program. A multi-national PATRIOT program is being explored at the OSD level for Belgium.

(U) A contract was signed in Dec 87 to build and operate a PATRIOT Missile Facility (PMF) through a NAMSA contract in Germany. This will bring the number of PMFs in Europe to two.

(U) The system is expected to meet its mission requirements. "Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decision."

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCPs (dated 14 Oct 76, with Cover Sheet No. 1, approved 20 Jan 78, and Cover Sheet No. 2 approved 24 Nov 78) or SDMM (dated 10 Sept 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

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

	Development Estimate/ Approved Program	Current Estimate
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) (10 Sep 80) Tests:		
Completion of DT/OT II testing	May 80/Dec 80	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/Mar 79	Mar 79
Limited Production Decision (DSARC-III [LP])	N/A	Sep 80
Full Production Decision	Apr 80/Apr 82	Apr 82
Initial Operational Capability (IOC)	Apr 82/Jun 83 (Ch-1)	Jun 83 (Ch-1)

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).

c. (U) Current Change Explanations
(Ch-1) From Feb 83 to reflect a change from the TRADOC IOC to the CONUS IOC.

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: FY89 President's Amended Budget; Program Baseline, approved 26 Feb 88

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10. (U) Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. (U) Characteristics			
(b)(1)	[redacted]		

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

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

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

Concur in Classification as marked
14 APR 1988
SECURITY REVIEW, ODCSINT, HQDA

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

2/ The values for the entries were changed from goal values in the SAR dated December 31, 1986 to agree with or add the threshold values in the Program Baseline approved February 26, 1988. Both documents were based on the DCP dated August 20, 1980 which displays a range (goal/threshold) for Technical/Operational Characteristics.

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

c. (U) Current Change Explanations--None

d. (U) References -- (U) Development Estimate DCP #50, approved October 14, 1976.
(U) Approved Program: FY89 President's Amended Budget; DCP, approved 20 Aug 80; Program Baseline, approved 26 Feb 88

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

	Development Estimate	Changes	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$1106.2	$ +447.8	$1554.0
Procurement	3121.2	+212.6	3333.8
Guided Missile	(964.7)	(+302.6)	(1267.3)
HE Warhead	(121.9)	(-7.1)	(114.8)
Adaption Kit	(271.7)	(-271.7)	(0.0)
Fire Control Section (FCS)	(1141.8)	(-258.6)	(883.2)
Launcher	(254.0)	(+68.6)	(322.6)
Other (GSE)	(186.0)	(-17.9)	(168.1)
Advanced Prod Engr	(56.9)	(-56.9)	(0.0)
IPF		(+126.8)	(126.8)
Total Flyaway	(2997.0)	(-114.2)	(2882.8)
Peculiar Support	(26.7)	(+12.7)	(39.4)
Training Devices		(+20.1)	(20.1)
Software Support		(+76.3)	(76.3)
ILS		(+75.7)	(75.7)
DMPE		(+15.9)	(15.9)
Initial Spares	(97.5)	(+126.1)	(223.6)
Construction (MILCON)	40.0	+19.4	59.4
Total FY 72 Base-Year $	4267.4	+679.8	4947.2
Escalation	973.1	+6608.2	7580.1
Development (RDT&E)	(93.8)	(+487.9)	(580.5)
Procurement	(848.6)	(+6056.1)	(6904.7)
Construction (MILCON)	(30.7)	(+64.2)	(94.9)
Total Then-Year $	5240.5	+7286.8	12527.3
b. (U) Quantities --			
Development (RDT&E)	6.0	-1	5.0
Procurement	234.0	-131	103.0
Total	240.0	-132	108.0
c. (U) Unit Cost --			
Procurement:			
FY 72 Base-Year $	13.3	+19.1	32.4
Then-Year $	17.0	+82.4	99.4
Program:			
FY 72 Base-Year $	17.8	+28.0	45.8
Then-Year $	21.8	+94.2	116.0

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

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

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

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

e. (U) Foreign Military Sales --

Quantity	Estimate Cost Then-Year $	Country
4	$306M	Netherlands
14	$1157M	Germany

f. (U) Nuclear Costs - - None

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

			Current Year SAR Current (Dec 87 SAR)	Current Year UCR Baseline (Dec 86 SAR)	Budget Year UCR Baseline (Dec 87 SAR)
a.	(U)	Program Acquisition			
(1)	(U)	Cost	12527.3	12605.2	12527.3
(2)	(U)	Quantity	108	108	108
(3)	(U)	Unit Cost	116.0	116.7	116.0
b.	(U)	Current Procurement	(FY 1988)	(FY 1988) 1/	(FY 1989)
(1)	(U)	Cost	965.8	965.8	858.8
		Less CY Adv Proc	40.1	40.1	37.4
		Plus PY Adv Proc	34.7	34.7	47.1
		Net Total	960.4	960.4	868.5
(2)	(U)	Quantity	12	12	9
(3)	(U)	Unit Cost	80.0	80.0	96.5

1/ Updated to FY 88 Appropriation

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	+81.7	+2009.2	-35.0	+2055.9
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	+2090.2	+195.5	+2418.1
Other	+27.6	-	-	+27.6
Support	+130.6	+1302.5	-	+1433.1
Subtotal	+937.9	+6343.0	+83.8	+7364.7
Current Changes				
Economic	-3.4	+20.9	-0.2	+17.3
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-43.7	-	-43.7
Other	-	-	-	-
Support	-	-51.5	-	-51.5
Subtotal	-3.4	-74.3	-0.2	-77.9
Total Changes	+934.5	+6268.7	+83.6	+7286.8
Current Estimate	2134.5	10238.5	154.3	12527.3

(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	+64.8	+599.6	+62.5	+726.9
Other	+24.5	-	-	+24.5
Support	+63.6	+446.8	-	+510.4
Subtotal	+448.6	+80.4	+17.1	+546.1
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-0.8	+147.0	+2.3	+148.5
Other	-	-	-	-
Support	-	-14.8	-	-14.8
Subtotal	-0.8	+132.2	+2.3	+133.7
Total Changes	+447.8	+212.6	+19.4	+679.8
Current Estimate	1554.0	3333.8	59.4	4947.2

13. (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

onstruction

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		
Revised Feb 88 escalation rates (Economic)	N/A	-3.4
(2) (U) Procurement		
Revised Feb 88 escalation rates (Economic)	N/A	+20.9

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

Estimating changes	+132.2	-95.2
o Revised estimate to comply with budget guidance production cost data (Estimating)	(+147.0)	(-43.7)
o Revised estimate for Initial Spares (Support)	(-7.7)	(-26.8)
o Revised estimate for Training Devices (Reduction in FY88/FY89 funds prohibited procurement of PATRIOT Intermediate Maintenance Training Equipment and other training equipment) (Support)	(-7.1)	(-24.7)
(3) (U) MILCON	N/A	-.2
Revised Feb 88 escalation rates (Economic)		

d. (U) References --

(1) (U) Revised DCP #50, dated March 1972.

(2) (U) SDDM, dated September 10, 1980.

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	+19.196	+19.129	+21.756	-0.956	+21.985	+.256	+12.793	+94.159	115.994

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

a. (U) RDT&E

Engineering Development

Raytheon Company, Boston, MA
DAAH01-82-C-A181, CPIF
Award: March 10, 1981
Definitized: April 27, 1982

Initial Contract Price

Target	Ceiling	Qty
$11.3	N/A	N/A

Current Contract Price

Target	Ceiling	Qty
$110.3	N/A	N/A

Estimated Price at Completion

Contractor	Program Manager
(b)(4)	

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$ 3.6	$-3.8
Cumulative Variances to Date (25 Oct 87)	$ 3.3	$-1.4
Net Change	$-0.3	$ 2.4

(U) Explanation of Change: The net change in cost variance is due to cost underruns associated with ED spares, and cost overruns associated with clutter canceller development, radar enhancement, and Standoff Jammer Counter. The net change in schedule variance is due to schedule slips associated with Pulse Doppler Search/Track (PDS/T) software development, and schedule recovery associated with Standoff Jammer Counter and ED spares.

(U) The $1.2M increase in the Program Manager's estimate is due to a $1.0M increase resulting from contract modification for additional requirements associated with responsive threat analysis, and a $0.2M net increase in Estimate-to-Complete (ETC) due to ETC increases for clutter canceller development, Standoff Jammer Counter, and PDS/T software development, and ETC decreases for ICC dual CPU, ED spares, fuze processor, and program management activities. The total program estimate and schedule are not affected by these variances.

13. (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

Target	Ceiling	Qty
$70.7	N/A	N/A

Estimated Price at Completion

Contractor	Program Manager
(b)(4)	

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$ 3.5	$-4.4
Cumulative Variances to Date (10/26/87)	$ 6.3	$-3.7
Net Change	$ 2.8	$ .7

(U) Explanation of Change: The cost variance is primarily due to underruns on Missile and Ground Support Equipment (GSE) Test Equipment, Tooling, Program Management and Production Line setup at Raytheon. The schedule variance is primarily due to schedule recovery on Missile and GSE Test Equipment, Tooling, and Production Line setup at Raytheon. The Program Manager's estimate is equal to the contract target price and will remain unchanged until trends indicate otherwise. The total program estimate and schedule are not affected by these variances.

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

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

Production Contract (FY85)

Raytheon Company, Boston, MA
DAAH01-85-C-A026, FPI
Award: January 15, 1985
Definitized: February 4, 1986

Initial Contract Price

Target	Ceiling	Qty 2/ 3/
$876.2M	$984.7	18

Current Contract Price

Target	Ceiling	Qty 3/
$876.6	$984.6	18

Estimated Price at Completion

	Contractor	Program Manager
(b)(4)	[redacted]	

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$ 4.0	$-34.4
Cumulative Variances to Date (27 Oct 86)	$35.0	$-42.7
Net Change	$31.0	$- 8.3

(U) Explanation of Change: The cost variance is primarily due to underruns in Missile and Ground Support Equipment (GSE) material and labor. Favorable cost variances also resulted from underruns in support labor, rates and factors, test and inspection, and Cost Accounting Standards loading at Raytheon and GSE and Missile labor at Martin. Schedule variance is due primarily to schedule slips on GSE assembly labor, support labor, and production support at Raytheon and slips on launcher motors, Motor Control Units, and actuators at Martin.

(U) The Program Manager's Estimated Price at Completion decreased $26.0M due to (1) a $2.0M net increase due to contract modifications for Launcher Ground Support Equipment (GSE) wiring, Control Unit Group (CUG), and Identify Friend or Foe (IFF) upgrades; (2) a $37.5M Estimate to Completion (ETC) decrease primarily due to estimated underruns at Raytheon on Missile and Radar direct labor; (3) a $9.6M fee increase associated with the contract modifications and the ETC decrease; and (4) a $0.1M decrease to the FMS tooling included in this contract. 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 (Cont'd)

Production Contract (FY86)

Raytheon Company, Boston, MA
DAAH01-86-C-A020, FPI
Award: February 5, 1986
Definitized: February 22, 1986

Initial Contract Price		
Target	Ceiling	Qty
$933.9	$1046.3	15 2/ 4/

Current Contract Price		
Target	Ceiling	Qty
$954.8	$1069.8	15 4/

Estimated Price at Completion

	Contractor	Program Manager
(b)(4)	[redacted]	

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$-2.2	$-29.7
Cumulative Variances to Date (25 Oct 87)	$ .7	$-91.1
Net Change	$ 2.9	$-61.4

(U) Explanation of Change: The cost variance is due primarily to underruns on Missile and Ground Support Equipment (GSE) fabrication, assembly, inspection, and test (FAIT) labor, less than planned effort in support labor, favorable overhead rates, and and intra-divisional transfers of materials to other contracts at Raytheon. Cost variance at Martin is due to underruns in GSE Data Center Labor and Missile factor labor. The schedule variance is due primarily to schedule slips caused by late material receipts, material transfers which will be transfered back at a later date, rates, and support labor allocations at Raytheon. Schedule variance at Martin is due primarily to slips on linear actuators, Inertial Sensor Assembly gyros, and Control section manifolds and motor pumps. Unfavorable variances have also been incurred in Factor, Quality, and Test and CRAF due to concentration on Buy 6 hardware.

(U) The Program Manager's Estimated Price at Completion increased $1.7M due to (1) a $.5M net decrease resulting from contract modifications for incorporation of radome bonding ECP, various VECPs, and definitization of a Not-to-Exceed (NTE) spares option; and (2) a $2.2M net increase in fee due to the definitization of the NTE spares option. The total program estimate and schedule are not affected by these variances.

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/3 NATO
4/ 12 U.S./3 FMS

NOTE: The Multiyear contract DAAH01-87C-A025 is not included since it is a firm-fixed-price contract and does not have cost performance report requirements.

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

a. (U) Program Status --

(1) (U) Percent Program Completed: 85.7% (24 yrs/28 yrs)

(2) (U) Percent Program Cost Appropriated: 77.5% ($9714.5/$12527.3)

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

Appropriation	Current & Prior Yrs (FY65-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-93)	Balance To Complete Beyond FYDP (FY94)	Total
RDT&E	2134.5	0	0	0	2134.5
Procurement	7455.7	858.8	1924.0	0	10238.5
MILCON	124.3	1.1	28.9	0	154.3
Total	9714.5	859.9	1952.9	0	12527.3

c. (U) Annual Summary--"Program Funding and Quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 Amended Budget Decisions."

Fiscal Year	Qty FU/Msl	FY 72 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1965				17.8			13.6	1.8
1966				18.8			15.0	2.7
1967				14.7			12.0	3.2
1968				33.0			28.0	3.6
1969				67.1			59.9	4.7
1970				63.2			59.4	5.5
1971				84.2			83.1	5.1
1972				110.9			115.3	4.6
1973				153.9			170.8	4.4
1974				164.5			193.7	8.0
1975				81.4			104.2	10.9
1976				95.8			129.9	6.6
FY7T				28.5			40.0	2.9
1977				126.1			182.0	2.6
1978				136.6			214.3	6.8
1979				132.1			228.1	8.4
1980				69.9			128.5	10.6
1981				36.6			74.5	10.6
1982				23.4			51.3	7.6
1983				19.5			44.8	4.9
1984				32.9			78.4	3.8
1985				24.5			60.4	3.4
1986				18.6			47.3	2.8
Subtotal	5/126			1554.0			2134.5	

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	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: MIPA								
1979	0/0	31.8	0	33.7			67.1	8.9
1980	5/117	40.3	128.4	206.4			414.4	11.8
FY81	5/130	5.4	160.1	215.2			482.0	11.6
1982	9/176	14.0	226.1	285.8			731.7	14.3
1983	12/287	10.8	251.1	305.4			852.2	9.0
1984	12/440 1/	13.6	278.0	315.0			949.3	8.0
1985	12/440	7.1	284.9	333.2			1038.3	3.4
1986	12/560		259.3	297.8			952.9	2.8
1987	12/700		276.8	302.3	45.3		1002.0	2.7
1988	12/715		247.2	281.3	40.1	34.7	965.8	3.7
1989	9/815		226.7	242.2	37.4	47.1	858.8	3.8
1990	3/815		188.7	203.3		20.5	741.7	3.6
1991	0/817		148.0	151.5		20.5	567.0	2.9
1992	0/440		156.9	160.7			615.3	2.8
Subtotal	103/6452 1/	123.0	2832.2	3333.8	122.8	122.8	10238.5	2.3

1/ Does not include the 3 fire units and 40 missiles procured with NATO Air Base Defense funds.

Appropriation: MILCON								
1972				1.4			1.4	5.9
1973								5.6
FY74								11.8
1975								16.1
1976								3.0
FY7T								1.6
1977								2.8
1978								7.7
1979				1.4			2.4	9.3
1980								10.6
1981								10.6
1982				5.0			11.7	7.6
1983				19.6			48.1	4.9
1984				6.0			15.4	3.8
1985								3.4
1986				7.1			19.2	2.8
1987				6.9			19.5	2.7
1988				2.3			6.6	3.7
1989				0.4			1.1	3.8
1990				8.2			25.3	3.6
1991				0.0			0.0	3.3
1992				1.1			3.6	2.8
Subtotal				59.4			154.3	
Total				4947.2			12527.3	

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

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated 1/	Expended 1/
Appropriation: RDT&E			
1965	13.6	13.6	13.6
1966	15.0	15.0	15.0
1967	12.0	12.0	12.0
1968	28.0	28.0	28.0
1969	59.9	59.9	59.9
1970	59.4	59.4	59.4
1971	83.1	83.1	83.1
1972	115.3	115.3	115.3
1973	170.8	170.8	170.8
1974	193.7	193.7	193.7
1975	104.2	104.2	104.1
1976	129.9	129.9	129.9
FY7T	40.0	40.0	40.0
1977	182.0	182.0	181.5
1978	214.3	214.3	214.0
1979	228.1	228.1	227.5
1980	128.5	128.5	128.3
1981	74.5	74.5	72.9
1982	51.3	51.2	49.7
1983	44.8	44.7	43.0
1984	78.4	78.4	74.1
1985	60.4	60.4	59.9
1986	47.3	47.2	46.3
To Complete			
Total	2134.5	2134.2	2122.0
Appropriation: MIPA			
1979	67.1	67.1	67.1
1980	414.4	396.6	395.2
1981	482.0	438.7	435.8
1982	731.7	675.8	667.1
1983	852.2	777.4	763.3
1984	949.3 2/	850.2	837.4
1985	1038.3	946.6	817.4
1986	952.9	899.9	475.7
1987	1002.0	908.8	141.5
1988	965.8	682.7	0.4
1989	858.8		
1990	741.7		
1991	567.0		
1992	615.3		
To Complete			
Total	10238.5	6643.8	4600.9

1/ Does not include MIPA for Initial Spares. Spares are procured by the U.S. Army Missile Command.

2/ Does not include $185.0M of FY84 NATO Air Base Defense funds.

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

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: MILCON			
1972	1.4	1.4	1.4
1973			
1974			
1975			
1976			
1977			
1978			
1979	2.4	2.4	2.4
1980			
1981			
1982	11.7	11.7	11.7
1983	48.1	19.9	18.0
1984	15.4	6.1	5.2
1985			
1986	19.2	14.6	12.0
1987	19.5	17.0	3.5
1988	6.6		
1989	1.1		
1990	25.3		
1991	0.0		
1992	3.6		
To Complete			
Total	154.3	73.1	54.2

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	N/A		
1979	524	N/A		
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		N/A	817	880
1992			440	880
Fire Units				
1978	4	N/A		
1979	18	N/A		
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		N/A	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	+257.0	4947.2	0.0	4947.2
(TY $)	11312.2	+1215.1	12527.3	0.0	12527.3
PAUC (BY $)	43.4	+2.4	45.8	0.0	45.8
(TY $)	104.7	+11.3	116.0	0.0	116.0

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	54/54
Missiles	1590/1595

18. (U) Operating and Support Costs: N/A

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823) (U)
PROGRAM: HELLFIRE MODULAR MISSILE SYSTEM (HMMS)

A-13 HELLFIRE

AS OF DATE: DECEMBER 31, 1987

87-032

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Concur in classification as marked
MAR 7 1988 23
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

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. Huston
Assigned: 1 Feb 88
AV 746-1365; COMM (205) 876-1365

4. (U) Program Elements/Procurement Line Items:
RDTE: PE 64310
MIPA: APPN 2032 SSN C70000
MILCON: None

5. (U) Related Programs: AH-64 APACHE Helicopter; UH-60 BLACK HAWK Helicopter; Ground/Vehicular Laser Locator Designator; High Mobility Multipurpose Wheeled Vehicle (HMMWV)

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, ground remote, airborne remote, direct or indirect fire, and rapid or ripple fire. HELLFIRE will be employed from helicopters against heavy armored vehicles at longer standoff ranges than 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. HELLFIRE does not replace another missile system in the air-to-ground role.

Concur in Classification as marked
4 MAR 1988
George Bromwell
SECURITY REVIEW, DOCSINT, HQDA

~~Classified by HELLFIRE SCG~~
~~Dated 17 Aug 87, OADR~~

~~CONFIDENTIAL~~

OASD(PA) DFOISR 88-T-0387

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 countermeasure 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.

b. (U) Significant Developments Since Last Report -- A contract was awarded to Rockwell International Corporation 17 Nov 87 for development of a Ground Launched HELLFIRE (GLH) Missile System. The GLH Missile System will be employed by the Ninth Infantry Division on the High Mobility Multipurpose Wheeled Vehicle (HMMWV). The development program consists of adapting the Swedish developed shore defense system launcher to the HMMWV by means of a pedestal mount.

Three digital autopilot (DAP) programmed rounds were successfully flown during September and November 1987.

Two HELLFIRE missiles were successfully launched from a BLACK HAWK helicopter in Mar 87 as part of qualification tests. The helicopter was equipped with the automatic target handover system which greatly enhances command, control and communications for remotely designated launch platforms. Three missiles were successfully fired in BLACK HAWK development tests in Aug 87 at Yuma Proving Ground.

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.

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.

Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 amended budget decisions. The FY 89 amended budget increased FY 89 missile procurement from 4000 to 5000 missiles. Consequently, the FY 93 procurement is decreased by 1000 missiles (3614 to 2614).

7. Program Highlights (Cont'd):

c. (U) Changes Since "As of" Date -- Col. Robert E. Huston replaced Col. William J. Schumacher as project manager effective 1 Feb 88.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (DCP #118, dated 7 Jan 82) threshold breaches.

9. (U) Schedule:

a. (U) Milestones --

	Development Estimate/ Approved Program 1/	Current Estimate
Advanced Development		
Start	Dec 72/ NA	Dec 72
Complete	Oct 75/ NA	Oct 75
Competitive AD Contracts		
Start	Jun 74/ NA	Jun 74
Complete	Oct 75/ NA	Oct 75
Milestone II (ASARC/DSARC II)	Feb 76/ NA	Feb 76
ED Contract award	Oct 76/ NA	Oct 76
PQT-C (Contractor)		
Start	Mar 79/ NA	Mar 80
Complete	Aug 79/ NA	Mar 82
Operational Test (OT)(COBRA)		
Start	Aug 79/ NA	Apr 80
Complete	Dec 79/ NA	Jul 80
Milestone III (ASARC III)	Feb 80/Mar 82	Mar 82
Production Contr Award	Apr 80/Mar 82	Mar 82
Prod Val Tests Complete	Oct 81/Oct 84	Oct 84
ASARC/DSARC IIIA	Nov 81/N/A	N/A
Full-Scale Production	Jan 82/Mar 82	Mar 82
Initial Operational Capability (IOC) (on AH-64)	May 83/Jul 86	Jul 86
Missile Fly-to-Buy (FTB) Lot Acceptance		
Test Start (FY 84 Buy)	N/A /Jan 87	Jan 87
USAREUR FUE	N/A /Jan 87	Jan 87
National Guard FUE	N/A /Nov 87	Nov 87

(U) NOTE: 1/ Updated to reflect approved Program Baseline, 26 Feb 88.

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 six 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 -- None

d. (U) References -- Development Estimate: DCP #118, dated 12 Nov 76.
Approved Program: FY 88-89 President's Budget as amended.

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

		Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. (U)	Technical --			
	Missile Weight Maximum (lbs)	95/99.8	99.8	99.8
b. (U)	Operational--			
(U)	Missile Range (km)			
(U)	Minimum (Km)	.5/ .59	.59	.59
(U)	Maximum (Km) (Direct)	5.0/5.0	7.0	7.0
(U)	Maximum (Km) (Indirect)	N/A/8.0	8.0	8.0
(U)	Footprint (degrees)	±15/±15	+17.5 to -18.0	±15
(U)	Time of Flight (Sec)			
(U)	3 Km	13/13	9.6	13
(U)	5 Km	20/ 22	18.1	20
(U)	Reliability			
(U)	Missile (in-flight)	.92-.95/.92-.95	1.0 3/	.92-.95
(U)	Launcher	.95-.99/.95-.99	1.0	.95-.99
(U)	Prob of Hit (PH/R) 1/	(b)(1)		
[redacted]	Stat Tgts			
[redacted]	Moving Tgts			

(U) NOTES:

1/ Probability of hit in the direct fire mode, given reliability.
2/ Classified in accordance with SCG for production missile.
3/ Demonstrated performance for reliability reflects performance of last 50 rounds fired during the period ending 15 Jan 88.

c. (U) Previous Change Explanations --

(U) The current estimate for missile weight was raised to 99.8 pounds when it became evident that the 95 pound weight requirement could not be achieved. The current estimate for minimum range was changed to .59 km and the current estimate for maximum range was changed to 7.0 km after completion of engineering development testing.

d. (U) Current Change Explanations -- None

e. (U) References --

(U) 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

(U) Approved Program: FY 88-89 President's Budget as amended.

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

	Development Estimate	Changes	Current Estimate
a. (U) Cost --			
Development 1/	$ 211.9	$+ 18.3	$ 230.2
Procurement	276.7	+ 510.2	786.9
Missile Bus	(143.1)	(+ 280.1)	(+423.2)
Laser Seeker	(109.4)	(+ 233.6)	(+343.0)
Total Flyaway	(252.5)	(+ 513.7)	(+766.2)
Other Wea Sys Cost 2/	(4.0)	(+ 12.8)	(+ 16.8)
Initial Spares	(20.2)	(- 16.3)	(+ 3.9)
Construction	0.0	0.0	0.0
Total FY 75 Base-Year $	488.6	+ 528.5	1017.1
Escalation	214.8	+1188.8	1403.6
Development	(54.3)	(+ 32.7)	(87.0)
Procurement	(160.5)	(+1156.1)	(1316.6)
Construction	(0.0)	(0.0)	(0.0)
Total Program Cost	$703.4	$1717.3	$2420.7
b. (U) Quantities --			
Development			
Missile	241	-12	229
Laser Seeker	241	+140	381
Launcher	74		74
Procurement			
Missile	24,600	+24,096	48,696
Laser Seeker 3/	24,600		N/A
Launcher	2,000		N/A
Total Missiles	24,841	+24,084	48,925
c. (U) Unit Cost --			
Procurement: Missile			
FY 75 Base-Year	$ .011	$ +.005	$ .016
Then-Year	.018	+.025	.043
Program: Missile			
FY 75 Base-Year	.020	+.001	.021
Then-Year	$ .028	+.021	$ .049

d. (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 $	10,264/18,047 4/	18,047	N/A
Then-Year $	17,796/44,525	44,525	N/A

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

(U) 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/ 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.

e. (U) Foreign Military Sales -- None

f. (U) Nuclear Costs -- None

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

			Current Year		Budget Year
			Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a.	(U)	Program Acquisition --			
	(1) (U)	Cost	$ 2,420.7	$ 2,407.6	$ 2,420.7
	(2) (U)	Quantity	48,925	48,925	48,925
	(3) (U)	Unit Cost	$ .049	$ .049	$ .049
b.	(U)	Current Procurement	(FY 88)	(FY 88 APPN)	(FY 89)
	(1) (U)	Cost	$ 168.4	$ 168.4	$ 180.5
		Less CY Adv Proc	0.0	0.0	0.0
		Plus FY Adv Proc	0.0	0.0	0.0
		Net Total	$ 168.4	$ 168.4	$ 180.5
	(2) (U)	Quantity	5,000	5,000	5,000
	(3) (U)	Unit Cost	$ .034	$ .034	$ .036

13. (U) Cost Variance Analysis:

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

	DEV	PROC	MILCON	TOTAL
Development Estimate	$266.2	$437.2	-	$703.4
Previous Changes:				
Economic	+8.0	+124.3	-0.4	+131.9
Quantity	-3.5	+465.8	-	+462.3
Schedule	+14.6	+440.5	+0.4	+455.5
Engineering	+14.2	+303.1	-	+317.3
Estimating	+13.6	+323.8	-	+337.4
Other	-	-	-	-
Support	+4.1	-4.3	-	-.2
Subtotal	+51.0	+1653.2	-	+1704.2
Current Changes:				
Economic	-	+6.1	-	+6.1
Quantity	-	-	-	-
Schedule	-	-5.6	-	-5.6
Engineering	-	-	-	-
Estimating	-	+11.3	-	+11.3
Other	-	-	-	-
Support	-	+1.3	-	+1.3
Subtotal	-	+13.1	-	+13.1
Total Changes	+51.0	+1666.3	-	+1717.3
Current Estimate	317.2	2103.5	-	2420.7

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

	DEV	PROC	MILCON	TOTAL
Development Estimate	$211.9	$276.7	-	$488.6
Previous Changes:				
Quantity	-2.7	+153.6	-	+150.9
Schedule	+9.1	+57.2	-	+66.3
Engineering	+8.7	+119.0	-	+127.7
Estimating	+1.2	+180.8	-	+182.0
Other	-	-	-	-
Support	+2.0	-3.8	-	-1.8
Subtotal	+18.3	+506.8	-	+525.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-0.9	-	-0.9
Engineering	-	-	-	-
Estimating	-	+4.0	-	+4.0
Other	-	-	-	-
Support	-	+0.3	-	+0.3
Subtotal	-	+3.4	-	+3.4
Total Changes	+18.3	+510.2	-	+528.5
Current Estimate	230.2	786.9	-	1017.1

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

b. Previous Change Explanations --

RDT&E

Economic: Revised escalation indices.

Quantity: Decrease due to deletion of 12 practice missiles; changes in seeker quantity.

Schedule: Increase due to budget reduction in FY 78; slips in validation test.

Engineering: Increase due to addition of competitive low cost seeker program and autopilot improvements.

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.

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, largely due to increased savings from competition.

Support: Increase due to addition of training hardware, depot capital equipment, and changes in support hardware. Decreases due to reduction in initial spares requirement, and 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.

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		
None	0.0	0.0
(2) (U) Procurement		
Revised Feb 88 economic escalation rates. (Economic)	N/A	+6.1
Reprofiling of missile procurement schedule reflecting addition of 1000 rounds in FY 89 and deletion of 1000 rounds in FY 93. (Schedule)	-0.9	-5.6
Increased FY 83 funds (+$11.0M); program authority decrease (-$12.1M) in FY 85 and FY 86, and anticipated decrease in competitive savings ($12.4M) for out year production. (Estimating)	+4.0	+11.3
Increase due to revision of initial spares requirements ($0.5M) and anticipated decrease in competitive savings ($0.8) for out year data and training equipment. (Support)	+0.3	+1.3
(3) (U) MILCON		
None	0.0	0.0

d. (U) References --

(1) (U) Development Estimate: DCP #118, dated 12 Nov 76.

(2) (U) Current Estimate: FY 88 President's Budget as amended.

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 (REV DEV EST)2/
	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	+.003	-.004	+.009	+.006	+.007	-	-	+ .021	$ .049M

+.002 — .011 -.002 .001 (.0005)

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 -- Initial Contract Price

Third Production Buy	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
$117.2	N/A	2651	$117.2	$117.2

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

15. (U) Contract Information (Cont'd):

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	NA	1676

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$ 72.4	NA	1676	$ 72.4	$ 72.4

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

Explanation of Change: This contract is added to the SAR for the first time as one of the six largest contracts in the program.

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):

	Initial Contract Price		
Fifth Production Buy	Target	Ceiling	Qty
Martin Marietta, Orlando, FL	$ 65.9	NA	1500
DAAH01-86-C-0496, FFP			
Award: March 17, 1986			
Definitized: June 26, 1986 1/			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 65.9	NA	1500	$ 65.9	$ 65.9

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

Explanation of Change: This contract is added to the SAR for the first time as one of the six largest contracts in the program.

NOTE 1/: The contract was originally awarded for spare parts only and modified June 26, 1986 to add the missile quantity.

	Initial Contract Price		
Sixth Production Buy	Target	Ceiling	Qty
Martin Marietta, Orlando, FL	$121.5	N/A	3750
DAAH01-88-C-0109, FFP			
Award: December 23, 1987			
Definitized: December 23, 1987			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$121.5	N/A	3750	$121.5	$121.5

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

Explanation of Change: This contract is added to the SAR for the first time as one of the six largest contracts in the program.

16. (U) Program Funding Summary: (Current Est 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: 62.9% ($1523.0/$2420.7)

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 (FY 72-88)	Budget Year (FY 89)	Balance to Complete FYDP (FY 90-93)	Beyond FYDP (FY 94)	Total
RDT&E	317.2	0	0	0	317.2
Procurement	1205.5	180.5	717.5	0	2103.5
MILCON	0	0	0	0	0
Total	1522.7	180.5	717.5	0	2420.7

c. (U) Annual Summary -- Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 amended budget decisions.

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation RDT&E								
1972				5.9			4.9	5.5
1973	14			5.7			5.0	6.1
1974				6.5			6.1	7.9
1975				13.6			14.0	8.4
1976				3.6			3.9	5.4
1977T				.6			.7	3.3
1977	215			16.4			19.1	3.8
1978				41.0			51.4	7.8
1979				48.1			66.2	9.7
1980				38.1			57.8	10.2
1981				26.5			43.9	9.0
1982				12.6			22.2	6.5
1983				8.3			15.3	4.4
1984				.8			1.5	3.7
1985				.2			.5	3.0
1986				2.3			4.7	2.8
Subtotal	229			230.2			317.2	

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	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement								
1981	LLI	9.9	1.3	11.2			22.6	12.6
1982	680	9.5	37.9	51.0			112.8	10.0
1983	3971	3.3	98.1	110.1			258.7	6.2
1984	4651		86.4	89.0			216.6	3.5
1985	5780		85.7	88.0			221.9	3.7
1986	6000		78.0	78.9			204.4	2.8
1987	0		0	0			0.1	2.7
1988	5000		60.6	60.7			168.4	3.7
1989	5000	1.7	49.7	63.1			180.5	3.8
1990	5000		61.5	61.2			180.6	3.6
1991	5000		69.8	69.6			210.8	3.3
1992	5000		67.4	67.0			207.6	2.8
1993 1/	2614		42.3	37.1			118.5	2.3
Subtotal	48696	24.4	738.7	786.9			2103.5	

1/ Proc objective is 48696. When FY 89 was increased from 4000 to 5000; 1000 was subtracted from FY 93.

Appropriation: MILCON								
Subtotal				0.0			0.0	
Total	48925	24.4	738.7	1017.1			2420.7	

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1972	4.9	4.9	4.9
1973	5.0	5.0	5.0
1974	6.1	6.1	6.1
1975	14.0	14.0	14.0
1976	3.9	3.9	3.9
1977T	.7	.7	.7
1977	19.1	19.1	19.1
1978	51.4	51.4	51.4
1979	66.2	66.2	65.7
1980	57.8	57.8	57.5
1981	43.9	43.9	43.6
1982	22.2	22.2	20.0
1983	15.3	15.3	14.3
1984	1.5	1.5	1.5
1985	.5	.5	.5
1986	4.7	4.7	4.6
To Complete	-	-	-
Total	317.2	317.2	312.8

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

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated 1/	Expended 1/
	Appropriation: Procurement		
1981	22.6	22.6	22.6
1982	112.8	111.2	107.9
1983	258.7	257.3	251.4
1984	216.6	213.7	194.0
1985	221.9	216.1	123.5
1986	204.4	177.0	28.2
1987	.1	-	-
1988	168.4	98.4	0
To Complete	898.0	-	-
Total	2103.5	1096.3	727.6

1/ PMO cannot account for obligation and expenditures for initial spares.

	Appropriation: MILCON		
To Complete	0.0	-	-
Total	2420.7	1413.5	1040.4

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 and FY 93 is seven months. The delivery period for all other buys is 12 months.)

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	5000	6240
1989			5000	8400
1990			5000	8400
1991			5000	8400
1992			5000	8400
1993			4481	8400

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.)

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY $M)	882.0	+135.1	$1017.1	30.6	$ 986.5
(TY $M)	$1953.4	+467.3	$2420.7	152.0	$2268.7
PAUC (BY $M)	$ .025	$- .004	$ .021	$ .001	$ .020
(TY $M)	$ .054	$- .005	$ .049	$ .003	$ .046

c. (U) Schedule Variance --

	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	53	156	22	134
End Date (Mo/Yr)	9/90	N/A	2/95	N/A	4/93

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

		To DATE
Missile	RDT&E	229/229
	Procurement	9534/8587

18. (U) Operating and Support Costs: N/A

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

Program: CH-47D

87-027

A-7 CH-47D

AS OF DATE: December 31, 1987

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CLEARED
FOR OPEN PUBLICATION
MAR 23 1988 23
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD—PA) DEPARTMENT OF DEFENSE

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

2. DoD Component: Department of the Army

3. Responsible Office and Telephone Number

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

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

No SECURITY Objection to PUBLIC RELEASE
16 MAR 1988
SECURITY REVIEW, ODCSINT, HQDA

4. Program Elements/Procurement Line Items:

RDT&E: PE 64213A
PROCUREMENT: APPN 2031

Project DC37 (Sunk)
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

OASD(PA) DFOISR 87-F-0733

6. Mission and Description (Cont'd):

have a lift capability of 15,000 lbs at design conditions of 4,000 feet/95 F. Fleet compatibility is improved, logistics support enhanced, maintenance support simplified, and operational costs reduced. The modernized CH-47 replaces the current CH-47 fleet on a one-for-one basis.

7. Program Highlights:

a. Significant Historical Developments--ASARC III, held at DA on 19 Aug 80, 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 20 Oct 80.

b. Significant Developments Since Last Report-- An acquisition plan was approved in February 1988 for a second multi-year contract covering FY 90-FY 92 procurement.

Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 congressional direction and FY 89 amended budget decisions.

CH-47D aircraft fieldings within CONUS were completed in October 1987. Europe, the 205th Aviation Company, received its first CH-47D in late October 1987 with hand-off occurring in early November 1987.

As of this report, a total of 192 production helicopters have been delivered to the Army.

The CH-47D Program is expected to satisfy the mission requirements.

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

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (dated 15 August 1980), or Secretary of Defense Decision Memorandum (SDDM) (dated 20 October 1980) threshold breaches. Average unit flyaway and procurement DCP thresholds were breached and reported in the Dec 83 SAR. Breach occurred as a result of program stretch-out caused by OSD and DA direction per PBD 102, dated 7 Dec 83, 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 13 Feb 84.

9. Schedule:

a. Milestones --	Development Estimate/ Approved Program	Current Estimate
Milestone III (DSARC)	Sep 80/Oct 80	Oct 80
Initial Prod Contr Award	Sep 80/Oct 80	Oct 80

9. Schedule (Cont'd):

	Development Estimate/ Approved Program	Current Estimate
Prod Validation Testing		
(1) Start	Oct 81/May 82	May 82
(2) Complete	Mar 83/Aug 83	Aug 83
Initial Production Delivery	May 82/May 82	May 82
IOC (24th Aircraft 1st Unit)	Aug 83/Feb 84	Feb 84
First Unit Equipped	NA/Feb 83	Feb 83

b. Previous Change Explanations -- Initial Production Contract Award was changed to October 1980 because of the 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 4 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 20 Oct 80.

c. Current Change Explanations -- None.

d. References --

Development Estimate: DCP, number 139, as revised 5 Jan 77.

Approved Program: FY 89 President's Amended Budget ; Program Baseline, 26 Feb 88.

10. Technical/Operational Characteristics

a. Technical --	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
System Operational Reliability (SOR) (MTBF)			
(1) DSARC III Objective	.96/ 1.1	1.38 1/	1.33
(2) Maturity Objective (100K hrs)	1.4/ N/A	1.5 2/	1.33
Hardware System Reliability (MTBF)			
(1) DSARC III Objective	2.06/ 2.2	3.14 3/	3.41
(2) Maturity Objective (100K hrs)	3.0 / N/A	4.8 2/	3.58
Maintenance Man-Hour/Flight Hour	17.66/ N/A	15.10 3/	15.10
b. Operational --			
Vertical Rate of Climb (fpm)	200/ N/A	200 1/	200
Mission Radius (NM)	30/ N/A	30 1/	30
Mission Payload (lb) 4/	15,775/15,000	16,529 1/	16,529
Maximum Cruise Speed at Design Gross Weight (kt)	155/155	163 1/	163
Service Ceiling at Design Gross Weight (ft) (1 engine inoperative)	10,000/10,000	13,200 1/	13,200

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

b. Operational -- Cont'd.

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
Hover-Out-of-Ground Effect (lbs)	NA/50,000	50,000	53,950
Mission III Payload (lbs) (Outbound/Inbound)	NA/13,000/6500	13,000/6,500	14,728/7,364

Footnotes:

1/ Demonstrated performance reflects production testing.

2/ Sample field data collection as of March 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 -- None.

e. References -- Same as 9d.

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	$ 76.1	$+ 10.2	$ 86.3
Procurement	806.4	+ 421.3	1227.7
(Initial Spares)	(26.0)	(+ 18.6)	(44.6)
Total FY 75 Base -Year$	$ 882.5	$+ 431.5	$ 1314.0
Escalation	680.3	+1043.3	1723.6
Development (RDT&E)	(22.5)	(+ 4.7)	(27.2)
Procurement	(657.8)	(+1038.6)	(1696.4)
Total Then-Year$	$ 1562.8)	+1474.8	$ 3037.6
b. Quantities --			
Development (RDT&E)	3	-	3
Procurement	361	+75	436
Total	364	+75	439
c. Unit Cost --			
Procurement:			
FY 75 Base-Year$	$ 2.23	$ + .59	$ 2.82
Then-Year$	4.06	+ 2.65	6.71
Program:			
FY 75 Base-Year$	2.42	+ .57	2.99
Then-Year$	$ 4.29	$ + 2.63	$ 6.92

d. Approved Design-to-cost Goal--
(approved Unit Flyaway Cost at a production rate of 4/month)

11. Program Acquisition Cost Cont'd.:
d. Approved Design-to-Cost Goal (Cont'd.) --

	Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
CH-47A			
Qty: 104			
Peak Rate: N/A			
FY 75 Base-Year$	2.764/N/A	N/A	N/A
Then-Year$	4.600/N/A	N/A	N/A
CH-47B			
Qty: 74			
Peak Rate: N/A			
FY 75 Base-Year$	2.357/N/A	N/A	N/A
Then-Year$	4.195/N/A	N/A	N/A
CH-47C			
Qty: 183			
Peak Rate: N/A			
FY 75 Base-Year$	1.567/N/A	N/A	N/A
Then-Year$	2.900/N/A	N/A	N/A
CH-47D			
Qty: 436			
Peak Rate: N/A			
FY 75 Base-Year$	NA/2.62	2.62	2.63
Then-Year$	NA/6.26	6.26	

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

	Current Year		Budget Year
	SAR Current (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a. Program Acquisition--			
(1) Cost	3037.6	3070.6	3037.6
(2) Quantity	439	439	439
(3) Unit Cost	6.92	6.99	6.92
b. Current Procurement--	(FY 1988)	(FY 1988 APPN)	(FY 1989)
(1) Cost	232.4	232.4	258.0
Less CY Adv Proc	57.2	57.2	84.4
Plus PY Adv Proc	59.9	59.9	63.6
Net Total	235.1	235.1	237.2
(2) Quantity	48	48	48
(3) Unit Cost	4.90	4.90	4.94

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	98.6	1464.2	-	1562.8
Previous Changes:			-	
Economic	-	+ 151.4	-	+ 151.4
Quantity	-	+ 545.5	-	+ 545.5
Schedule	-	- 7.6	-	- 7.6
Engineering	-	-	-	-
Estimating	+ 14.9	+ 742.3	-	+ 757.2
Other	-	-	-	-
Support	-	+ 61.3	-	+ 61.3
Subtotal	+ 14.9	+1492.9	-	+1507.8
Current Changes				
Economic	-	+ 13.0	-	+ 13.0
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 38.7	-	- 38.7
Other	-	-	-	-
Support	-	- 7.3	-	- 7.3
Subtotal	-	- 33.0	-	- 33.0
Total Changes	+ 14.9	+1459.9	-	+1474.8
Current Estimate	113.5	2924.1	-	3037.6

Cost Variance Analysis (Con't):
(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	+ 212.7	-	+ 222.9
Other	-	-	-	-
Support	-	+ 31.7	-	+ 31.7
Subtotal	+ 10.2	+ 440.5	-	+ 450.7
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 16.9	-	- 16.9
Other	-	-	-	-
Support	-	- 2.3	-	- 2.3
Subtotal	-	- 19.2	-	- 19.2
Total Changes	+ 10.2	+ 421.3	-	+ 431.5
Current Estimate	86.3	1227.7	-	1314.0

b. Previous Change Explanations --

(1) RDT&E
Estimating: Reflects actual RDT&E program.

(2) Procurement
Economic: Application of CH-47D historical, and OSD inflation guidance through December 1986.

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 3 Feb 88 economic escalation rates. (Economic)	N/A	+ 13.0
Congressional direction, FY 89 Amended Budget Decision, Congressional actions, Reprogramming to CE-47 Flight Simulator Mod (Estimating).	-16.9	-38.7
Congressional Actions, (Support).	- 2.3	- 7.3

d. References --

Development Estimate: Same as 9d.

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

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	+.38	- .51	- .02	-	+1.64	+ .12	-	+ 2.63	6.92

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

Airframe	Initial Contract Price: Target Price	Ceiling	Qty
B[redacted]ng Helicopter Co., Ridley Park, PA, D[redacted]50-85-C-A005, FFP, 5-year Multiyear Contract, Award: April 8, 1985 Definitized: April 8, 1985	$1,172.7	N/A	240

Current Contract Price: Target	Ceiling	Qty	Estimated Price at Completion: Contractor	Program Manager
$1,183.3	N/A	240	1,183.3	1,183.3

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

Engine	Initial Contract Price: Target Price	Ceiling	Qty
AVCO Lycoming Co., Stratford, CT, DAAJ09-85-C-A485, FFP Award: September 30, 1985* Definitized: September 30, 1985*	$70.4	N/A	169

Current Contract Price: Target	Ceiling	Qty	Estimated Price at Completion: Contractor	Program Manager
.4		169	70.4	70.4

NOTE: For FFP contracts, cost and schedule variances information is not required.
*Corrects date error shown in Dec 1986 SAR.

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

a. Program Status --

(1) Percent Program Completed: 72.2% (13 yrs/18 yrs)

(2) Percent Program Cost Appropriated: 73.2% (2222.1/3037.6)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Years (FY76-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP	Total
RDT&E	113.5	-	-	-	113.5
Procurement	2108.6	258.0	557.5	-	2924.1
MILCON	-	-	-	-	-
Total	2222.1	258.0	557.5	-	3037.6

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

c. Annual Summary --

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		(%) 1/
Appropriation: RDT&E								
1976				10.1			11.3	8.7
197T				2.1			2.4	2.2
1977				19.9			25.8	8.1
1978				24.2			32.0	8.5
1979				13.9			19.1	7.7
1980				15.7			22.4	7.7
1981				.4			.5	7.7
Subtotal	3 2/			86.3			113.5	
Appropriation: Procurement 4/								
1980		6.3	7.7	15.5	5.3	.0	28.6	13.4
1981	9	8.1	55.9	79.0	8.5	5.3	159.3	10.8
1982	19	1.6	91.8	104.2	21.3	8.5	219.0	7.9
1983	24	1.4	99.0	107.4	58.9	21.3	247.4	2.8
1984	36	1.4	127.7	137.7	26.4	18.0	320.1	3.4
1985	48	.6	138.0	155.4	82.3	67.3	369.0	0.8
1986	48		114.0	115.7	110.6	54.3	275.6	0.0
1987	48		101.5	106.5	59.8	110.6	257.2	0.8
1988	48		92.3	94.6	57.2	59.9	232.4	3.7
1989	48		100.6	101.7	84.4	63.6	258.0	3.
1990	48		95.8	103.2	59.7	60.9	269.5	3.
1991	48		75.6	79.2	10.9	68.8	212.3	3.
1992	12		23.7	27.6	.0	36.2	75.7	2.
Subtotal	436	19.4	1123.6	1227.7	588.6	588.6	2924.1 3/	
Total	436	19.4	1123.6	1314.0	588.6	588.6	3037.6	

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1976	11.3	11.3	11.3
197T	2.4	2.4	2.4
1977	25.8	25.8	25.8
1978	32.0	32.0	32.0
1979	19.1	19.1	19.1
1980	22.4	22.4	22.4
1981	.5	.5	.5
Total	113.5	113.5	113.5
Appropriation: Procurement			
1980	28.6	28.6	28.6
1981	159.3	159.3	159.3
1982	219.0	219.0	219.0
1983	247.4	247.4	247.4
1984	320.1	320.1	303.1
1985	369.0	369.0	343.5
1986	275.6	275.4	232.4
1987	257.2	237.5	37.5
1988	232.4	198.9	-
To complete	815.5	N/A	N/A
Total	2924.1	2055.2	1570.8

1/ Since spend-out rates are not shown, the escalation rates cannot be used to verify the composite indices.

2/ Cannot be identified to a specific fiscal year, as these prototypes were worked simultaneously.

3/ Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 congressional direction and FY 89 amended budget decisions.

4/ OSD/HQDA approved deflators.

17. Production Rate Data:

a. Annual Production Rates --

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	-
1992	21	12	12	-

b. Cost Variance -- Dollars in Millions

	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Mas Econ)	Maximum Economic
Prog Acq Cost (BY $)	1325.1	- 11.1	1314.0	+ 41.4	1272.6
(TY $)	3224.4	- 186.8	3037.6	+ 40.1	2997.5
PAUC (BY $)	3.02	- .03	2.99	+ .09	2.90
(TY $)	7.35	- .43	6.92	+ .04	6.88

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	NA	10/81
Duration	168	-33	135	+24	111
End Date	9/94	N/A	12/92	NA	12/90

d. Deliveries (Plan/Actual --

	To Date
RDT&E	3/3
Procurement	192/192

Operating and Support Costs: N/A

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

a. Program Status --

(1) Percent Program Completed: 88.0% (22/25 yrs)

(2) Percent Program Cost Appropriated: 83.8% ($5,485.0/$6,547.2)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY68-88)	Budget Year (FY89)	Balance To Complete FYDP (FY 90-92)	Beyond FYDP	Total
RDT&E	549.9	40.9	0	0	590.8
Procurement	4,935.1	494.9	526.4	0	5,956.4
MILCON	0	0	0	0	0
TOTAL	5,485.0	535.8	526.4	0	6,547.2

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

c. Annual Summary --

Fiscal Year	Qty	FY 71 Base-Year Dollars			Then-Year Dollars			Escl Rate 1/ (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1968				0.6			0.5	3.6
1969				2.4			1.8	4.7
1970				1.2			1.2	5.5
1971				7.7			7.9	5.1
1972				21.1			22.7	4.6
1973				44.1			50.3	4.4
1974				83.3			102.6	8.0
1975				39.4			52.7	10.9
1976				65.8			93.6	6.6
7T				12.7			18.6	2.9
1977				49.8			76.0	2.6
1978				23.9			39.2	6.8
1979				6.3			11.4	8.4
1980				1.8			3.6	10.6
1981				3.2			7.0	10.6
1982				2.9			6.7	7.6
1983				3.8			9.1	4.9
1984				6.0			15.0	3.8
1985				0.0			0.0	3.4
1986				5.7			15.0	2.8
1987				0			0	2.7
1988				5.3			15.0	3.7
1989				13.9			40.9	3.8
Subtotal	10			400.5			590.8	

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	Qty	FY 71 Base-Year Dollars			Then-Year Dollars			Escl Rate 1/ (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: Procurement								
1977	15	18.7	39.7	71.9	7.2	0.0	140.6	3.7
1978	56	11.8	82.1	111.4	10.6	5.8	245.7	6.0
1979	92	5.5	131.7	157.7	13.1	11.2	395.6	12.0
1980	94	3.2	124.5	138.0	15.1	13.4	380.2	9.8
1981	80	2.3	123.3	164.9	24.7	15.4	478.0	13.5
1982	96	2.6	180.6	211.8	130.0	24.9	618.8	8.1
1983	96	8.7	165.4	184.4	144.2	102.9	540.6	-.3
1984	84	1.1	125.9	132.5	136.8	152.1	389.4	1.7
1985	86	.9	136.8	146.7	164.8	144.1	432.2	-.3
1986	78	1.4	128.3	138.3	187.1	138.8	412.9	-.1
1987	82	1.8	104.8	125.1	161.2	208.3	386.0	.2
1988	72	4.5	133.4	160.8	208.4	155.7	515.1	3.7
1989	72	5.5	130.6	149.5	205.6	176.8	494.9	3.8
1990	72	5.3	98.5	109.8	96.1	202.6	374.4	3.6
1991	36	1.7	37.1	42.7	0.0	152.9	149.3	3.3
1992	0	0.0	0.0	.8	0.0	0.0	2.7	2.8
Subtotal	1,111	75.0	1,742.7	2,046.3	1,504.9	1,504.9	5,956.4	

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)

Appropriation: MILCON

Subtotal	0			0			0	
Total	1,121			2,446.8	1,504.9	1,504.9	6,547.2	

Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 Amended Budget decisions.

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1968	0.5	0.5	0.5
1969	1.8	1.8	1.8
1970	1.2	1.2	1.2
1971	7.9	7.9	7.9
1972	22.7	22.7	22.7
1973	50.3	50.3	50.3
1974	102.6	102.6	102.6
1975	52.7	52.7	52.7
1976	93.6	93.6	93.6
TT	18.6	18.6	18.6
1977	76.0	76.0	76.0
1978	39.2	39.2	39.2
1979	11.4	11.4	11.4
1980	3.6	3.6	3.6
1981	7.0	7.0	7.0
1982	6.7	6.4	6.4
1983	9.1	9.1	8.1
1984	15.0	15.0	12.2
1985	0.0	0.0	0.0
1986	15.0	8.2	1.0
1987	0.0	0	0
1988	15.0	0	0
To Complete	40.9	0	0
Subtotal	590.8	527.8	516.8

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

d. Annual Summary -- (Cont'd)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: Procurement			
1977	140.6	139.6	139.5
1978	245.7	245.7	245.7
1979	395.6	392.8	387.8
1980	380.2	378.7	377.2
1981	478.0	473.5	458.6
1982	618.8	613.4	610.9
1983	540.6	539.1	527.7
1984	389.4	389.4	373.4
1985	432.2	428.5	383.9
1986	412.9	411.4	401.6
1987	386.0	351.1	267.5
1988	515.1	210.5	0
To Complete	1,021.3	0	0
Subtotal	5,956.4	4,573.7	4,173.8
Appropriation: MILCON			
Subtotal	0	0	
Total	6,547.2	5,101.5	4,690.6

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.

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	136	144
1984	165	180	113	144
1985	165	180	109	144
1986			80	144
1987			84	144
1988			72	144
1989			72	
1990			72	
1991			72	

17. Production Rate Data: (Cont'd)

b. Cost Variances -- Dollars in Millions

Item		Production Estimate	Variance (CE Less Pde)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Prog Acq Cost	(BY$)	1755.6	+ 691.2	2,446.8	+ 87.7	2,359.1
	(TY$)	3402.4	+3144.8	6,547.2	+ 387.6	6,159.6
PAUC	(BY$)	1.572	.611	2.183	+ .079	2.104
	(TY$)	3.046	2.794	5.840	+ .345	5.495

c. Schedule Variance --

Item	Production Estimate	Variance (CE Less Pde)	Current Estimate	Variance (CE vs Max)	Maximum Ecomomic
Start Date (Mo/Yr)	Oct 78		Oct 78		Oct 78
Duration (in months)	93	+60	153	+32	121
End Date (Mo/Yr)	Jun 86		Jun 91		Aug 88

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	10/10
Procurement	859/859

18. Operating and Support Costs: N/A

(4)

SAR-87-009

UNCLASSIFIED

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

N-8 C/MH-53E

AS OF DATE: December 31, 1987

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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)

CLEARED
FOR OPEN PUBLICATION

APR 13 1988 11

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

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 292-3151; 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

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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.

UNCLASSIFIED

OASD(PA) DFOISR 88-T-0934

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 -- SDR 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. RDT&E efforts during FY 88 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 --

On 14 February 1987 the Navy restricted the H-53E helicopter from flight for the inspection and replacement of the bull gear assembly in the main transmissions. The final installation was completed in December. The only aircraft remaining in a non-flyable condition are those requiring a main transmission from overhaul at Sikorsky.

7. Program Highlights: (Cont'd)

(2) On 1 October 1987 the fourth Marine CH-53E squadron stood-up at MCAS New River. This was the first squadron to stand-down CH-53D's and stand-up CH-53E's.

(3) The MH-53E completed follow-on operational testing for OPEVAL deficiencies in November 1987. Follow-on operational testing OT-IIIA and OT-IIIB were completed in December 1987. Additional testing to certify the MH-53E for C-5 transportability was completed in December 1987.

(4) 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. Decision Coordinating Paper (DCP) Threshold Breaches. Except for Approval for Service Use milestone slip from DCP #94 dated February 14, 1978, there are no other threshold breaches.

9. Schedule:

a. Milestones —

	Development Estimate/ Approved Program*	Current Estimate
CH-53E		
Program Initiation	NA/NA	Jun 69
Milestone I (DSARCI) Concept Validation	NA/May 73	May 73
First Navy Flight Development Prototype #1	Mar 74/NA	Mar 74
Milestone II (DSARC II)	Oct 74/Apr 75	Apr 75
IOT&E Complete	Feb 76/NA	May 79
BIS Initial Report	Mar 76/NA	Jul 77
Milestone III (DSARC III)	Mar 76/Jan 78	Jan 78
Navy Technical Evaluation	NA/NA	Jan 78
Approval for Service Use (ASU)	NA/Apr 80	Apr 80
Acceptance First Production Aircraft	Jun 77/NA	Dec 80
Fleet Introduction	Jul 77/NA	Jun 81
FOT&E	NA/NA	Apr 83
BIS-FTP	NA/NA	Dec 82
IOC/First Detachment Deployable	NA/Jun 82	Jun 82
Navy Support Date	NA/NA	FY 83
Procurement Objective Attained	NA/Sep 90	Sep 90
MH-53E		
Milestone I DCP #94, Feb 78	NA/Feb 78	Feb 78
Milestone II FSED	NA/Feb 81	Feb 81
First Flt Development Prototype	NA/NA	Sep 83
Milestone IIIA Ltd. Production	NA/Mar 85	Mar 85
OPEVAL	NA/Mar 85	Apr 86
AFP	NA/NA	Apr 88 CH-1
Acceptance First Production Aircraft	NA/NA	Jun 86
Milestone IIIB Continue Ltd. Production	NA/Nov 87	Nov 87
Milestone IIIC Full Scale Production	NA/Nov 87	Nov 88
FOT&E	NA/NA	Dec 87

9. Schedule: (Cont'd)

a. Milestones —

	Development Estimate/ Approved Program*	Current Estimate
MH-53E		
IOC	NA/Aug 88	Aug 88
FOC	NA/Apr 89	Apr 89
Procurement Objective Attained	NA/Sep 90	Sep 90

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 —

(CH-1) APP extended from November 1987 to April 1988 because of extended deficiency correction testing.

* Incorporation of DAE baseline of 17 Feb 1988.

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. FY 1988/89 President's Amended Biennial Budget; DAE Baseline approved 17 Feb 1988.

10. Technical/Operational Characteristics:

a. Technical —	Dev Estimate/ App Program	Demonstrated Performance	Current Estimate
Weight Empty (lbs)			
Maximum gross weight (lbs)			
Weight Empty (lbs)	34,000/34,000	33,226	33,2
w/Ext Payload, HIGE SL/90 deg F	73,500/73,500	75,100	73,5

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

a. Technical —	Dev Estimate/ App Program	Demonstrated Performance	Current Estimate
Dimensions (Spread/Folded configuration)			
Length	*99.0/60.3	99.5/60.5	99.5/60.5
Width	*79.0/29.4	79.0/28.5	79.0/28.5
Height	*28.4/18.6	28.4/18.7	28.4/18.7
*Dev estimate same as Approved Program			
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	176	170
2. 56K lbs GW (Internal Load)	140/140	170	140
3. 70K lbs GW (External Load)	100/100	125	100
Rate of Climb (ft/min) One Engine Inop @ 69,750 lbs GW	150/150	400	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	560	500
Payload (lbs)			
Payload (lbs)			
External, 50 NM radius. S/L90 F, HIGE 20 min. fuel reserve)	32,000/32,000	32,000	32,000
3000' MSL 91.5oF, HOGE			
Internal Payload (10% reserve) 500 NM Range	20,000/16,000	16,000	16,000
Reliability (%)			
Mission reliability 1 hr mission @ 90% confidence	.93/.88	.94	.93
Aircraft MFHBA (1 hour mission)	13.7/7.82	16.8	13.8
Aircraft MFHBF	.77/.70	.97	.70
Maintainability			
Aircraft MMH/FH (org. corrective)	8.0/9.50	7.72	9.50
Availability	.85/.85	.93	.93
AMCM (MH-53E)			
Tow Tension (x 1,000 lbs.)	N/A	30.0	30.0
Time on Station (hrs.)	N/A	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 — 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 1988/89 President's Amended Biennial Budget. DAE Baseline approved 17 Feb 1988.

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

	Development Estimate	Changes	Current Estimate
a. Cost —			
Development (RDT&E)	$ 93.3	$ +101.4	$ 194.7
Procurement	371.1	+697.1	1068.2
Airframe	(250.2)	(+441.1)	(691.3)
Engine	(46.9)	(+69.2)	(116.1)
Avionics	(5.4)	(+ 8.9)	(14.3)
Other GFE	(1.9)	(+7.6)	(9.5)
Total Flyaway	(304.4)	(+533.9)	(831.2)
Other Wpn Sys Cost	(29.4)	(+109.3)	(138.7)
Initial Spares	(37.3)	(+61.0)	(98.3)
Construction (MILCON)		+2.8	2.8
Total FY 73 Base-Year $	464.4	+801.3	1265.7
Escalation	114.0	+1621.4	1735.4
Development RDT&E	(7.0)	(+115.9)	(122.9)
Procurement	(107.0)	(+1500.9)	(1607.9)
Construction (MILCON)	-	(+4.6)	(4.6)
Total Then-Year $	$578.4	$+2422.7	$3001.1
b. Quantities —			
Development (RDT&E)	4		4
Procurement	70	+79	149
Total	74	+79	153
c. Unit Cost —			
Procurement:			
FY 73 Base-Year $	$5.3	+$1.9	$7.2
Then-Year $	6.8	+11.2	18.0
Program:			
FY 73 Base-Year $	6.3	+2.0	8.3
Then-Year $	$7.8	+$11.8	$19.6

11. Program Acquisition Cost: (Cont'd)

d. Approved Design to Cost Goal —

	(Average Unit Flyaway Cost) Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty: 49			
@ Peak Rate: 2/Mo			
FY 78 Base-Year $	(1)/8.4	7.9(2)	9.3
Then-Year $	(1)/9.9	13.9(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 $.

e. Foreign Military Sales -- None

f. Nuclear Cost — None

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

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition —			
(1) Cost	3001.1	3181.1	3001.1
(2) Quantity	153	157	153
(3) Unit Cost	19.6	20.3	19.6
b. Current Procurement —	FY 1988 Appropriation Act		
	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	251.4	251.4	207.6
Less CY Adv Proc*	-21.8	-21.8	-0.0
Plus PY Adv Proc*	+46.2	+46.2	+46.7
Net Total	275.8	275.8	254.3
(2) Quantity	14	14	14
(3) Unit Cost	19.7	19.7	18.2

*Advance procurement in FY 85-FY 88 reflects multiyear procurement FY 86-FY 89.

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	+5.4	-163.1	-	-157.7
Quantity	-	+2306.2	-	+2306.2
Schedule	+1.5	+63.9	-	+65.4
Engineering	+162.7	+294.6	-	+457.3
Estimating	+34.8	-731.7	-	-696.9
Other	+3.0	-0	-	+3.0
Support	+18.6	599.6	7.2	+625.4
Subtotal	+226.0	+2369.5	+7.2	+2602.7
Current Changes:				
Economic	+0.3	+5.7		+6.0
Quantity	-	-136.6		-136.6
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-9.0	+11.9	+0.2	+3.1
Other	-	-	-	-
Support	-	-52.5	-	-52.5
Subtotal	-8.7	-171.5	+0.2	-180
Total Changes	+217.3	+2198.0	+7.4	+2422.7
Current Estimate	317.6	2676.1	7.4	3001.1

(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		+638.9	-	+638.9
Schedule	+1.6	+33.2	-	+34.8
Engineering	+77.1	+96.1	-	+173.2
Estimating	+12.8	-205.0	+0.4	-191.8
Other	+2.4	-	-	+2.4
Support	+10.5	+183.4	+2.6	+196.5
Subtotal	+104.4	+746.6	+3.0	+854.0

13. Cost Variance Analysis (Cont'd):

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

	RDT&E	PROC	MILCON	TOTAL
Current Changes:				
Economic	-	-	-	-
Quantity	-	-32.0	-	-32.0
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-3.0	-4.4	-0.2	-7.6
Other	-	-	-	-
Support	-	-13.1	-	-13.1
Subtotal	-3.0	-49.5	-0.2	-52.7
Total Changes	+101.4	+697.1	+2.8	+801.3
Current Estimate	194.7	1068.2	2.8	1265.7

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.

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.

13. Cost Variance Analysis (Cont'd)

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 87 economic escalation rates. (Economic)	N/A	+0.3
Revised estimates for development of Composite Main Rotor Blade and MH-53E development adjustments (Estimating)	-3.0	-9.0
(2) Procurement		
Revised Dec 87 economic escalation rates. (Economic)	N/A	+5.7
Reduction in aircraft quantities		
(Then-year net -101.1 for four aircraft)	-32.0	-136.6
Reduction of four aircraft in FY 90 (Quantity)		
Estimating change since initial quantity increase. (Estimating)	+ 1.0	+ 35.5
Revised flyaway estimates and reevaluation of replacement and refurbishment of aircraft tooling (Estimating)	- 5.4	- 24.6
Revised estimates for support in prior years and for support and spares in balance of program (support)	-13.1	-52.5
(3) MILCON		
Revised estimate (Estimating)	- 0.2	+0.2

d. References --

Development Estimate: Development Concept Paper (DCP) #94, dated 25 April 1979 subject "CH-53E Prototype Development Approval".

Approved Program: Decision Coordinating Paper (DCP) #94, dated 14 February 1978, subject "CH-53E Production Approval."

Current Estimate: FY 1988/89 President's Amended Budget.

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 Estimate

b. Current Baseline Estimate to Current Estimate--

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
7.8	-0.9	+10.1	+0.4	+3.0	-4.5	0.0	+3.7	+11.7	19.6

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

a. Procurement--

Sikorsky Aircraft, Stratford, CT.
N00019-85-C-0066/MYP/FFP
Award: April 30, 1985
Definitized: September 30, 1986

Initial Contract Price		
Target	Ceiling	Qty
$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

General Electric Co., West Lynn, MA.
N00019-84-C-0158/FFP
Award: July 31, 1986
Definitized: December 31, 1986

Initial Contract Price		
Target	Ceiling	Qty
$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: 84.2% (16 yrs/19 yrs)

(2) Percent Program Cost Appropriated: 89.0% ($2672.1/$3001.1)

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 73-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-93)	Beyond FYDP	Total
RDT&E	265.3	9.0	43.3	-	317.6
Procurement	2399.4	207.6	69.1	-	2676.1
MILCON	7.4	0.0	-	-	7.4
Total	2672.1	216.6	112.4		3001.1

c. Annual Summary --

Fiscal Year	Qty	FY 73 Base-Year Dollars Flyaway Nonrec	Rec	TOTAL	Then-Year Dollars Advance Proc Debit	Credit	Total	Escl Rate
Appropriation: RDT&E								
1973				14.0			14.6	4.4
1974	2			26.8			30.3	8.0
1975	2			38.2			47.0	10.9
1976				9.6			12.5	6.6
197T				16.0			21.7	2.9
1977				8.6			11.9	2.6
1978				13.6			20.4	6.8
1979				0.2			0.4	8.4
1980				7.9			14.5	10.5
1981				4.7			9.4	10.6
1982				5.8			12.1	7.6
1983				6.9			15.2	4.9
1984				12.6			28.7	3.8
1985				4.9			11.5	3.4
1986				0.8			1.9	2.8
1987				1.4			3.6	2.7
1988				3.7			9.6	3.7
1989				3.4			9.0	3.8
1990				5.1			14.0	3.6
1991				5.2			14.5	3.3
1992				5.3			14.8	2.8
Subtotal 4				194.7			317.6	--

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

c. Annual Summary —

Fiscal Year	Qty	FY 73 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Flyaway Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate %
Appropriation: Procurement								
1977	6	23.6	47.8	74.7	0.0	0.0	120.8	3.8
1978	0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
1979	14	1.9	76.0	104.0	2.4	0.0	190.4	8.7
1980	13	0.0	82.5	104.8	1.9	2.4	211.0	11.8
1981	14	0.0	80.7	99.1	1.7	1.9	222.6	11.6
1982	14	0.0	71.8	91.4	6.5	1.7	227.9	14.3
1983	11	5.3	56.4	85.9	7.3	6.5	222.9	9.0
1984	11	2.2	51.7	72.8	10.0	7.3	198.4	8.0
1985	10	11.9	47.7	81.2	38.6	10.0	254.5	3.4
1986	14	1.0	69.1	87.2	42.6	18.9	267.4	2.8
1987	14	0.0	63.7	77.3	39.3	30.5	232.1	2.7
1988	14	2.9	67.1	89.3	21.8	46.2	251.4	3.7
1989	14	2.3	65.6	79.6	0.0	46.7	207.6	3.8
1990	0	0.0	0.0	15.0	0.0	0.0	49.1	3.6
1991	0	0.0	0.0	5.9	0.0	0.0	20.0	3.3
1992	0	0.0	0.0	0.0	0.0	0.0	20.0	--
Subtotal	149	51.1	780.1	1068.2	172.1	172.1	2676.1	--
Appropriation: MILCON								
1983				0.4			0.8	4.9
1984				0.0			0.0	3.8
1985				0.0			0.0	3.4
1986				1.3			3.4	2.8
1987				0.0			0.0	2.7
1988				1.1			3.2	3.7
Subtotal				2.8			7.4	
Total	153			1265.8			3001.1	

16. Program Funding Summary (Cont'd)

d. Obligations and Expenditures

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
Appropriation: RDT&E			
1973	14.6	14.6	14.6
1974	30.3	30.3	30.3
1975	47.0	47.0	47.0
1976	12.5	12.5	12.5
197T	21.7	21.7	21.7
1977	11.9	11.9	11.9
1978	20.4	20.4	20.4
1979	0.4	0.4	0.4
1980	14.5	14.5	14.5
1981	9.4	9.4	9.4
1982	12.1	12.1	12.1
1983	15.2	15.2	14.6
1984	28.7	28.7	28.2
1985	11.5	11.5	10.8
1986	1.9	1.9	1.3
1987	3.6	3.6	1.6
1988	9.6	0.9	0.0
To Complete	52.3	N/A	N/A
Subtotal	317.6	256.6	249.5
Appropriation: Procurement			
1977	120.8	120.8	120.8
1978	0.0	0.0	0.0
1979	190.4	190.4	190.4
1980	211.0	211.0	211.0
1981	222.6	222.6	222.6
1982	227.9	227.9	221.7
1983	222.9	222.9	222.9
1984	198.4	198.4	187.8
1985	254.5	254.5	236.2
1986	267.4	265.7	211.1
1987	232.1	230.3	162.4
1988	251.4	96.3	24.1
To complete	276.7	N/A	N/A
Subtotal	2676.1	2240.8	2011.0
Appropriation: MILCON			
1983	0.8	0.8	0.8
1984	0.0	0.0	0 0
1985	0.0	0.0	0.0
1986	3.4	0.0	0.0
1987	0.0	0.0.	0.0
1988	3.2	0.0	0.0
Subtotal	7.4	0.8	0.8
Total	3001.1	2498.2	2261.3

17. Production Rate Data:

a. Annual Production Rates — (NOTE: The Maximum Economic Production Rate was not attained until August 1978 and substained at two per month until program completion.)

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	19
1985			10	
1986			14	
1987			14	
1988			14	
1989			14	
1990			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 $)	476.0	+789.8	1265.8	+ 78.5	1187.3
	(TY $)	768.5	+2232.6	3001.1	+564.7	2436.4
PAUC	(BY $)	9.0	-0.7	8.3	+0.5	7.8
	(TY $)	14.5	+5.1	19.6	+3.7	15.9

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	0	2/78
Duration (in months)	44	96	140	+62	78
End Date (Mo/Yr)	9/81	NA	9/89	+62	7/84

17. Production Rate Data (Cont'd)

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	4/3*
Procurement	109/110

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

18. Operating and Support Costs: N/A

SAR-87-105

~~CONFIDENTIAL~~

A-8 COPPERHEAD

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

PROGRAM: COPPERHEAD

AS OF DATE: December 31, 1987

Concur in classification as marked

APR 1 1988 23

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

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1. (U) Designation/Nomenclature (Popular Name): M712/155MM Cannon Lauched 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 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, Remotely Piloted Vehicle Program, AHIP, AH64 Designator and the Navy 5 Inch Guided Projectile Program

Concur in Classification as marked

31 MAR 1988

SECURITY REVIEW, ODCSINT, HQDA

~~CLASSIFIED BY: Copperhead SCG~~

~~DECLASSIFY ON: 22 Aug 80~~

DECLASSIFY ON: 31 Dec 88

~~CONFIDENTIAL~~

OASD(PA) DFOISR 88-T-0835

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 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. However, designation by other systems is envisioned, (e.g., Remotely Piloted Vehicles, Airborne Designator, etc.). Designator developments are being accomplished under separate programs.

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.

b. (U) Significant Developments Since Last Report - - 2297 COPPERHEAD Projectiles were delivered by the contractor in the year ending 31 December 1987. Total delivery to date is 16470. There have been no deliveries since 31 Jul 87, as Buy #6 had problems with deliveries. Gyros had to be reworked at the contractor's cost. Schedule will be completely recovered by the end of the funded delivery period. New deliveries scheduled for 11 Mar 88. The program/ system is expected to satisfy the mission requirements.

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

(1) (U) System cumulative weighted reliability is 89.9% based on 1982 through 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.

(2) (U) Copperhead field firings confirm the Lot Acceptance Test results with a cumulative reliability (pt. estimate) since 1982 of 86.0%. The COPPERHEAD Projectile is expected to meet mission requirements.

(3) (U) Second Source Evaluation was completed and forwarded to Congress on 10 February 1988. In accordance with the FY86 appropriation language, the cost effectiveness analysis was performed and it showed that second source was not cost effective. Congress has thirty days to act on the decision. The Army program was terminated during the FY 89 budget deliberations.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: None

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

9. (U) Schedule (Cont'd)

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) from Feb 78 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: SDDM dated 15 Dec 1979
Approved Program Baseline, 26 February 1988

10. (U) Technical/Operational Characteristics:

a. (U) Technical - -		Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(U) Projectile Weight	(lbs)	96-150/138	137.7	138
	(kg)	43.5-68.0/62.6	62.4	62.6
(U) Projectile Length	(in) 3/	28-54/54.2	54.2	54.2
	(cm)	71.1-137.2/137.7	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)	6.4/6.4	6.4	6.4

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

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
b. (U) Operational			
(b)(1)			
(U) Maximum Range (km)	16-24/16.0	16.0	16.0
(U) Minimum Range (km)			
(1) (U) High Angle	3.5/5.0	5.0	5.0
(2) (U) Low Angle	1.5-3.0/3.0	3.0	3.0
(b)(1)			
(U) Oper Prob of Proper Launch (P(L)) 4/	- -/.98	.98	.98
(U) Oper Prob of Proper Des (P(D)) 4/	- -/.98	.98	.98

c. (U) Previous Change Explanations - -

(b)(1)

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

d. (U) Current Change Explanations - - None

e. (U) References - -

Development Estimate: DCP No. 119 dated September 1975

Approved Program: DCP No. 119 dated September 1975
Approved Program Baseline, 26 February 1988

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.

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

a. (U) Cost - -	Development Estimate	Changes	Current Estimate
Development (RDT&E)	109.3	+25.3	134.6
Procurement	738	-163.1	574.9
Total Flyaway	(731.6)	(-171.6)	(560.0)
Other Wpn Sys Cost	(6.4)	(+8.5)	(14.9)
Total: Const FY75 $	847.3	(-137.8)	709.5
Escalation	393.4	(+134.7)	528.1
Development	(8.9)	(+6.9)	(15.8)
Procurement	(384.5)	(+127.8)	(512.3)
Total Then-Year $	1240.7	-3.0	1237.7
b. (U) Quantities - -			
Development	408	-88	320
Procurement	132650	-108104	24546
Total	133058	-108192	24866

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

	Development Estimate	Changes	Current Estimate
c. (U) Unit Cost - -			
Procurement:			
FY75 Base-Year	.0056	+.0178	.0234
Then-Year $	.0085	+0.358	.0443
Program:			
FY75 Base-Year $	.0064	+.0221	.0285
Then-Year $	.0093	+.0405	.0498

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

	(Average Unit Flyaway Cost) Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty:			
@ Peak Rate: 3000/mo			
FY75 Base-Year $	.0055/.0186	.0228	.0225
Then-Year $	.0082/.0385	.0444	.0490

e. (U) Foreign Military Sales - - Sales to date total 25 projectiles to Japan (all fired in test).

f. (U) Nuclear Costs - - None

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

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR 1/	UCR Baseline Dec 87 SAR
a. (U) Program Acquisition			
(1) Cost	1237.7	1661.0	1237.7
(2) Quantity	24866	39521	24866
(3) Unit Cost	.0498	.0420	.0498
b. (U) Current Procurement	(FY88)	(FY88 APPN)	(FY89)
(1) Cost	117.9	117.9	0
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	117.9	117.9	0
(2) Quantity	2771	2771	0
(3) Unit Cost	.0425	.0425	0

COPPERHEAD, December 31, 1987

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	55.3	-	51.1
Quantity	-2.2	-617.0	-	-619.2
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	388.0	-	420.3
Current Changes				
Economic		+2.4	-	+2.4
Quantity		-425.7	-	-425.7
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0.0	-423.3	-	-423.3
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	-408.9	-	-410.6
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	6.7	-	32.0
Current Changes				
Quantity		-173.3	-	-173.3
Schedule			-	
Engineering			-	
Estimating			-	
Other			-	
Support			-	
Subtotal	0.0	-173.3	-	-173.3
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. Previous Changes Explanations (Cont'd)

Procurement

Economic:	Revised escalation indices
Quantity:	Reduction from 132,650 to 24,546
Schedule:	Revised procurement strategy; stretchout of IPF contract and expanded prove-out requirement. Changes in delivery quantities.
Estimating:	Additional facilities and tooling. Re-estimation of procurement costs due to production rate change.
Support:	Ancillary equipment for artillery battalions

c. (U) Current Change Explanations - -

	(Dollars in Millions) FY75 Base-Year	Current Then-Year
(1) (U) Development	--	--
(2) (U) Procurement		
o Revised inflation indices (Economic)	--	+2.4
o Deletion of FY89-92 quantities (14,655 projectiles) due to termination of program after FY88 (Quantity)	-173.3	-423.3

d. (U) References - - Development Estimate: DCP #119, dated Sep 75
- - FY 89 Amended Budget Submission

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

a. (U) Initial SAR estimate to Current Estimate

PAUC (Initial SAR Est)	Changes (Current (Then Year) Dollars in Millions)								PAUC (Current Estimate
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.0093	+.0022	-.0014	+.0133	+.0011	+.0245	+.0006	+.0002	+.0405	.0498

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

a. (U) RDT&E - None

b. (U) Procurement - -

COPPERHEAD

Martin Marietta Aerospace, Orlando, FL
DAAA21-86-C-0190 (FFP)
Award: 10 Jul 86
Definitized: 3 Sep 87

Initial Contract Price		
Target	Ceiling	Qty
$167.96	N/A	5200

Current Contract Price		
Target	Ceiling	Qty
$167.96	N/A	5200

Estimated Price at Completion	
Contractor	Program Manager
$167.96	$167.96

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

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

a. (U) Program Status - -

(1) Percent Program Completed: 18/18 (100%)
(2) Percent Program Cost Appropriated: $1237.7/1237.7 (100%)

b. (U) Appropriation Summary - -

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY71-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-94)	Beyond FYDP (FY95)	Total
RDT&E	150.5	-	-	-	150.5
Procurement	1087.2	0	0	-	1087.2
MILCON	-	-	-	-	-
Total	1237.7	0	0	-	1237.7

COPPERHEAD, December 31, 1987

(U) Program Funding Summary (Cont'd): (Current Estimate in Millions of [redacted]ars)

c. (U) Annual Summary - -

Fiscal Year	Qty	FY75 Base-Year Dollars			Then-Year Dollars		Escl Rate (%)
		Flyaway		Total	Advance Proc	Total	
		Nonrec	Rec				
Appropriation: RDT&E							
FY71				2.1		1.6	3.8
FY72				9.1		7.3	4.2
FY73				9.6		8	5.8
FY74	24			6.2		5.6	8.8
FY75				6.1		6.1	6.6
FY76				13.1		17	3.5
FY77				36.5		38	3.8
FY78				30		36	6.8
FY79	296			11.5		15	8.4
FY80				6.2		9	9.4
[redacted]81				2.6		4.2	11.9
[redacted]82				1.6		2.7	7.6
FY83				0		0	4.9
FY84				0		0	4.3
Subtotal	320	0	0	134.6		150.5	
Appropriation: Procurement 1/ 2/ 3/							
FY78		22.2		22.2		27.2	6.8
FY79		15.9	1.5	17.4		23.2	8.7
FY80	1114		52.4	52.4		76.5	9.7
FY81	2624		79.9	79.9		130.4	11.9
FY82	3957		86.7	86.7		154.5	7.6
FY83	1220		27.1	27.1		55.0	4.9
FY84	1580		34.7	34.7		73.7	3.8
FY85	5250		93.0	93.0		200.8	3.4
FY86	5536		98.3	98.3		210.1	2.8
FY87	494		8.1	8.1		17.9	2.7
FY88	2771		51.6	51.6		117.9	3.7
Subtot	24546	38.1	533.3	571.4		1087.2	

See footnotes next page.

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

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.

d. (U) Obligations and Expenditures - -

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
FY71	1.6	1.6	1.6
FY72	7.3	7.3	7.3
FY73	8	8	8
FY74	5.6	5.6	5.6
FY75	6.1	6.1	6.1
FY76	17	17	17
FY77	38	38	38
FY78	36	36	36
FY79	15	15	15
FY80	9	9	9
FY81	4.2	4.2	4.2
FY82	2.7	2.7	2.7
FY83	0	0	0
FY84	0	0	0
Total	150.5	150.5	150.5
Appropriation: Procurement			
FY78	27.2	26.7	26.7
FY79	23.2	22.3	22.3
FY80	76.5	75.9	75.9
FY81	130.4	129.9	129.9
FY82	154.5	154.5	153.7
FY83	55.0	55.0	50.2
FY84	73.7	73.7	72.1
FY85	200.8	200.8	127.6
FY86	210.1	182.2	64.3
FY87	17.9	.3	0
FY88	117.9	1.3	0
Total	1087.2	922.6	722.7

17. (U) Production Rate Data

a. (U) Annual Production Rates:

Fiscal Yr	Production Rates/(Quantity/Year)			
	Dev Est	Prod Est	Current Estimate	Maximum Economic
78	7125			
79	3636			
80	9600	2100	1114	1114
81	21200	4300	2624	2624
82	24000	3900	3957	3957
83	36000	8400	1220	1220
84	31090	8400	1580	1580
85		8400	5250	16800
86		8886	5536	16800
87			494 1/	16800
88			2771	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	Prod Est	Variance (CE less PdE)	Current Est	Variance (CE less Max)	Max Econ
Prog Acq Cost					
BY $	618.3	+91.2	709.5	- 0 -	709.5
TY $	1114.9	+112.8	1237.7	- 0 -	1237.7
PAUC BY $	.0139	+.0146	.0285	- 0 -	.0285
TY $	.0249	+.0249	.0498	- 0 -	.0498

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

c. (U) Schedule Variance - -

	Prod Est	Variance (CE less PdE)	Current Est	Variance (CE vs Max)	Max Econ
Start Date (mo/yr)	3/78	+33	12/80	N/A	12/80
Duration (months)	80	+16	96	- 0 -	96
End Date (mo/yr)	11/84	+49	12/88	N/A	12/88

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

	To Date
RDT&E	320/320
Procurement	16470/16470

18. (U) Operating and Support Costs: N/A

(3)

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SAR-87-081

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

AF-11 DSCS III

AS OF DATE: December 31, 1987

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MAR 17 18
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

SAF/PAS
88-0132-L

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 33110F, APPN 3600

PROCUREMENT: PE 33110F, APPN 3020 ICN MS0777

5.(U) Related Programs: Air Force Satellite Communications Program (AFSATCOM), Space Boosters Program, Space Shuttle Operations Program, DoD and NASA Space Transportation System (STS) Programs, Communication Security Program.

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OASD(PA) DFOISR 98-T-1663

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 -- Initiated planning 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 December 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.

b.(U) Significant Developments Since Last Report -- The DSCS program was identified as part of the Shuttle offload effort and was directed to proceed up to contract award in producing a DSCS III compatible Integrated Apogee Boost Subsystem (IABS). This would permit single launching of DSCS III satellites with a Medium Launch Vehicle (MLV II). Successful development of this Booster/IABS combination is expected to result in MLV II being the primary launch vehicle for DSCS III. DSCS III has completed all on orbit development and operational testing.

FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

The DSCS Space Segment is expected to meet its current mission requirements.

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

8.(U) Decision Coordinating Paper (DCP) 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.

9.(U) Schedule:

a.(U) Milestones --

Milestones	Development Estimate/ Approved Program	Current Estimate
(U) DSARC II (JRMB II, Full Scale Dev)	Dec 76/Dec 76	Dec 76
(U) Full-Scale Development (Phase 2) Contract Award	Feb 77/NA	Feb 77
(U) Critical Design Review (CDR)	Apr 78/NA	May 78
(U) First Development Flight Satellite (III-A1) Launch	Jul 79/NA	Oct 82
(U) DSARC III (JRMB III, Production Dec)	Jan 80/Dec 81	Dec 81
(b)(1)	(b)(1)	(b)(1)
(U) First Production Satellite Delivery (III-B4)	Mar 82/Apr 85	Apr 85

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.

c.(U) Current Change Explanations --

(b)(1)

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:
Decision Coordinating Paper (DCP) #144, Revision 4, 8 May 1981.
Program Management Directive (PMD) R-S 2146-(24)/PE 33110F, 13 Jul 87.
USD(A) memo, 9 Feb 1988

10.(U) Technical/Operational Characteristics:

a.(U) Technical —	Dev Estimate/ Appr Program	Demonstrated Performance /A	Current Estimate
(U) Frequency (GHz)	7.25-8.4/7.25-8.4	7.25-8.4	7.25-8.4
(U) Bandwidth (MHz) per channel	50-85/50-85	50-85	50-85
(b)(1)			
(U) Effective Isotropic Radiated Power (EIRP) (dBW) C/			
Channels			
1 & 2 (EC:Spot:AC)	29:39:43/ NA	29:40:44	29:40:44
3 (EC:EC:Spot)	24:23:33/ NA	25:23:34	25:23:34
4 (EC:EC:Spot:AC)	24:23:33:37/ NA	25:23:35:38	25:23:35:38
5 & 6 (EC)	24/ NA	25	25
Beacons (EC)	11/ NA	12	12
(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)	-/7 (Ch-2)	7	7 (Ch-2)
(U) Satellite Reliability D/	.7/.7	N/A	.7
(U) Weight (lbs) E/	1650	N/A	1866
(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/MLV II: IABs(Ch-1)		N/A	MLV II: IABs(Ch-1)

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)

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

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.

d.(U) Current Change Explanations --

(Ch-1) (U) The DSCS Program has been directed to have a compatible launch configuration with the MLV II and an integrated upper stage.

(Ch-2) (U) Reflects USD(A) baseline approval.

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:
Decision Coordinating Paper (DCP) #144, Revision 4, 8 May 1981.
Program Management Directive (PMD) R-S 2146-(24)/PE 33110F, 13 Jul 87
DSCS III Space Segment Specification 07868 DSCS III-1, Rev A, 19 Sep 1979
DSCS III Space Segment Specification SVS-8950-II-A, 2 Jul 84, SCN-5 Jun 85
USD(A) memo, 9 Feb 1988

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

a.(U) Cost --	Development Estimate	Changes	Current Estimate
Development (RDT&E)	$134.3	$+207.3	$341.6
Procurement	496.8	+226.7	723.5
Satellites	(313.1)	(+284.8)	(597.9)
Launch Vehicles	(183.7)	(-58.1)	(125.6)
Construction (MILCON)	---	---	---
Total FY 77 Base-Year $	631.1	+434.0	1065.1
Escalation	262.5	+678.5	941.0
Development (RDT&E)	(17.5)	(+170.4)	(187.9)
Procurement	(245.0)	(+508.1)	(753.1)
Construction (MILCON)	---	---	---
Total Then-Year $	$893.6	$+1112.5	$2006.1

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

b.(U) Quantities —	Development Estimate	Changes	Current Estimate
Development (RDT&E)	2	0	2
Procurement	12	1	13
Total	14	1	15

c.(U) Unit Cost —			
Procurement:			
FY 77 Base-Year $	$ 41.400	+14.254	$ 55.654
Then-Year $	61.817	+51.768	113.585
Program:			
FY 77 Base-Year $	45.079	+25.928	71.007
Then-Year $	$ 63.829	$+69.911	$133.740

d.(U) Approved Design to Cost Goal — (Average Unit Flyaway Cost)

	Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty: 12			
@ Peak Rate: .028/mo			
FY 77 Base-Year $	20.000/49.058	44.065	56.417
Then-Year $	28.500/97.900	87.350	112.585

e.(U) Foreign Military Sales — None

f.(U) Nuclear Costs — None

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

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a.(U) Program Acquisition —			
(1) Cost	2006.1	1610.3	2006.1
(2) Quantity	15	14	15
(3) Unit Cost	133.740	115.021	133.740
b.(U) Current Procurement —	(FY 88)	*(FY 88)	(FY 89)
(1) Cost	71.9	71.9	54.4
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	25.9	25.9	0.0
Net Total	97.8	97.8	54.4
(2) Quantity	1	1	0
(3) Unit Cost	97.800	97.800	N/A

* Differs from the December 86 SAR to reflect the FY 1988 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	-1.1	+86.8	--	+85.7
Quantity	-	+0.4	--	+0.4
Schedule	+29.8	+93.9	--	+123.7
Engineering	+168.5	+57.0	--	+225.5
Estimating	+49.0	+155.0	--	+204.0
Other	-	+77.4	--	+77.4
Support	-	-	--	-
Subtotal	+246.2	+470.5	--	+716.7
Current Changes:				
Economic	-0.3	+1.4	--	+1.1
Quantity	-	+54.9	--	+54.9
Schedule	-	-	--	-
Engineering	+106.4	+217.1	--	+323.5
Estimating	+25.4	-9.1	--	+16.3
Other	-	-	--	-
Support	-	-	--	-
Subtotal	+131.5	+264.3	--	+395.8
Total Changes	+377.7	+734.8	--	+1112.5
Current Estimate	529.5	1476.6	--	2006.1

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	134.3	496.8	--	631.1
Previous Changes:				
Quantity	-	-	--	0.0
Schedule	+16.3	+34.0	--	+50.3
Engineering	+94.4	+25.1	--	+119.5
Estimating	+34.9	+25.8	--	+60.7
Other	-	+38.4	--	+38.4
Support	-	-	--	-
Subtotal	+145.6	+123.3	--	+268.9
Current Changes:				
Quantity	-	+21.3	--	+21.3
Schedule	-	-	--	-
Engineering	+51.0	+88.5	--	+139.5
Estimating	+10.7	-6.4	--	+4.3
Other	-	-	--	-
Support	-	-	--	-
Subtotal	+61.7	+103.4	--	+165.1
Total Changes	+207.3	+226.7	--	+434.0
Current Estimate	341.6	723.5	--	1065.1

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

b. Previous Change Explanation --

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 from this SAR
Estimating: Revised production costs, First time integration, 1987 Balanced Budget Amendment impacts, III-A2 launch delay costs, Removal of Block C development 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.

Estimating: FCRC requirements, LV integration, Production costs, Gramm-Rudman-Hollings Bill, Non-awarded contingent liabilities, Launch delay costs.
Other: Signal Channel Transponder (SCT) hardware funding transfer, DSARC III (JRMB III) adjustment

c. Current Change Explanation --

(1) RDT&E	(Dollars in Millions) Base-Year	Then-Year
Revised economic escalation indices (Economic)	N/A	-0.3
Adjustment to current/prior years escalation (Estimating)	+0.3	+0.3
Adjustment to prior years actual costs (Estimating)	-2.6	-4.5
Congressional cut resulting in increased program risk (Estimating)	-1.0	-2.0
SHF Development of Yaw Rate Gyro and 20 Watt SSA (Engineering)	+16.1	+35.9
IABS Development Costs	+48.9	+102.1
IABS Development & MLV II 1st Time Integration (Engineering)	(+34.9)	(+70.5)
Additional Aerospace/Schedules/Mission Support costs (Estimating)	(+14.0)	(+31.6)

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

(2) Procurement	(Dollars in Millions) Base-Year	Then-Year
Revised economic escalation indices (Economic)	N/A	1.4
Adjustment to current/prior years escalation (Estimating)	0.1	0.2
Correction to Dec 86 SAR	N/A	0.0
(Quantity)	N/A	(-0.4)
(Estimating)	N/A	(+0.4)
Additional Satellite quantity of one	+69.5	+180.0
(Quantity)	(+21.3)	(+55.3)
(Engineering)	(+33.8)	(+87.3)
(Estimating)	(+14.4)	(+37.4)
Product Improvements: Yaw Rate Gyro, TLS Retrofit, and 20 Watt SSA (Engineering)	+9.8	+23.0
Congressional cut resulting in increased program risk (Estimating)	-1.8	-4.0
Reprogramming to higher priority requirement (Estimating)	-1.3	-2.7
Adjustment to prior year actual costs (Estimating)	-4.4	-8.7
IABS Procurement Costs	+47.4	+114.6
Procurement of IABS (Engineering)	(+44.9)	(+106.8)
Additional Aerospace support/Integration/ Operations costs (Estimating)	(+2.5)	(+7.8)
Re-estimated Storage/reactivation costs (Estimating)	-12.8	-31.9
Elimination of Titan IV spacecraft mods resulting in increased program risk (Estimating)	-3.1	-7.6

d. References —

Development Estimate:
Decision Coordinating Paper (DCP) #144, Revision 2, 17 Nov 1976.

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	+5.787	-0.569	+8.247	+36.600	+14.686	+5.160	-	+69.911	133.740

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

a. RDT&E — None.

b. Procurement —

Advance Buy B8-14:
General Electric Co., King of Prussia, PA
F04701-84-C-0009, FFP,
Award: January 23, 1984
Definitized: December 31, 1983

Initial Contract Price		
Target	Ceiling	Qty
$70.1	N/A	0

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$80.7	N/A	N/A	$80.7	$80.7

CPR reporting is not required on this contract.

DSCS III Production B8-14:
General Electric Co., King of Prussia, PA
F04701-84-C-0072, FFP,
Award: November 16, 1984
Definitized: November 16, 1984

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

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$455.0	N/A	7	$455.0	$455.0

CPR reporting is not required on this contract.

c. MILCON — None.

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

a. Program Status --

(1) Percent Program Completed: 59.1% (13yrs/22yrs)

(2) Percent Program Cost Appropriated: 70.4% ($1412.0/$2006.1)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY76-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Beyond FYDP (FY93-97)	Total
RDT&E	390.6	38.1	59.5	41.3	529.5
Procurement	1021.4	54.4	160.2	240.6	1476.6
MILCON	-	-	-	-	-
Total	1412.0	92.5	219.7	281.9	2006.1

c. Annual Summary -- * (See next page)

Fiscal Year	Qty	FY 77 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1976	-	-	-	11.3	-	-	10.5	7.0
197T	-	-	-	2.8	-	-	2.8	3.6
1977	-	-	-	28.1	-	-	28.7	4.7
1978	-	-	-	54.5	-	-	59.5	7.0
1979	-	-	-	24.3	-	-	29.3	8.4
1980	-	-	-	14.8	-	-	19.8	9.4
1981	-	-	-	19.6	-	-	29.0	11.9
1982	-	-	-	32.8	-	-	52.0	9.2
1983	-	-	-	23.9	-	-	39.7	4.9
1984	-	-	-	17.9	-	-	30.8	3.7
1985	-	-	-	14.0	-	-	24.8	3.4
1986	-	-	-	3.1	-	-	5.6	2.8
1987	-	-	-	7.9	-	-	14.8	2.7
1988	-	-	-	22.2	-	-	43.3	3.7
1989	-	-	-	18.8	-	-	38.1	3.8
1990	-	-	-	13.5	-	-	28.2	3.6
1991	-	-	-	7.2	-	-	15.6	3.3
1992	-	-	-	7.1	-	-	15.7	2.8
1993	-	-	-	8.0	-	-	18.2	2.3
1994	-	-	-	6.5	-	-	15.0	2.3
1995	-	-	-	1.2	-	-	2.9	2.3
1996	-	-	-	1.2	-	-	2.9	2.3
1997	-	-	-	0.9	-	-	2.3	2.3
Subtotal	2	-	-	341.6	-	-	529.5	

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

c. Annual Summary (Con'd) --

Fiscal Year	Qty	FY 77 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: Procurement								
1978	-	35.8	-	35.7	-	-	43.0	7.0
1979	-	.3	-	4.7	5.8	-	6.2	8.7
1980	-	.4	-	7.4	10.5	-	11.1	9.7
1981	1	.6	39.0	47.2	48.8	16.3	77.9	11.9
1982	2	.5	78.1	63.6	-	24.1	112.4	9.6
1983	2	.2	104.7	74.7	-	24.7	139.3	9.0
1984	-	5.4	-	50.3	81.6	-	98.0	8.0
1985	2	11.7	98.2	112.3	52.4	23.2	224.8	3.4
1986	2	5.2	85.4	61.4	13.7	52.2	127.3	2.8
1987	2	4.7	85.4	51.0	5.5	51.9	109.5	2.7
1988	1	7.1	37.5	32.3	-	25.9	71.9	3.7
1989	-	8.8	-	23.7	-	-	54.4	3.8
1990	-	9.2	-	21.8	-	-	51.5	3.6
1991	-	11.2	-	24.7	-	-	59.8	3.3
1992	-	7.6	-	19.7	-	-	48.9	2.8
1993	-	6.5	-	19.9	-	-	50.4	2.3
1994	1	6.2	69.6	65.5	-	-	170.0	2.3
1995	-	2.0	-	3.5	-	-	9.2	2.3
1996	-	1.3	-	2.9	-	-	7.8	2.3
1997		0.9	-	1.2	-	-	3.2	2.3
Subtotal	13	125.6	597.9	723.5	218.3	218.3	1476.6	
Total	15			1065.1			2006.1	

* FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated /1	Expended /1
Appropriation: RDT&E			
1976	10.5	10.5	10.5
197T	2.8	2.8	2.8
1977	28.7	28.7	28.7
1978	59.5	59.5	59.5
1979	29.3	29.3	29.3
1980	19.8	19.8	19.8
1981	29.0	29.0	29.0
1982	52.0	52.0	52.0
1983	39.7	39.7	39.7
1984	30.8	30.8	30.8
1985	24.8	24.8	22.2
1986	5.6	5.6	4.2
1987	14.8	14.3	4.1
1988	43.3	1.5	0.1
To Complete	138.9	N/A	N/A
Total	529.5	348.3	332.7
Appropriation: Procurement			
1978	43.0	43.0	43.0
1979	6.2	6.2	6.2
1980	11.1	11.1	11.1
1981	77.9	77.9	77.9
1982	112.4	112.4	112.4
1983	139.3	139.3	139.3
1984	98.0	96.5	95.5
1985	224.8	224.3	215.0
1986	127.3	114.3	11.4
1987	109.5	100.2	4.5
1988	71.9	51.2	-
To Complete	455.2	N/A	N/A
Total	1476.6	976.4	716.3

/1 Reflects program office records as of 31 Dec 87

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

18. (U) Operating and Support Costs: N/A

(M)

SAR-87-015

~~CONFIDENTIAL~~

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

N-16 F-14D

AS OF DATE: December 31, 1987

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CLEARED FOR OPEN PUBLICATION
AS AMENDED
APR 14 1988
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

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

No Security Objection to Open Publication (AS AMENDED)
88 C 432
APR 14 1988
Office of the Chief of Naval Operations
Dept. of the Navy

4. Program Elements/Procurement Line Items:
RDT&E: PE 25667N
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, JITDS and AIM-54 A/C PHOENIX Missile.

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OASD(PA) DPC/ER 88-M-0937

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 buss 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 calls 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.

b. Significant Developments Since Last Report -- Avionics and radar and development and operational testing began in August 1987. The TA-3B, APG-71 radar test bed commenced flight testing in August and concluded Navy "quicklook" evaluation on 12 December. The first F-14D prototype aircraft was delivered to the Navy 23 November 1987 and completed 12 test flights assessing the avionics systems. Navy "Quicklook" evaluation of the avionics system was also completed in December 1987. Results of T&E were favorable. The Navy and Grumman definitized the settlement of Grumman's request for equitable adjustment on 1 February 1988. The FSD program is proceeding on or ahead of schedule. Pre-Deployment Update (PDU) which includes integration of AMRAAM, HARM, Fighter-to-Fighter Data Link and Radar Improvements prior to first F-14D deployment was delayed by FY-88 budget shortfalls and will commence in FY-89. The F-14D commenced production with the FY-88 aircraft procurement contract.

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

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

8. Decision Coordinating Paper (NDCP) Threshold Breaches: There are currently no NDCP (dated June 16, 1986) threshold breaches.

9. (U) Schedule

		Development Estimate/ Approved Program	Current Estimate
a.(U)	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 Acquision Contract Award	Dec 86/Sep 87	Apr 87 Ch 1
(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 Ch 2
(U)	NPDM III A (Limited Production Approval)	Mar 89/Oct 88	Oct 88 Ch 3
(U)	Techeval	Apr 90/Apr 90	Apr 90
(U)	NPDM III B (Limited Approval)	Mar 90/Oct 89	Oct 89 Ch 4
(U)	OPEVAL	Jun 90/May 90	May 90
(U)	NPDM III C (Full Production Approval)	Oct 90/Sep 90	Sep 90 Ch 5
(U)	Deliver first production F-14D	Mar 90/Mar 90	Mar 90
(U)	BIS	Sep 90/Sep 90	Sep 90
(b)(1)			

b.(U) Previous Change Explanations--

First F110 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.

c.(U) Current Change Explanations--

(Ch-1) Advance Acquisition Contract Award delayed due to extended negotiations on not-to-exceed prices and the aircraft specification.
(Ch-2) Pilot Production Approval delayed one month to accomodate formal report of Navy "Quicklook" on radar and avionics flight tests.
(Ch-3) Milestone name DNSARC IIIB changed to NPDM IIIA.
(Ch-4) Milestone name DNSARC IIIC changed to NPDM IIIB.
(Ch-5) Milestone name DNSARC IIID changed to NPDM IIIC.

d.(U) References --

Development Estimate: NDCP was approved by the Secretary of the Navy, 16 June 1986.

Approved Program: Amended FY 1989 President's Budget. DAE Baseline Approved 17 Feb 1988.

REPRODUCED AT GOVERNMENT EXPENSE

(b)(1) [redacted]

(U) a. Technical	Dev Estimate/ Appr Program		Demonstrated Performance	Current Estimate
(U) Weight				
Empty no stores (lb)	41,210/ NA	(Ch-1)	N/A	41,700 (Ch-2)
Max T/O	72,467/NA	(Ch-1)	N/A	72,467
(U) Length/Height/Span (ft)	62/16/64.1/NA	(Ch-1)	N/A	62/16/64.1
(U) Spotting Factor (A7=1.0)	1.55/NA	(Ch-1)	N/A	1.55
(U) Direct Maintenance Manhours per flight hours (unscheduled)	6.4/6.4		N/A	6.4
(U) SDLM Cycle (mo.)	44/NA		N/A	44
MFHBF (Total Weapon System)	NA/1.8		N/A	1.8

(U) b. Operational	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(b)(1) [redacted]	(b)(1) [redacted]		
(U) Rate of Climb, Single Engine Take-off wt (ft/min)	350/NA	N/A	350 A/
(b)(1) [redacted]			

NOTES:

A/ (U) Sea level, 89.8 F, minimum catapult speed + 15 kts, IRT, takeoff weight less 600 lbs. of initial useable fuel, takeoff configuration.

B/ (U) Fleet Air Defense Configuration (4 Phoenix, 2 Sparrows, 2 Sidewinders, 2 Tanks).

C/ (U) Combat weight, defined as takeoff weight less 40% initial useable fuel.

c. Previous Change Explanations - - None

d. Current Change Explanations --

Ch-1 Incorporation of DAE approved baseline of 17 Feb 1988.

Ch-2 Weight decrease based on newly negotiated acceptable weight allowances.

e. References --

Development Estimate: NDCP was approved by the Secretary of the Navy, 16 June 1986
Approved Program: FY 1989 President's Budget. DAE Baseline Approved 17 Feb 1988

REPRODUCED AT GOVERNMENT EXPENSE

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	1464.9	+219.8	1684.7
Procurement	13627.5	+2336.6	15964.1
Airframe	(7289.6)	(-248.4)	(7041.2)
Engine	(2144.6)	(+438.1)	(2582.7)
Avionics	(786.6)	(+1730.2)	(2516.8)
Other Hardware	(836.2)	(+508.5)	(1344.7)
Total Flyaway	(11057.0)	(+2428.4)	(13485.4)
Other Wpn Sys Cost	(1884.0)	(-268.4)	(1615.6)
Initial Spares	(686.5)	(+176.6)	(863.1)
Construction (MILCON)	10.3	+48.7	59.5
Total FY 86 Base-Year $	15103.2	+2605.1	17708.3
Escalation	4116.6	+1169.7	5286.3
Development (RDT&E)	(104.2)	(+50.3)	(154.5)
Procurement	(4010.1)	(+1104.6)	(5114.7)
Construction (MILCON)	(2.3)	(+14.8)	(17.1)
Total Then-Year $	19219.8	+3774.8	22994.6
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	304	+223	527
Total	304	+223	527
c. Unit Cost --			
Procurement:			
FY 86 Base-Year $	44.827	-14.535	30.292
Then-Year $	58.018	-18.020	39.998
Program:			
FY 86 Base-Year $	49.682	-16.080	33.602
Then-Year $	63.223	-19.590	43.633

d. Approved Design to Cost Goal--N/A
e. Foreign Military Sales -- None
f. Nuclear Costs -- None

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

	Current Year		Budget Year
	SAR Current Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	22994.6	22940.0	22994.6
(2) Quantity	527	527	527
(3) Unit Cost	43.6	43.5	43.6
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	586.4	586.4	893.4
Less CY Adv Proc	84.3	84.3	84.8
Plus PY Adv Proc	80.7	80.7	84.3
Net Total	582.8	582.8	892.9
(2) Quantity	7	7	12
(3) Unit Cost	83.3	83.3	74.4

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Developement Estimate	1569.1	17637.6	13.1	19219.8
Previous Changes:				
Economic	-11.9	-29.6	-	-41.5
Quantity	-	+9561.8	-	+9561.8
Schedule	-	-859.2	-	-859.2
Engineering	+221.8	-	-	+221.8
Estimating	+70.8	-5925.4	+0.7	-5853.9
Support	-	+691.2	-	+691.2
Other	-	-	-	-
Subtotal	+280.7	+3438.8	+0.7	+3720.2
Current Changes:				
Economic	+2.7	+203.6	-	+206.3
Quantity	-	-	-	-
Schedule	-	-22.6	-	-22.6
Engineering	-	-	-	-
Estimating	-13.3	+603.9	+62.8	+653.4
Support	-	-782.5	-	-782.5
Other	-	-	-	-
Subtotal	-10.6	+2.4	+62.8	+54.6
Total Changes	+270.1	+3441.2	+63.5	+3774.8
Current Estimate	1839.2	21078.8	76.6	22994.6

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1464.9	13627.5	10.8	15103.2
Previous Changes:				
Quantity	-	+6852.8	-	+6852.8
Schedule	-	-457.8	-	-457.8
Engineering	+174.4	-	-	+174.4
Estimating	+57.2	-4391.1	+1.0	-4332.9
Support	-	+521.1	-	+521.1
Other	-	-	-	-
Subtotal	+231.6	+2525.0	+1.0	+2757.6
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-29.9	-	-29.9
Engineering	-	-	-	-
Estimating	-11.8	+454.4	+47.7	+490.3
Support	-	-612.9	-	-612.9
Other	-	-	-	-
Subtotal	-11.8	-188.4	+47.7	-152.5
Total Changes	+219.8	+2336.6	+48.7	+2605.1
Current Estimate	1684.7	15964.1	59.5	17708.3

15. 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.

Estimating: assessment of outyear funding requirements less Congressional reduction

Procurement:

Quantity: increase in the number of F-14D aircraft from 304 to 527

Estimating: reduction of 177 new production F-14Ds and an addition of 400 remanufactured aircraft at significantly lower unit cost

MILCON: N/A

c. Current Change Explanation --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E:		
Revised Jan 89 economic escalation rate (Economic)	N/A	+2.7
Congressional adjustment to the FY-88 budget (-$20.8M) and partial funding of equitable adjustment settlement between the Navy and Grumman Corporation (FY-88 +$3.9M and FY-89 +$8.0M) (Estimating)	-11.8	-13.3
(2) Procurement:		
Revised Jan 89 economic escalation rate (Economic)	N/A	+203.6
FY-90 slip of 7 A/C to be procured FY-96 through FY-98, decrease based on assumption that the 7 A/C will be F-14A(PLUS)s vice F-14As and will already contain the upgraded engine (Schedule)	-29.9	-22.6
Revised F-14D(R) estimate based on recent proposal information, APG-71 repricing and better definition of F-14D(R) program (Estimating)	+454.4	+603.9
Support equipment decrease required to offset F-14D(R) increases. Reductions in A/F, engine and avionics PGSE $543.7M, peculiar training and pub/tech data $204M, etc (Support)	-612.9	-782.5
(3) MILCON		
Revised estimates to include: avionics shop and maintenance hanger, aircraft parking apron, aircraft acoustical enclosure, etc. (Estimating)	+47.7	+62.8

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

a. Initial SAR Estimate to Current Estimate

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
63.223	+.313	-8.610	-1.673	+.421	-9.868	-.173	0	-19.590	+43.633

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

FY-84-90 FSD	Initial Contract Price		
	Target	Ceiling	Qty
Grumman Aerospace Corp Bethpage, NY N00019-84-C-0015 ** Award: July 31, 1984 Definitized: December 16, 1986	984.3	N/A	0*

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	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.

** 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).

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

b. Procurement —

FY-87-AAC	Initial Contract Price		
	Target	Ceiling	Qty
Grumman Aerospace Corp Bethpage, NY N00019-87-C-0131, AAC * Award: November 30, 1987 Definitized: TBD	467.0	467.0	7 *

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

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
N/A	467.0	7	467.0 1/	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

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

1/ Not to exceed price establised during AAC award. AAC for 5 F-14A(PLUS)s and 7 F-14Ds. Current target is estimated amount for F-14Ds.
2/ Contract in currently in negotiations. It is inappropriate to disclose program manager's estimate due to sensitivity of pricing.

c. MILCON--N/A

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

a. Program Status --

(1) Percent Program Completed: 31% (5/16).
(2) Percent Program Cost Appropriated: 7.9% (1837.9 /22994.6)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY83-88)	Budget Year (FY 89)	Balance to Complete FYDP (FY90-93)	Balance to Complete Beyond FYDP (FY93-98)	Total
RDT&E	1101.1	151.9	436.2	150.0	1839.2
Procurement	729.8	893.4	6858.6	12597.0	21078.8
MILCON	7.0	-	36.6	33.0	76.6
Total	1837.9	1045.3	7331.4	12780.0	22994.6

c. Annual Summary --

Fiscal Year	Qty	FY 86 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1983	-			7.0			6.5	4.90
1984	-			42.0			40.3	3.80
1985	-			279.1			275.7	3.40
1986	-			342.2			347.6	2.80
1987	-			251.1			263.0	2.70
1988	-			154.6			168.0	3.70
1989	-			134.8			151.9	3.80
1990	-			112.8			131.4	3.60
1991	-			113.1			135.8	3.30
1992	-			110.9			133.3	2.80
1993	-			23.8			30.0	2.30
1994	-			23.3			30.0	2.30
1995	-			22.8			30.0	2.30
1996	-			22.2			30.0	2.30
1997	-			21.7			30.0	2.30
1998	-			21.3			30.0	2.30
Subtotal	-			1684.7			1939.2	
Appropriation: APN								
1987	-	45.6	-	118.0	80.0	-	131.4	2.70
1988	7	115.4	300.5	526.9	84.3	80.0	598.4	3.70
1989	12	62.5	505.2	762.6	84.8	84.3	893.4	3.80
1990	12	91.1	540.0	793.2	184.3	84.8	958.9	3.60
1991	30	134.4	914.3	1204.5	229.2	184.3	1491.7	3.30
1992	42	151.0	1114.4	1577.3	240.9	229.2	1998.1	2.80
1993	60	115.8	1440.9	1860.3	244.6	240.9	2409.9	2.30
1994	72	129.8	1636.1	2050.5	246.0	244.6	2716.3	2.30
1995	72	120.7	1570.9	1994.3	253.8	246.0	2702.9	2.30
1996	72	80.5	1582.3	1938.4	252.5	253.8	2687.4	2.30
1997	74	80.3	1505.3	1813.8	228.6	252.5	2572.8	2.30
1998	72	71.9	1166.2	1324.3	-	228.6	1917.6	2.30
Subtotal	527	1208.8	12276.6	15964.1	2129.0	2129.0	21078.8	
Appropriation: MILCON								
1987				0.5			0.5	2.70
1988				5.8			5.5	3.70
1989				-			-	3.80
1990				-			-	3.60
1991				2.8			3.4	3.30
1992				2.7			3.4	2.80
1993				23.1			29.8	2.30
1994				7.4			9.8	2.30
1995				17.2			23.2	2.30
Subtotal (RDT&E/APN/MILCON)				59.5			76.6	
Total	527	1208.8	12276.6	17708.3	2129.0	2129.0	22994.6	

d. Obligations and Expenditures -

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	TOTAL	Obligated	Expended
Appropriation: RDT&E			
1983	6.5	6.5	6.5
1984	40.3	40.3	37.4
1985	275.7	275.7	255.8
1986	347.6	347.6	327.5
1987	263.0	262.7	236.4
1988	168.0	113.6	16.1
To Complete	738.1	N/A	N/A
Total	1,839.2	1046.4	879.7
Appropriation: APN			
1987	131.4	-	-
1988	598.4	-	-
To Complete	20,349.0	N/A	N/A
Total	21,078.8	-	-
Appropriation: MILCON			
1987	.5	.3	.1
1988	6.5	-	-
To Complete	69.6	N/A	N/A
Total	76.6	.3	.1

17. Production Rate Data

a. Annual Production Rates -- F-14D program is in full scale development.

Production Rates (Quantity/Year)

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1988	7	N/A	7 1/	N/A
1989	18	N/A	12	N/A
1990	24	N/A	12	N/A
1991	36	N/A	30	N/A
1992	30	N/A	42	N/A
1993	30	N/A	60	N/A
1994	30	N/A	72	N/A
1995	30	N/A	72	N/A
1996	30	N/A	74	N/A
1997	30	N/A	74	N/A
1998	39	N/A	72	N/A

1/ F-14C is Milestone II FSD.

17. Production Rate Data (Con't)

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 $)	N/A	N/A	17708.3	0	N/A
(TY $)	N/A	N/A	22994.6	0	N/A
PAUC - (BY $)	N/A	N/A	33.602	0	N/A
(TY $)	N/A	N/A	43.633	0	N/A

c. Schedule Variance --

Item	Production Estimate	Variance (CE less Pd E)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	4/1987	N/A	N/A
Duration (in Months)	N/A	N/A	161	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	9/2000	N/A	N/A

Deliveries (Plan/Actual) --

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

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 of 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 costs 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.

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

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 catagories: 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.

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-86 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	13.50	14.71
O&S Consumables	5.49	6.01
Direct Depot Maintenance	7.75	8.06
Sustaining Investments	4.91	4.64
Other Direct Costs	N/A	N/A
Indirect Costs	N/A	N/A
Total	31.65	33.43

SAR-87-068

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

AF-13 F-15

AS OF DATE: December 31, 1987

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

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

SAF/PAS

88-0125- 1

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 27130F/27134F
PE 64739F (Shared Funding)
PROCUREMENT: APPN 3010, ICN F015AD; PE 27130F/27134F

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 88-T-0502

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. In March 1970, Pratt and Whitney was selected to develop and produce an engine jointly for the Air Force F-15 and Navy F-14 Programs. The F-14 Program was redirected and the Navy did not exercise its production option. This caused a major restructuring of the engine program. Although the original F-15 Production Rate was scheduled to be 12 aircraft per month, actual procurement reached a high of nine aircraft per month. The FY 1978 procurement introduced the F-15 C/D models, which had an additional 2000 lbs of internal fuel capacity and provisions for Conformal Fuel Tanks (CFTs) and a Programmable Signal Processor (PSP), allowing radar enhancement through software changes. This provides a less costly and faster radar upgrade capability. The first PSP equipped F-15 C/D aircraft were delivered to Camp New Amsterdam, NL (CNA) in June 1980. A new PSP software tape containing a Raid Assessment Mode (RAM) as well as a host of other improvements was fielded in Europe in May 1981. F-15 Program Management Directive (PMD) R-P2060(33)/27130F, dated 18 November 1981, directed initial planning for implementation of the Multistaged Improvement Program (MSIP). 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 enhancements to Fire Control and Weapons Delivery Systems, Tactical Electronic Warfare Systems (TEWS), and secure Communications Systems. The contract for MSIP Phase I, involving the study effort for full scale development was awarded to McDonnell Douglas Corporation 13 August 1982. Planning for development of an F-15 derivative configuration with Air-to-Ground capability was also directed. On 1 October 1982, management responsibility for all fielded F-15 aircraft was transferred to AFLC under the F-15 Program Management Responsibility Transfer (PMRT) Agreement. AFSC still maintains responsibility for all production and R&D efforts on the F-15 Program.

F-15 PMD R-P2060(37)/27130F, dated 14 Apr 1983, directed a comparison be made between the 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 not only their ability to fulfill Air-to-Air combat requirements, but also 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 CY 1984.

7. (U) Program Highlights:

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

During the CY 1985, the F-15 MSIP Program experienced a number of successes, beginning with the delivery of the first MSIP aircraft in June 1985. Four MSIP aircraft participated in a two week Green Flag exercise at Nellis AFB in August, flying a total of 61 sorties. Of these 61 sorties, only 1 MSIP failure was noted, with 50 of the remaining 60 sorties having no write-ups at all.

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. ASAT (Anti-Satellite Missile System) successfully tested in November 1985, hitting the targets designated. Additionally, the QRC (Quick Reaction Capability) ALQ-135 began flight testing in April 1986. The test program lost aircraft D-50 (MSIP test aircraft) in December 1985, however, it was replaced by D-54. The loss of D-50 caused only minor impacts to the F-15 test program.

The F-15 program experienced a number of successes in CY86, beginning with Flight Testing of AMRAAM (Advanced Medium Range Air-to-Air Missiles) on both MSIP and non-MSIP F-15 aircraft.

In the production environment, the ALE-45 began production installation during July, while the ALR-56C began field installation in December. Software qualification testing (SFQT) was completed on the ALQ-135, and Northrop began production on the Quick Reaction Capability (QRC) ALQ-135 in September 1986.

The F-15/F100-PW-100 DEEC (Digital Electronic Engine Control)/Gearpump Field Service Evaluation was a two year program using 17 F-15 C/D aircraft assigned to the 57th Fighter Weapons Wing at Nellis AFB, NV. Aircraft flew over 4,800 sorties 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. Over 2,800 pages of Tech data were verified, and this directly supported the Tech Order (TO) verification for the F100-PW-220 activation at Eglin AFB, FL. The Field Service Evaluation (FSE) identified several production problem areas that were corrected prior to F100-PW-220 engine production.

The F100-PW-220 powered F-15 C/Ds began delivery to Eglin in July 1986. The deployment began six (6) months ahead of schedule to ensure that all of the aircraft assigned to the 33rd Tactical Fighter Wing (TFW) would have the same engine model. In addition, all of the I-Level (Intermediate Level) engine TOs and 95% of the O-Level (Operational Level) TOs were validated and verified prior to the first aircraft delivery.

The F-15E program completed Preliminary Design Review (PDR) on 25 March 1985 and its Critical Design Review (CDR) on 4 November 1985, leading to the first flight which successfully occurred on 11 December 1986 at the McDonnell Douglas facility in St. Louis, Missouri.

7. (U) Program Highlights:

b. (U) Significant Developments Since Last Report -- The production of APG-63 Fire Control Radar ceased as the first F-15C was delivered with an APG-70 radar in June 1986. To date, the new radar has demonstrated significantly higher reliability than its predecessor. The new ALE-45 Countermeasures Dispenser was deployed to the tactical air forces in Europe and the Pacific. The nose radome, which had been difficult to maintain, were redesigned , tested, and entered into production in a configuration which will require considerably less maintenance. An agreement was forged with AFLC (Air Force Logistics Command) to effect program management responsibility transfer (PMRT) for MSIP (Multi-stage Improvement Program) items in October 1987. The second F-15E first flew in May 1987 and entered flight test at Edwards AFB shortly thereafter.

The F-15 currently satisfies its mission requirements.

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: DCP #19, Revision C, 5 May 1977, as amended 21 February 1980. DCP Procurement Cost Threshold has been breached.

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/ NA	Sep 70
Critical Design Review (CDR)	Apr 71/ NA	Apr 71
Engine Preliminary Flight Rating Test (PFRT)	Feb 72/ NA	Feb 72
First Flight	Jul 72/ NA	Jul 72
Long Lead Release (Production Approval)	Oct 72/Oct 72	Oct 72
Engine Qualification Test (EQT)	Feb 73/ NA	Oct 73
First Wing Full Release	Feb 73/ NA	Feb 73
Fatigue Test - Three Life Times	Nov 73/ NA	Oct 73
Increase Production Rate	Jan 74/ NA	Jan 74
Begin AFDT&E Tests	Mar 74/ NA	Feb 74
Fatigue Test - Four Life Times	Jul 74/ NA	Feb 74
First Aircraft to TAC	Nov 74/ NA	Nov 74
Exercise Option for 2nd Wing	Dec 74/ NA	Oct 74
Initial Operational Capability (IOC) A/	Jul 75/Sep 75(Chl)	Sep 75
Last F-15 MSIP Aircraft	-/May 88(Chl)	May 88(Chl)

9. (U) Schedule (Continued):

a. (U) Milestones

	Development Estimate/ Approved Program	Current Estimate
F-15E		
Contract Award (Letter Contract)	Apr 84/Apr 84	Apr 84
System Integration PDR	Mar 85/NA	Mar 85
System Integration CDR	Nov 85/NA	Nov 85
Begin Flight Test (F-15E)	Jan 87/NA	Dec 86
IOC (F-15E) B/	Jun 89/Sep 89(Ch1)	Sep 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.

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.

9. (U) Schedule (Continued):

c. (U) Current Change Explanations--(Ch-1) To reflect USD(A) baseline approval, 9 Feb 1988.

d. (U) References--

(U) Development Estimate:

(1) F-15A/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:

(1) F-15A/B/C/D
PMD R-P2060(43)/27130F/F-15, dated 19 September 1985 (as amended by PMD R-P 2060(44)/27130F/F-15, dated 24 March 1986) and DCP #19C, dated 5 May 1977 (as amended 21 February 1980);USD(A) Memo, 9 Feb 1988.
(2) F-15E
PMD R-P2060(43)/27130F/F-15, dated 19 September 1985, as amended by message PMD R-P 2060(44)/27130F/F-15, dated 24 March 1986; USD(A) Memo, 9 Feb 1988.

10. (U) Technical/Operational Characteristics:

	Development Estimate/ Approved Program	a/ Demonstrated Performance	Current Estimate
a. (U) Technical			
(U) F-15A/B/C/D			
(U) Thrust to Weight Ratio Take-Off	1.17/	NA	1.15	1.15
(U) Take-Off Thrust Engine (lbs)				
(U) Max Rated	23470	/ NA	23759	23759
(U) Mil Rated	14120	/ NA	14626	14626
(U) Take-Off Gross Weight (lbs)	40000	/41,500(GhD	41491	41500
(U) Design Mission Radius (NM)	(b)(1)		(b)(1)	
(U) F-15E AIR-TO-GROUND CONFIGURATION b/ e/				
(U) Take-Off Gross Weight (lbs)	81000	/81000	81000	81000
(U) Mission Radius (NM)	(b)(1)		(b)(1)	

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

	Development Estimate/ Approved Program	a/ Demonstrated 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/ NA	N/A	12100
(U) Max Rated	25950/ NA	N/A	25950
(U) Take-Off Gross Weight (lbs)	62500/ NA	N/A	62500
(U) Design Mission Radius (NM)			
[redacted] Cruise	200/ NA	N/A	200
[redacted] Dash	215/ NA	N/A	215
b. (U) Operational			
(U) F-15A/B/C/D			
(U) Max Speed/Sea Level, Sustained (Mach)	1.2/ 1.2	1.16	1.2
(U) Max Speed/At Altitude, Sustained (Mach)	2.3/ 2.3	2.3	2.3
(U) Max Speed/Burst (Mach)	2.5/ 2.5	2.5	2.5
(U) Take-Off Distance: 50 ft Obstacle (Ft)	2500 / NA	2313	2313
(U) Landing Distance: 50 ft Obstacle (Ft)	3840 / NA	3773	3773
(U) System Serial Mean Time Between Failure (Hr)	3.5/ NA	3.8	3.8
(U) System Operationally Ready Rate (%)	70 / NA	80	80
(U) Direct Maintenance Man-Hours Per Flight Hour (MMH/FH)	20.8/ 12.04(Ch-1)	12.04	12.04
(U) Specific Excess Power (Ft/Sec)	[redacted]		[redacted]

(b)(1) [redacted]

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

	Development Estimate Approved Program	a/ Demonstrated 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 / NA	N/A	3590
(U) Max Speed/Sea Level, Sustained (Mach) c/	.97/ NA	N/A	.97
(U) Max Speed/Sea Level, Sustained (Mil Power) (Mach) c/	.84/ NA	N/A	.84
(U) Direct Maintenance Man-Hours per flight hour	-/11.95(CH-1)		-/11.95(CH-1)
(U) Maximum Sustained Load Factor (G)	(b)(1)		
(U) F-15E AIR-TO-AIR CONFIGURATION: e/ f/			
(U) Max Speed/Sea Level, Sustained (Mach)	1.04/ 1.04	N/A	1.04
(U) Max Speed at Altitude, Sustained (Mach)	1.76/ 1.76	N/A	1.76
(U) Max Speed, Burst (Mach)	1.76/ 1.76	N/A	1.76
(U) Thrust to Weight Ratio at Take-Off	.67/ NA	N/A	.67
(U) Take-Off Distance/50 Ft Obstacle (Ft)	3520 / NA	N/A	3520
(U) Landing Distance/50 Ft Obstacle (Ft)	5000 / NA	N/A	5000
(b)(1)			
(U) Specific Excess Power (Ft/Sec)	(b)(1)	(b)(1)	

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.

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

d. (U) Current Change Explanations -- (Ch-1) To reflect USD(A) baseline approval, 9 Feb 1988.

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:
(1) F-15 A/B/C/D
PMD R-P2060(43)/27130F/F-15, dated 19 September 1985 (as amended by message PMD R-P 2060(44)/27130F/F-15, dated 24 March 1986) and DCP #19C, dated 5 May 1977 (as amended 21 February 1980). Air Force Estimates as a result of Source Selection and Contract Definitization; USD(A) Memo, 9 Feb 1988.
(2) F-15E
PMD R-P2060(43)/27130F/F-15, dated 19 September 1985 (as amended by message PMD R-P 2060(44)/27130F/F-15, dated 24 March 1986). Air Force Estimates as a result of Source Selection and Contract Definitization; USD(A) Memo, 9 Feb 1988.

(F-15, December 31, 1987)

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

	Development Estimate	Changes	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$ 1657.8	+738.4	$2396.2
Procurement	4333.2	+6575.5	10908.7
Airframe	(1679.1)	(+2798.0)	(4477.1)
Engines	(832.4)	(+1327.0)	(2159.4)
Electronics	(866.8)	(+936.7)	(1803.5)
Armament	(111.8)	(-6.8)	(105.0)
Other Hardware	(18.2)	(+70.5)	(88.7)
Total Flyaway	(3508.3)	(+5125.4)	(8633.7)
Peculiar Support	(449.2)	(+1057.6)	(1506.8)
Initial Spares	(375.7)	(+392.5)	(768.2)
Construction (MILCON) 1/	--	--	--
Total: FY 70 Base-Year $	5991.0	+7313.9	13304.9
Escalation	1364.2	+24024.9	25389.1
Development (RDT&E)	(120.8)	(+818.2)	(939.0)
Procurement	(1243.4)	(+23206.7)	(24450.1)
Total Then Year $	7355.2	+31338.8	38694.0

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

b. (U) Quantities --

Development (RDT&E)	20	--	20
Procurement	729	+537	1266
Total	749	+537	1286

c. (U) Unit Cost --

Procurement:			
FY 70 Base-Year $	$ 5.944	$+ 2.673	$ 8.617
Then Year $	7.650	+ 20.280	27.930
Program:			
FY70 Base-Year $	7.999	+ 2.347	$ 10.346
Then Year $	9.820	+ 20.269	30.089

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

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

e. (U) Foreign Military Sales -- Sales to date total 127 aircraft at an estimated cost of $4432.3M, broken out by country as follows:

Country	Quantity	Estimated Cost
Israel	51	$1371.7M
Japan	14	292.6M
Saudi Arabia	62	2768.0M
Total	127	4432.3M

All FMS deliveries have been completed; therefore, there will be no further impact on USAF Costs or Schedule.

f. (U) Nuclear Costs -- None

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

		Current Year		Budget Year
		Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. (U)	Program Acquisition--			
(1)	Cost	38694.0	37070.2	38694.0
(2)	Quantity	1286	1286	1286
(3)	Unit Cost	30.089	28.826	30.089
b. (U)	Current Procurement--	(FY 1988)	(FY 1988)*	(FY 1989)
(1)	Cost	1560.7	1560.7	1505.9
	Less CY Adv Proc	- 154.2	- 154.2	- 100.7
	Plus PY Adv Proc	+ 139.4	+ 139.4	+ 154.2
	Net Total	1545.9	1545.9	1559.4
(2)	Quantity	42	42	36
(3)	Unit Cost	36.807	36.807	43.317

* Adjusted to reflect FY88 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	TOTAL
Development Estimates	1778.6	5576.6	7355.2
Previous Changes			
Economic	- 12.5	+ 669.7	+ 657.2
Quantity	+ 0.0	+14749.2	+14749.2
Schedule	+ 0.0	+ 3022.4	+ 3022.4
Engineering	+ 1074.9	+ 2949.4	+ 4024.3
Estimating	+ 153.0	- 38.1	+ 114.9
Other	+ 208.6	+ 559.1	+ 767.7
Support	+ 113.0	+ 6266.3	+ 6379.3
Subtotal	+ 1537.0	+28178.0	+29715.0
Current Changes			
Economic	- 3.1	- 14.8	- 17.9
Quantity	+ 0.0	+ 0.0	+ 0.0
Schedule	+ 0.0	+ 285.9	+ 285.9
Engineering	+ 26.3	+ 0.0	+ 26.3
Estimating	+ 7.6	+ 974.3	+ 981.9
Other	+ 0.0	+ 0.0	+ 0.0
Support	- 11.2	+ 358.8	+ 347.6
Subtotal	+ 19.6	+ 1604.2	+ 1623.8
Total Changes	+ 1556.6	+29782.2	+31338.8
Current Estimate	3335.2	35358.8	38694.0

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	TOTAL
Development Estimates	1657.8	4333.2	5991.0
Previous Changes			
Quantity	+ 0.0	+ 3365.7	+ 3365.7
Schedule	+ 0.0	+ 513.9	+ 513.9
Engineering	+ 490.2	+ 723.0	+ 1213.2
Estimating	+ 60.0	- 127.1	- 67.1
Other	+ 173.9	+ 445.2	+ 619.1
Support	+ 7.4	+ 1384.7	+ 1392.1
Subtotal	+ 731.5	+ 6305.4	+ 7036.9
Current Changes			
Quantity	+ 0.0	+ 0.0	+ 0.0
Schedule	+ 0.0	+ 0.0	+ 0.0
Engineering	+ 9.8	+ 0.0	+ 9.8
Estimating	+ 1.3	+ 204.7	+ 206.0
Other	+ 0.0	+ 0.0	+ 0.0
Support	- 4.2	+ 65.4	+ 61.2
Subtotal	+ 6.9	+ 270.1	+ 277.0
Total Changes	+ 738.4	+ 6575.5	+ 7313.9
Current Estimate	2396.2	10908.7	13304.9

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).

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.

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.

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.

13. (U) Cost Variance Analysis:

c. (U) Current Change Explanations--

(1) (U) RDT&E

	(Dollars in Millions) Base-Year $	Then-Year $
Revised economic escalation indices. (Economic)	$ + 0.0	$ - 3.1
Development of a new central computer for the F-15E with Very High Speed Integrated Circuit (VHSIC) technology (Engineering)	+ 9.8	+ 26.3
Adjustment for current and prior years for escalation (Estimating)	+ 1.4	+ 3.9
Restructure of the Flight Test Program (Estimating)	- 5.0	- 9.9
Refinement of estimate for the F-15 Multi-Staged Improvement Program (MSIP) (Estimating)	- 0.9	- 2.8
Revised estimate for RF Compatibility and other avionics improvements (Estimating)	+ 5.2	+ 14.1
Revised estimate to add one additional year for Program Office operations (Estimating)	+ 0.6	+ 2.3
Revised estimate for TEWS Intermediate Support System (TISS) and other depot support equipment (Support)	- 4.2	- 11.2

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	- 14.8
Rescheduling of aircraft from FY89 thru FY98 (Schedule)	+ 0.0	+ 285.9
Adjustment for current and prior years for escalation (Estimating)	+ 10.7	+ 41.3
Deferral of R&M Improvements to the Radar Warning Receiver (Estimating)	+ 0.0	+ 2.8
Deferral of Engineering changes (Estimating)	+ 0.0	+ 7.2
Revised estimate resulting from Engine Competition (Estimating)	- 0.5	- 2.6
Revised estimate of Air Vehicle and non recurring costs (Estimating)	+ 194.5	+ 925.6
Adjustment for current and prior years for escalation (Support)	+ 4.2	+ 15.9
Revised estimate for Operational and Intermediate (O&I) and depot support equipment (Support)	- 2.9	- 10.6

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13. (U) Cost Variance Analysis:

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

	(Dollars in Millions) Base-Year $	Then-Year $
(2) (U) Procurement		
Deferral of Maintenance Trainers, Mobile Shelters and Sustaining Engineering for Support Equipment (Support)	+ 0.0	+ 11.1
Revised Initial Spares Estimate (Support)	- 36.8	- 170.0
Decision to defer depot support equipment from FY89 to FY97 (Support)	+ 0.0	+ 19.7
Revised estimate for Peculiar Avionics Support Equipment (Support)	+ 15.2	+ 70.0
Revised estimate for Training, Support Equipment and Data (Support)	+ 85.7	+ 422.7

d. (U) References --

(U) Development Estimate:
AF Form 1037 - Quarterly Review -- January 5, 1970.

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	+0.497	+7.368	+2.573	+3.150	+0.853	+5.231	+0.597	+20.269	30.089

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

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 B/	
Target	Ceiling	Qty	Contractor	Program Manager
$ 385.6	$ N/A	N/A	$ 404.1	$ 414.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -20.6	$ - 16.3
Cumulative Variances to Date (12/31/87)	-16.5	- 11.3
Net Change	+ 4.1	+ 5.0

Explanation of Change:

(U) Cost Variance is marginal; Schedule Variance is satisfactory. Major Subcontractor on FPI contract is going to ceiling.
Impact: APG-70 Radar Software was one year late on delivery. Radar Hardware delivery will occur on schedule. Initial capability of the system is no less than the APG-63.

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 B/	
Target	Ceiling	Qty	Contractor	Program Manager
$ 343.0	$ 381.2	65	$ 381.2	$ 430.4

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

b. (U) Procurement (continued)

Band III, Internal Countermeasures Set (continued)

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -18.6	$ -15.0
Cumulative Variances to Date (12/31/87)	-65.2	-21.8
Net Change	-46.6	- 6.8

Explanation of Change:

(U) Cost Variance is unsatisfactory and Schedule Variance is marginal. Previous Cumulative Cost and Schedule Variances are zero due to an Over-Target Baseline (OTB) which was implemented on this contract in November 1985. Since the implementation of the OTB, Contract Change Proposal (CCP) 94 was added to the contract which resulted in continued cost and schedule variances. Slow Hardware and Software development are still the major causes of these variances. Impact: Hardware deliveries are approximately twelve months late, and flight testing is approximately six months late. Initial Quick-Reaction Capability (QRC) system deployment planned for the summer of 1987 has slipped. The F-15 System Program Office (SPO) received QRC install system deployment from HQ TAC on 5 January 1988. In the Pre-Planned Product Improvement (P3I) area, hardware deliveries are approximately seven months late.

	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 A/
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

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

b. (U) Procurement (continued)

Engines Buy (Lot 14)
United Technologies, Pratt & Whitney,
West Palm Beach, FL
F33657-84-C-2014, FFP A/
Award: February, 1984 (CPR or C/SSR not required)
Definitized: February, 1984

Initial Contract Price		
Target	Ceiling	Qty
$ 896.9	$ N/A	78

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

F-15E/AMSIP/Prod Nonrecurring
McDonnell Douglas, St. Louis, MO
F33657-84-C-2228, FPIF
Award: March 11, 1985
Definitized: March 11, 1985

Initial Contract Price		
Target	Ceiling	Qty
$ 373.4	$ 416.3	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 500.3	$558.9	N/A	$ 558.9	$ 558.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -34.6	$ -14.7
Cumulative Variances to Date (12/31/87)	-63.8	-25.6
Net Change	-29.2	-10.9

Explanation of Change:

(U) Cost Variance is unsatisfactory and Schedule Variance is marginal. 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.

15. (U) Contract Information: (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 A/
Award: August, 1987
Definitized: August, 1987

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 304.3	$ 345.7	129	$ 304.3	$ 304.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ + 0.0	$ + 0.0
Cumulative Variances to Date (12/31/87)	- 7.1	+ 0.6
Net Change	- 7.1	+ 0.6

Explanation of Change:

(U) Cost Variance is unsatisfactory. Schedule Variance is satisfactory. The cost variances are caused by labor expenditures being in excess of the interim budget released under the letter contract. Northrop is currently revising the budgets per definitized contract amounts.
Impact: No impact to major program milestones.

c. (U) MILCON -- NONE

A/ SAR requires reporting on the top six contracts for the program being reviewed. CPR data is not required on FFP Contracts.

B/ The variances between the Contractor and Program Manager Estimated Price at Completion reflects different methodologies in arriving at the estimated price at completion.

C/ Reporting change to the six largest contracts represent production lot buys being over 90% complete.

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

a. (U) Program Status --

(1) Percent Program Completed: 68.8% (22/32)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 64.3% ($24867.4M/$38694.0M)
(Funds Appropriated To Date in Millions/Total Program Funding in Millions)

b. (U) Appropriation Summary --

(Then Year Dollars in Millions)

Appropriation	Current & Prior Years (FY67-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Balance to Complete Beyond FYDP (FY93-98)	Total
RDT&E	$ 3049.9	$ 89.1	$ 132.0	$ 64.2	$ 3335.2
Procurement	$ 21817.5	$ 1505.9	$ 4547.5	$ 7487.9	$ 35358.8
MILCON	$ --	$ --	$ --	$ --	$ --
Total	$ 24867.4	$ 1595.0	$ 4679.5	$ 7552.1	$ 38694.0

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

c. (U) Annual Summary

FISCAL YEAR	BASE-YEAR DOLLARS QTY	FLYAWAY (NONADD) NONREC	FLYAWAY (NONADD) REC	TOTAL	THEN-YEAR DOLLARS ADV PROCUREMENT (DEBIT)	ADV PROCUREMENT (CREDIT)	TOTAL	ESCL RATE %
APPROPRIATION: RDT&E								
1967	--	--	--	1.1	--	--	1.0	3.2
1968	--	--	--	1.1	--	--	1.0	3.7
1969	--	--	--	78.2	--	--	75.5	3.5
1970	--	--	--	175.1	--	--	175.1	3.6
1971	--	--	--	338.3	--	--	349.5	3.3
1972	--	--	--	397.1	--	--	422.9	3.1
1973	--	--	--	408.6	--	--	454.4	4.4
1974	--	--	--	223.8	--	--	258.0	3.7
1975	--	--	--	154.2	--	--	184.2	3.6
1976	--	--	--	28.2	--	--	34.9	3.6
1977T	--	--	--	3.9	--	--	5.3	4.4
1977	--	--	--	43.3	--	--	59.6	4.6
1978	--	--	--	41.7	--	--	61.1	7.0
1979	--	--	--	7.2	--	--	11.7	8.4
1980	--	--	--	1.4	--	--	2.5	9.4
1981	--	--	--	5.8	--	--	11.6	11.9
1982	--	--	--	15.6	--	--	33.3	9.2
1983	--	--	--	50.8	--	--	114.0	4.9
1984	--	--	--	54.2	--	--	126.2	3.8
1985	--	--	--	79.4	--	--	190.8	3.4
1986	--	--	--	88.6	--	--	218.4	2.8
1987	--	--	--	60.2	--	--	153.3	2.7
1988	--	--	--	40.0	--	--	105.6	3.7
1989	--	--	--	32.5	--	--	89.1	3.8
1990	--	--	--	20.6	--	--	58.3	3.6
1991	--	--	--	12.6	--	--	36.9	3.3
1992	--	--	--	12.3	--	--	36.8	2.8
1993	--	--	--	8.0	--	--	24.6	2.3
1994	--	--	--	6.1	--	--	19.2	2.3
1995	--	--	--	4.0	--	--	12.8	2.3
1996	--	--	--	2.3	--	--	7.6	2.3
1997	--	--	--	0.0	--	--	0.0	2.3
1998	--	--	--	0.0	--	--	0.0	2.3
SUBTTL	20	-- 1/	-- 1/	2396.2	--	--	3335.2	

1/ Not Available

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

c. (U) Annual Summary

FISCAL YEAR	BASE-YEAR DOLLARS QTY	FLYAWAY (NONADD) NONREC	FLYAWAY (NONADD) REC	BASE-YEAR DOLLARS TOTAL	THEN-YEAR DOLLARS ADV PROCUREMENT (DEBIT)	ADV PROCUREMENT (CREDIT)	THEN-YEAR DOLLARS TOTAL	ESCL RATE %
APPROPRIATION: PROCUREMENT								
1973	30	3.3	269.6	344.5	--	--	478.1	7.9
1974	62	15.4	425.7	575.2	--	--	903.1	10.7
1975	72	1.6	434.4	542.1	30.9	--	927.0	13.8
1976	108	11.4	649.4	828.2	37.2	30.9	1522.3	12.5
1977	24	4.8	135.1	163.1	--	--	322.2	5.3
1978	108	6.1	617.0	712.1	51.4	37.2	1418.6	5.0
1979	97	3.5	598.3	711.6	69.6	51.4	1517.2	7.4
1980	78	0.7	435.0	536.5	81.4	69.6	1386.8	8.7
1981	60	--	330.6	365.1	77.9	81.4	1056.6	9.7
1982	42	--	261.5	349.4	125.1	77.9	1101.8	11.9
1983	36	--	260.2	346.2	109.2	125.1	1148.5	9.6
1984	39	7.1	264.0	417.5	158.5	109.2	1467.7	9.0
1985	36	33.2	273.5	394.7	144.0	158.5	1446.0	8.0
1986	42	31.0	327.4	538.1	175.3	144.0	2034.5	3.4
1987	48	16.1	332.3	450.4	191.5	175.3	1759.8	2.8
1988	42	2.1	305.1	436.3	139.4	191.5	1766.6	2.7
1989	42	9.1	275.0	372.0	154.2	139.4	1560.7	3.7
1990	36	15.3	265.8	347.5	100.7	154.2	1505.9	3.8
1991	30	3.1	236.6	355.4	100.1	100.7	1585.5	3.6
1992	30	10.8	232.5	333.0	106.1	100.1	1524.6	3.3
1993	30	1.1	238.4	306.8	101.9	106.1	1437.4	2.8
1994	30	8.1	225.6	292.2	103.4	101.9	1400.4	2.3
1995	30	3.9	223.5	275.0	105.1	103.4	1348.0	2.3
1996	30	1.1	222.6	254.7	106.8	105.1	1277.4	2.3
1997	30	0.0	221.3	238.7	103.4	106.8	1224.8	2.3
1998	30	0.0	211.2	262.8	78.5	103.4	1379.5	2.3
SUBTTL	24	8.0	165.4	159.7	0.0	78.5	857.8	2.3
TOTAL	1266	196.9	8436.8	10908.7	2451.6	2451.6	35358.8	
	1286			13304.9			38694.0	

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

d. (U) Obligations and Expenditures --

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated 1/	Expended 1/
	Appropriation: RDT&E		
1967	1.0	1.0	1.0
1968	1.0	1.0	1.0
1969	75.5	75.5	75.5
1970	175.1	175.1	175.1
1971	349.5	349.5	349.5
1972	422.9	422.9	422.9
1973	454.4	454.4	454.4
1974	258.0	258.0	258.0
1975	184.2	184.2	184.2
1976	34.9	34.9	34.9
197T	5.3	5.3	5.3
1977	59.6	59.6	59.6
1978	61.1	61.1	61.1
1979	11.7	11.7	11.7
1980	2.5	2.5	2.5
1981	11.6	11.6	11.6
1982	33.3	33.3	33.3
1983	114.0	114.0	114.0
1984	126.2	126.2	126.2
1985	190.8	190.7	187.5
1986	218.4	218.3	165.3
1987	153.3	141.0	25.9
1988	105.6	1.6	0.3
TO COMPLETE	285.3	N/A	N/A
TOTAL	3335.2	2933.4	2760.8

1/ Reflects Program Office records as of 31 December 1987.

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

d. (U) Obligations and Expenditures --

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated 1/	Expended 1/
	Appropriation: Procurement		
1973	478.1	478.1	478.1
1974	903.1	903.1	903.1
1975	927.0	927.0	927.0
1976	1522.3	1522.3	1522.3
1977T	322.2	322.2	322.2
1977	1418.6	1418.6	1418.6
1978	1517.2	1517.2	1517.2
1979	1386.8	1386.8	1386.8
1980	1056.6	1056.6	1056.6
1981	1101.8	1101.8	1101.8
1982	1148.5	1148.5	1148.5
1983	1467.7	1467.7	1467.7
1984	1446.0	1419.8	1298.2
1985	2034.5	1977.8	1631.3
1986	1759.8	1471.1	1018.8
1987	1766.6	699.4	218.4
1988	1560.7	2.5	0.3
TO COMPLETE	12079.2	N/A	N/A
TOTAL	33896.7	18820.5	17416.9

1/ Reflects Program Office records as of 31 December 1987.

(F-15, December 31, 1987)

17. (U) Production Rate Data:

a. (U) Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate 1/	Current Estimate	Maximum
1973	30	30	30	30
1974	77	62	62	62
1975	144	72	72	72
1976	144	108	108	108
1977T		24	24	24
1977	144	108	108	108
1978	144	97	97	97
1979	46	78	78	78
1980		60	60	60
1981		42	42	42
1982		36	36	36
1983		39	39	39
1984		36	36	36
1985		42	42	42
1986		48	48	48
1987		48	42	42
1988		48	42	42
1989		48	36	36
1990		48	30	72
1991		48	30	136
1992		48	30	56
1993		48	30	
1994		48	30	
1995			30	
1996			30	
1997			30	
1998			24	

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	Change (Cur Est Less Prod Est)	Current Estimate	Change (Cur Est Less Maximum)	Maximum
Prog Acq Cost (BY$)	13167.2	+137.7	13304.9	+ 399.5	12905.4
Prog Acq Cost (TY$)	37978.5	+715.5	38694.0	+ 2022.4	36671.6
PAUC (BY$)	10.239	+0.107	10.346	+ 0.311	10.035
PAUC (TY$)	29.532	+0.557	30.089	+ 1.573	28.516

c. (U) Schedule Variance --

	Production Estimate	Change (Cur Est Less Prod Est)	Current Estimate	Change (Cur Est Less Maximum)	Maximum
Start Date (Mon/Yr)	Oct 1972	N/A	Oct 1972	N/A	Oct 1972
Duration (In Months)	284	14	298	50	248
End Date (Mon/Yr)	Apr 1996	N/A	Jul 1997	N/A	May 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	852/852*

*Reflects program office records as of 31 December 1987.

18. (U) Operating and Support Costs:

Not Applicable.

SAR-87-067

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

PROGRAM: F-16

AF-14 F-16

AS OF DATE: December 31, 1987

INDEX

CLEARED
FOR OPEN PUBLICATION
MAR 14 1988
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE
SAF/PAS
88-0121

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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: PE27133F
PROCUREMENT: PE27133F 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).

6. Mission and Description:

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

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gh reliability and simplified maintenance procedures to assure successful operations der 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.

b. Significant Developments Since Last Report--A total of 462 F-16C/D rcraft have been delivered to the USAF by the end of CY87 and the F-16C/D is operational at six USAF bases. The USAF F-16 fleet has flown in excess of 1,300,000 hours as of 31 December 1987. In addition, the F-16 is now operated by air forces of 11 different friendly nations, including the original European Participating Governments and firm orders exist for deliveries to 4 others. The 2000th F-16 to be produced was delivered to the Republic of Singapore Air Force in February 1988. The favorable F-16 FY87 mishap rates through 30 Sep set a new F-16 record as we continue the downward trend. The F-16 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 have been tasked by the Secretary of Defense to evaluate future F-16 variant configurations in order to complement the Advanced Tactical Fighter in the late 1990s, and to provide solutions for prospective future requirements of the F-16 European Participating Governments.

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

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

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

8. Decision Coordinating Paper (DCP) 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 (CH-1)	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 (CH-1)	Oct 77
First Flight, Production Aircraft	Aug 78/ NA	Aug 78
First Aircraft to TAC	Sep 78/Sep 78	Sep 78
Deliver 100th Production Aircraft to USAF	May 80/May 80	May 80
F-16A/B PMRT	N/A	Oct 85
F-16C/D Milestones		
Begin MSIP I	Feb 80/ NA	Feb 80
Program Direction-MSIP II	Dec 80/ NA	Dec 80
Begin MSIP II	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 TAF	Dec 84/Dec 84	Dec 84

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) To reflect USD(A) baseline approval, 9 Feb 1988.

d. References --

F-16A/B

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

Approved Program - Decision Coordinating Paper (DCP) #143, 29 November 1977, Aircraft Production Planning Schedule for USAF (WA 78-1)(January 1978); USAF Bases Units and Priorities (PD 80-3) (May 1978), USD(A) Memo, 9 Feb 1988.

F-16C/D

Development Estimate and Approved Program - F-16 Multinational Staged Improvement Program Baseline (December 1985). USD(A) Memo, 9 Feb 1988.

10. Technical/Operational Characteristics:

	Development Estimate/ Approved Program			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		5.1
Mach 0.9 (Deg per sec)	7.3	/	7.3		7.3
(3) Sustained Turn Rate, 200 ft., Air-to-Ground.					
500 KTAS (Deg per sec) [3] [5]	6.6	/	6.6		6.6
b. Operational					
F-16A/B					
(1) Mission Reliability (%)	85	/	NA	91	91
(2) Mean Flight Time Between Failure (MFTBF) (Hrs)	1.75	/	NA	3.05	3.50(Ch1
(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(Ch2)					
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			Demonstrated Performance	Current Estimate
	F-16C/D					
(8)	Mean Time Between Maint Action (MTBMA) (Hrs.)	3.0	/	NA	5.1(Ch3)	4.0(Ch4)
(9)	Air-to-Air Mission [1]					
	No./wt. per Missile	2/195	/	NA	2/195(Ch3)	2/195
	No./wt. of Ammo	500/280	/	NA	500/280(Ch3)	500/280
(10)	Air-to-Air Mission [2]					
	No./wt. per AIM-9L	2/195	/	NA	2/195(Ch3)	2/195
	No./wt. per AMRAAM	2/328	/	NA		2/345
	No./wt. of Ammo	500/280	/	NA	500/280(Ch3)	500/280
(11)	Air-to-Ground Mission [3]					
	No./wt. of Weapon	2/1980	/	NA	2/1980(Ch3)	2/1980
	No./wt. per Missile	2/195	/	NA	2/195(Ch3)	2/195
	No./wt. of Ammo	500/280	/	NA	500/280(Ch3)	500/280
(12)	Air-to-Ground Mission [4]					
	No./wt. of Weapon	4/1856	/	NA	4/1856(Ch3)	4/1856
	No./wt. per Missile	2/195	/	NA	2/195(Ch3)	2/ 195
	No./wt. of Ammo	500/280	/	NA	500/280(Ch3)	500/280
(13)	Total Mission Radius (NM)					
	Air-to-Air [1] [5]	420	/	420		480(Ch5)
	Air-to-Ground: Hi-Lo-Lo-Hi [3] [5]	465	/	465		465
	Air-to-Ground: Lo-Lo-Lo-Lo [3] [5]	295	/	295		295
(14)	Max Speed, Air-to-Ground 200ft [3] [5]					
	with weapons (kts)	565	/	565		565
	without weapons (kts)	580	/	580		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] Threshold values for Loadings 2 and 4 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 TOGW to accommodate an increase in payload requirements.

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

(3) Operational characteristic No. 10.b(2) 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.

F-16C/D - 10.b.(10) AMRAAM weight is 345 for current estimate.

d. Current Change Explanations

F-16A/B -
(Ch1) - 10.b.(2): Reliability performance continues to improve.
(Ch2) - 10.b.(7): This characteristic was inadvertantly placed in the F-16C/D section in the December 31, 1987 SAR; it pertains to the F-16A/B

F-16C/D -
(Ch3) - New data added.
(Ch4) - 10.b.(8): Reliability performance continues to improve.
(Ch5) - 10.b.(13): Current estimate improved relative to earlier analysis results.

e. References

F-16A/B

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

Approved Program - Decision Coordinating Paper (DCP) #143, 29 November 1977; USD(A) Memo, 9 Feb 1988.

F-16C/D

Development Estimate and Approved Program - F-16 Multinational Staged Improvement Program (F-16 C/D) Program Baseline (December 1985). USD(A) Memo, 9 Feb 1988.

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

	Development Estimate	Changes	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$ 578.6	$ +405.1	$ 983.7
Procurement	3798.2	+14365.7	18163.9
Airframe	(1375.4)	(+ 4288.8)	(5664.2)
Engine	(911.3)	(+ 2488.3)	(3399.6)
Electronics	(539.6)	(+ 3167.7)	(3707.3)
Armament	(171.6)	(+ 423.1)	(594.7)
Sys/Proj Mgt	(33.8)	(+ 483.9)	(517.7)
Total Flyaway	(3031.7)	(+10851.8)	(13883.5)
Peculiar Support	(435.2)	(+ 2096.1)	(2531.3)
Other Weapon System Cost	(--)	(+ 124.9)	(124.9)
Initial Spares	(331.3)	(+ 1292.9)	(1624.2)
Construction (MILCON)	--	--	--
Total FY 75 Base-Year $	$ 4376.8	$+14770.8	$19147.6
Escalation	1677.7	+26830.7	28508.4
Development (RDT&E)	(80.5)	(+ 406.4)	(486.9)
Procurement	(1597.2)	(+26424.3)	(28021.5)
Construction (MILCON)	--	--	--
Total Then-Year $	$ 6054.5	$+41601.5	$47656.0
b. (U) Quantities --			
Development (RDT&E)	8	--	8
Procurement	650	+ 2079	2729
Total	658	+ 2079	2737
c. (U) Unit Cost --			
Procurement:			
FY 75 Base-Year $	$ 5.843	$+ 0.813	$ 6.656
Then-Year $	8.301	+ 8.623	16.924
Program:			
FY 75 Base-Year $	6.652	+ 0.344	6.996
Then-Year $	$ 9.201	$+ 8.211	$ 17.412

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

e. (U) Foreign Military Sales --

(1) *348 for European ParticipatingGovernments (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 @ $945.0M (Then Year) for Belgium

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

e. (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 @ $3,192.8M (Then Year) for Egypt

(7) 150 @ $3,219.1M (Then Year) for Israel

(8) 36 @ $927.1M (Then Year) for Korea

(9) 40 @ $1,004.5M (Then Year) for Pakistan

(10) 160 @ $4,144.1M (Then Year) for Turkey

(11) 24 @ $615.0M (Then Year) for Venezuela

(12) 8 @ $202.3M (Then Year) for Singapore

(13) 18 @ $430.5M (Then Year) for Thailand

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

(15) 12 @ $350.6M (Then Year) for Bahrain

f. Nuclear Costs -- None

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

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

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. (U) Program Acquisition --			
(1) Cost	47656.0	47528.8	47656.0
(2) Quantity	2737	2737	2737
(3) Unit Cost	17.412	17.365	17.412
b. (U) Current Procurement --	(FY 1988)	(FY 1988)*	(FY 1989)
(1) Cost	2788.7	2788.7	3705.2
Less CY Adv Proc	- 475.9	- 475.9	- 588.7
Plus PY Adv Proc	534.0	534.0	646.1
Net Total	2846.8	2846.8	3762.6
(2) Quantity	180	180	180
(3) Unit Cost	15.816	15.816	20.903

* Adjusted to reflect FY88 Appropriation Act in accordance with Congressional Change to SAR law.

3. (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	+19.0	-2143.6		-2124.6
Quantity		+20357.7		+20357.7
Schedule	+0.1	+1723.4		+1723.5
Engineering	+542.6	+14613.3		+15155.9
Estimating	+85.1	-3644.6		-3559.5
Other	+20.6	+35.8		+56.4
Support	+154.9	+9710.0		+9864.9
Subtotal	+822.3	+40652.0		+41474.3
Current Changes:				
Economic	-0.8	+52.3		+51.5
Quantity				
Schedule				
Engineering	-3.2	-64.2		-67.4
Estimating	-6.8	+168.4		+161.6
Other				
Support		-18.5		-18.5
Subtotal	-10.8	+138.0		+127.2
Total Changes	+811.5	+40790.0		+41601.5
Current Estimate	1470.6	46185.4		47656.0

(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	+282.7	+4636.3		+4919.0
Estimating	+10.3	-1430.8		-1420.5
Other	+15.5	+24.6		+40.1
Support	+101.0	+3523.4		+3624.4
Subtotal	+409.5	+14336.5		+14746.0
Current Changes:				
Quantity				
Schedule				
Engineering	-1.4	-23.2		-24.6
Estimating	-3.0	+61.9		+58.9
Other				
Support		-9.5		-9.5
Subtotal	-4.4	+29.2		+24.8
Total Changes	+405.1	+14365.7		+14770.8
Current Estimate	983.7	18163.9		19147.6

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.
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	-0.8
Advanced Identification Friend-or-Foe (AIFF) Restructure. (Engineering)	-1.4	-3.2
Re-estimate and extension of test and mission requirements. (Estimating)	-3.4	-7.5
Adjustment for prior year escalation. (Estimating)	+0.6	+1.4
Adjustment to FY90 and beyond for escalation. (Estimating)	-0.2	-0.7

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	+52.3
Impact of AIFF program restucture on production capability (Engineering)	-23.2	-64.2
Reestimate of Block 40 aircraft tasks due to current assessment of structural complexities and available contractor proposal (Estimating)	+120.5	+322.7
Revised engine estimate based on more current cost data. (Estimating)	-50.2	-134.9
Reestimate of ASPJ requirements based on contract cost. (Estimating)	+23.0	+42.8
Grassroots re-estimate of airframe cost. (Estimating)	-14.3	-8.5
Adjustment for prior year escalation.	+15.9	+46.7
Adjustment for flyaway elements. (Estimating)	(+13.1)	(+38.0)
Adjustment for support elements. (Support)	(+2.8)	(+8.7)
Adjustment to FY90 and beyond for escalation. (Estimating)	-30.2	-91.7

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)		
Refinement of peculiar support estimate. (Support)	-5.2	-7.8
Re-estimate of initial spares requirements. (Support)	-7.1	-19.4

d. (U) References --

Development Estimate: President's FY 1977 budget dated 19 January 1976.

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

(U) Initial SAR/Development Estimate to Current 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	-.757	+.448	+.630	+5.513	-1.241	+.021	+3.597	+8.211	17.412

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

	Initial Contract Price		
a. RDT&E - None	Target	Ceiling	Qty
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
$992.8M	$1107.8M	N/A	$985.1M	$990.3M

	Cost Variance	Schedule Variance
Previous Cumulative Variances 10/31/86	$-41.1M	$-23.3M
Cumulative Variances to date 11/30/87	$-45.9M	$-42.4M
Net Changes	$- 4.8M	$-19.1M

Explanation of Change: The increase in the negative cum to date cost variance s $4.8M. This change is the result of engineering/research underestimating he actual cost for test aircraft modifications and several tasks in software development. The variance will not impact contract costs at completion. The negative cost variance is offset by a large management reserve ($67.9M) which results in an undertarget at completion. The increase in the negative cum to date schedule variance is $19.1M due to delays in tasks associated with Block 40 development and delays in efforts associated with the AIFF, Global Positioning System and interrogator/transponder. The unfavorable schedule variance will not have an impact on the total program or MSIP contract. Both the contractor and the program manager's estimate remains below contract target price and is within approved funding levels. We foresee no funding problem on this effort.

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
$1,299.6M	$1,397.3M	144	$1,300.5M	$1,294.9 M

	Cost Variance	Schedule Variance
Previous Cumulative Variances 10/31/86	$-51.5M	$-15.2M
Cumulative Variances to date 11/30/87	$-38.5M	$-17.5M
Net Change	$+13.0M	$- 2.3M

Explanation of Change: The decrease in the negative cum to date cost variance since the 31 December 1986 SAR is $13.0M. The decrease is largely due to the removing of unbillable costs from the cum to date actual costs and the incorporation of final (lower) overhead rates in December 1986. In addition, there has been a resolution of European Program Office common cost allocations and some minor changes in several functional areas. These variances will not impact total program at completion. The increase in the negative cum to date schedule variance of $2.3M is the result of vendors not billing as anticipated for the Industrial Technology Modernization task. There will be no schedule impact to the total program. The Program Manager's estimate is below the contract target price and the approved funding levels. We foresee no funding problems on this effort.

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
$1,323.2M	$1,427.5M	150	$1,325.7M	$1,324.5M

	Cost Variance	Schedule Variance
Previous Cumulative Variances 10/31/86	$-57.1M	$-59.2M
Cumulative Variances to date 11/30/87	$-46.2M	$-37.1M
Net Change	$+10.9M	$+22.1M

Explanation of Change: The decrease in the negative cum to date cost variance since the 31 December 1986 SAR is $10.9M. The decrease is caused by the incorporation of final (lower) 1986 overhead rates and the removal of unbillable costs from the cum to date actual costs. These variances will not impact to total program at completion. The negative cum to date schedule variance decreased $22.1M since the 31 December 1986 SAR. This reflects the declaration of underrun at completion from a reevaluation of the costs-to-completion in procurement/hardware and raw materials and a corresponding change in BCWP. In addition, there has been a return to schedule resulting from the receipt of components in the manufacturing function from vendors delivering previously scheduled hardware. We anticipate no impact to the total program at completion. The Program Manager's estimate at completion remains above contract target price; but, GD/FW has submitted three CCPs to initiate a settlement for the extraordinary costs incurred due to the engine perturbations caused by General Electric. We foresee no funding problem.

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(FFP)	180

Current Contract Price

Target	Ceiling	Qty
FPIF $221.1	$ 232.2M	
FFP $1202.0	N/A(FFP)	180

Estimated Price at Completion

Contractor	Program Manager
$1423.1M	$1423.1M

F-16 Aircraft:

Westinghouse Electric Corp
Harmans, Maryland
F33657-81-C-0641 (FY84) FPIF
Award: N/A (Follow on Effort)
Definitized: 31 October 1985

Initial Contract Price		
Target	Ceiling	Qty
$311.2	$354.5M	207

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -7.0M	$ + 11.8M
Cumulative Variances to date 3/31/87	$ -21.4M	$ -1.6M
Net Change	$ -14.4M	$ - 13.4M

Reporting was discontinued in the March 1987 Unit Cost Report. Hardware deliveries were finished and the contract was 95 percent complete. The Program Manager's estimate identified a $4.1M over target cost at completion. We identified the amount as a contingent liability against the expired FY84 funds. We foresee no funding problem on this contract.

F-16 Aircraft:

Westinghouse Electric Corp
Harmans, Maryland
F33657-81-C-0641 (FY85) FPIF
Award: N/A (Follow on Effort)
Definitized: January 1986

Initial Contract Price		
Target	Ceiling	Qty
$359.7M	$386.1M	305

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$359.9M	$383.3M	305	$355.4	$355.9M

	Cost Variance	Schedule Variance
Previous Cumulative Variances 10/31/86	$ -4.6M	$ -19.3M
Cumulative Variances to date. 11/30/87	$ -5.4M	$ -12.0M
Net Change	$ -0.8M	$ +7.3M

Explanation of Change: The negative cum to date cost variance is $5.4M, an increase of $0.8M since the 31 December 1986 SAR. The increase is due to numerous cost accounts within the integration assembly and test work breakdown structure that exceeded thresholds and both routine and high value material being purchased at value greater than planned. No impact to the total program is anticipated. The negative cum to date schedule variance is $12.0M, a decrease of $7.3M since the 31 December 1986 SAR. The decrease is the result of the receipt of cables, printed wire assemblies and traveling wave tubes and additional high value material scheduled in a previous period. These variances will not impact the total program. The Program Manager's estimate is $4.0M under the contract target price. We foresee no funding problem. The contract is 95% complete.

Engines:

General Electric Corp Evendale, Ohio F33657-84-C-2011 (FY85) FFP* Award: 3 February 1984	Initial Contract Price Target	 Ceiling	 Qty
	$522.7M	$522.7M	126

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$586.7M	N/A	144	$ 586.7M	$586.7M

*FFP contract no CPR data available.

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

a. (U) Program Status —

(1) Percent Program Completed: 66.7% (14 yrs/21 yrs)

(2) Percent Program Cost Appropriated: 54.1% (25791.9/47656.0)

b. (U) Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY75-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Balance To Complete Beyond FYDP (FY93-95)	Total
RDT&E	1351.5	26.5	92.6	-	1470.6
Procurement	24440.4	3705.2	10120.2	7919.6	46185.4
MILCON	-	-	-	-	-
Total	25791.9	3731.7	10212.8	7919.6	47656.0

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

c. (U) Annual Summary

Fiscal Year	Qty	FY75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%) *
		Flyaway		Totals	Advance Proc		Total	
		NonRec	Rec		Debit	Credit		
Appropriation: RDT&E								
1975				31.2			32.0	--
1976				187.2			214.7	11.0
197T				57.7			69.0	5.4
1977				211.9			256.4	2.1
1978				121.3			162.3	5.9
1979				65.8			93.6	8.4
1980				17.4			27.6	9.4
1981				24.6			43.1	11.9
1982				30.9			57.9	9.2
1983				36.2			70.9	4.9
1984				45.7			93.1	3.8
1985				43.1			90.6	3.4
1986				28.4			61.2	2.8
1987				24.1			53.7	2.7
1988				11.0			25.4	3.7
1989				11.1			26.5	3.8
1990				5.0			12.3	3.6
1991				15.5			39.6	3.3
1992				15.6			40.7	2.8
Subtotal	8		**	983.7			1470.6	

* 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	FY75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%) *
		Flyaway		Totals	Advance Proc		Total	
		NonRec	Rec		Debit	Credit		
Appropriation: Procurement								
1977				182.2	174.9		257.6	6.2
1978	105	61.0	523.6	889.5	37.7	174.9	1385.9	6.6
1979	145	30.0	550.3	852.8	67.9	37.7	1434.4	8.7
1980	175	50.4	676.7	872.0	141.3	67.9	1641.9	9.7
1981	180	43.0	705.0	935.2	194.8	141.3	1918.0	11.9
1982	120	52.6	488.5	1021.6	545.5	166.8	2205.7	9.6
1983	120	187.2	527.2	895.7	218.6	372.3	2048.4	9.0
1984	144	69.3	645.1	970.1	339.1	313.1	2312.8	8.0
1985	150	141.3	696.6	1065.4	537.6	433.4	2620.8	3.4
1986	180	137.4	750.0	1144.2	488.3	369.1	2908.5	2.8
1987	180	109.6	771.2	1107.7	454.1	419.1	2917.7	2.7
1988	180	49.5	819.6	1021.9	475.9	534.0	2788.7	3.7
1989	180	111.8	965.1	1313.9	588.7	646.1	3705.2	3.8
1990	180	18.9	912.7	1322.4	721.4	456.6	3840.3	3.6
1991	180	18.2	895.9	1125.6	435.6	625.4	3353.2	3.3
1992	150	7.7	792.0	960.2	365.8	537.5	2926.7	2.8
1993	120	14.2	668.1	823.5	334.9	492.0	2567.8	2.3
1994	120	11.0	689.0	886.8	341.6	334.9	2829.0	2.3
1995	120	11.0	682.8	773.2		341.6	2522.8	2.3
Subtotal	2729	1124.1	12759.4	18163.9	6463.7	6463.7	46185.4	
Total	2737			19147.6			47656.0	

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

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Cont'd):

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated*	Expended*
	Appropriation: RDT&E		
1975	32.0	32.0	32.0
1976	214.7	214.7	214.7
197T	69.0	69.0	69.0
1977	256.4	256.4	256.4
1978	162.3	162.3	162.3
1979	93.6	93.6	93.6
1980	27.6	27.6	27.6
1981	43.1	43.1	43.1
1982	57.9	57.9	57.9
1983	70.9	70.9	70.9
1984	93.1	93.1	93.1
1985	90.6	90.6	87.7
1986	61.2	61.1	50.0
1987	53.7	51.5	21.7
1988	25.4	5.7	2.8
To Complete	119.1		
Total	1470.6	1329.5	1282.8

*Program Office records as of 31 January 1987

16. Program Funding Summary (Cont'd):

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated*	Expended*
Appropriation: Procurement			
1977	257.6	257.6	257.6
1978	1385.9	1385.9	1385.9
1979	1434.4	1434.4	1434.4
1980	1641.9	1641.9	1641.9
1981	1918.0	1918.0	1918.0
1982	2205.7	2205.7	2205.7
1983	2048.4	2048.4	2048.4
1984	2312.8	2312.8	2180.3
1985	2620.8	2620.8	2350.7
1986	2908.5	2834.6	1825.8
1987	2917.7	2604.2	309.6
1988	2788.7	1236.7	.1
To Complete	21745.0		
Total	46185.4	22501.0	17558.4

*Program Office records as of 31 January 1987

17. (U) Production Rate Data:

a. (U) Annual 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	180	180	180
1988	N/A	180	180	180
1989	N/A	180	180	324
1990	N/A	180	180	324
1991	N/A	180	180	324
1992	N/A	150	150	78
1993	N/A	120	120	N/A
1994	N/A	120	120	N/A
1995	N/A	120	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	10479.4	+636.2	9843.2
	TY $	N/A	N/A	30359.9	+2672.1	27687.8
PAUC	BY $	N/A	N/A	6.591	+.400	6.191
	TY $	N/A	N/A	19.094	+1.680	17.414

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 o new and inexperienced personnel and the difficulty in the abrupt change in rate from 180 to 324 per year (15 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	—	112	45	70
End Date (mo/yr)	5/96	—	5/96	N/A	12/92

d. (U) Deliveries (Plan/Actual)

	31 Dec 87
RDT&E	8/8
Procurement	
A/B	785/785
C/D	458/462

18. Operating and Support (O&S) Costs -- N/A

SAR-87-040

No Security Objection to Open Publication (AS AMENDED) APR 13 1988 Office of the Chief of Naval Operations Dept. of the Navy
88-C-0458

~~CONFIDENTIAL~~

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

AS OF DATE: DECEMBER 31, 1987

N-17 F/A-18

SAR 87B INDEX

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1. (U) **DESIGNATION/NOMENCLATURE:** F/A-18 Naval Strike Fighter (Hornet)

2. (U) **DOD COMPONENT:** United States Navy

3. (U) **RESPONSIBLE OFFICE AND TELEPHONE:**

F/A-18 Program Office
Naval Air Systems Command
Washington DC 20361

PM: CAPT J.A. LOCKARD
Assigned: 30 SEP 86

POC: CDR J. HEIN
AV: 222-9191
Comm: (202) 692-9191

4. (U) PROGRAM ELEMENTS/PROCUREMENT LINE ITEMS:

RDT&E (6.4) Development - PE 0604263N

PROCUREMENT (APPN): 1506; PE 0204136N, 0204156N, 0206134M

MILCON: PE 0204611N, 0206496M

CLEARED For Open Publication APR 14 1988 DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

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88-F-0458

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, ENGINE GENERATING SYSTEM, AYK-14 (XN-6), ASN-130/139, ARC-182, BRU-32

6. (U) **MISSION AND DESCRIPTION:** The F/A-18A 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-18B is the two seat version currently used for training. The F/A-18A is missionized for traditional fighter and attack roles. 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 FY92, with the addition of a sensor pallet which will replace the gun, selected aircraft may be configured as a tactical reconnaissance platform.

The primary design mission application for the aircraft is fighter escort, with fleet air defense as its secondary mission. The attack missions are interdiction and close air support. Since the same airframe, engine, flight controls, and weapon systems are used for both fighter and 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 YF-17 to satisfy its multi-mission strike fighter requirement. The Secretary of Defense approved the F/A-18 development plan in December 1975. Full scale development contracts were awarded to McDonnell Douglas for the airframe and General Electric for the engine. The first F/A-18 was flown in November 1978. Effective with the President's FY80 Budget (December 1978 SAR), the Navy increased the F/A-18 program from 811 to 1,377 aircraft. In November 1980, the Navy fleet replacement squadron(FRS), VFA-125 at NAS Lemoore, California, commenced operations. In July 1982 the Chief of Naval Operations approved the F/A-18 as the Marine Corp's tactical reconnaissance platform. The first F/A-18 Marine Air Group (MAG-11) was fully equipped with aircraft in August 1983. Operational testing, as requested by the 17 March 1983 Secretary of Defense Decision Memorandum (SDDM), was completed March 1984. Operational testing of the F/A-18 integrated EW Suite/HARM missile was completed 9 August 1985. During February 1985, Carrier Wing 14 (CVW-14) was deployed on the USS Constellation (CV-64) with two F/A-18 squadrons to the

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7. (U) **PROGRAM HIGHLIGHTS (Continued):**

Western Pacific and the Indian Ocean. Two Royal Australian Air Force F/A-18s established a world distance record for tactical jets during transpac from NAS Lemoore, CA to Australia. Ten MAG-11 F/A-18s participated in operation Bright Star 86 after translant to Egypt, flying 154 of 155 scheduled sorties in eight days. During April 1986, Carrier Wing 13 (CVW-13) was deployed on USS Coral Sea (CV-43) with two Navy and two Marine F/A-18 squadrons and led the highly successful strikes against Libya. The Navy Flight Demonstration Squadron (Blue Angels) transitioned from the A-4 to the F/A-18 for the 1987 show season.

The first major upgrade of the F/A-18 occurred with the FY86 procurement (Oct 87 delivery). The upgrade uses many subsystems developed as GFE systems by their sponsoring activities. Specifically the Airborne Self-Protection Jammer (ASPJ), the Advanced Medium Range Air-to-Air Missile (AIM-120 AMRAAM), and the AGM-65F Infrared Imaging (I^2R Maverick) will be incorporated into the F/A-18 C/D, along with the Navy Air Common Escape System (NACES). The addition of two AYK-14 (XN-6) mission computers, in place of initial AYK-14 (XN-5) units, provides additional growth capabilities in the areas of computer memory, speed, and interface.

b. Significant developments since last report.

USS Independence and USS America completed conversion from A-7 to F/A-18 squadrons. USS Constellation, USS Coral Sea and USS Midway have deployed with F/A-18 squadrons aboard. VMFA-122 deployed to Norway for Teamwork 87. MAG 11 (VMFA314/VMFA323) deployed to Egypt for Bright Star 87. The Hornet 2000 study was initiated at the request of the Secretary of Defense to meet the threat in the year 2000. The F/A-18 C/D, first major upgrade, was delivered. The nose of the aircraft was also missionized for reconnaissance. VMFAT-101 was activated as the third F/A-18 Replacement Aircraft Group (RAG) during October. Planned procurement reduced to 1157 aircraft and total aircraft deliveries (US, Canada, Australia, Spain) as of 31 December 1987 were 631.

After years of nearly trouble-free service, the F-18's F404 engine has exhibited compressor blade and after-burner liner failures which led to the loss of four aircraft in 1987. These failures have been addressed through design changes already incorporated in production engines. The current fleet of over one thousand engines are being retrofitted with these design improvements and should be completed in October 1989.

7. (U) PROGRAM HIGHLIGHTS (Continued):

c. Changes since "As Of" Date. None.

8. (U) DECISION COORDINATING PAPER (DCP) THRESHOLD BREACHES:

None.

9. (U) SCHEDULE:

a. Milestones.

	Development Estimate	Approved Program	Current Estimate
Release of RFP	Oct 74	Oct 74	Oct 74
Award of Advanced Engineering Contracts			
General Electric (Engine)	May 75	May 75	May 75
McDonnell Douglas (Airframe)	May 75	May 75	May 75
Award of Full Scale Development Contract			
General Electric (Engine)	Nov 75	Nov 75	Nov 75
DSARC II	Dec 75	Dec 75	Dec 75
Award of 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 for first F/A-18 Squadron	Sep 82	Mar 83	Mar 83
Navy Support Date	TBD	Oct 83	Oct 83
DSARC Principals Review	NA	Mar 85	Mar 85

b. Previous Change Explanations.

First Flight: Was rescheduled from Jul 78 to Sep 78 in accordance with contract definitization. First flight date 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.

9. (U) SCHEDULE (Continued):

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 OSD Program Guidance of May 1980 and Program Review April 80. Decision Memorandum of 17 December 1980 established the date of February 81 for a Limited Program Review which combined with the Nov 1980 program review constituted DSARC III (Fighter). The limited program review was held March 1981. DSARC III (Fighter) completed as stated in 29 June 81 Decision Memorandum. DSARC III (Attack) was set for Fall 1982 by Decision Memorandum of 29 June 81 and completed in December 1982.

OPEVAL Completion: Concurrent fighter and attack systems OPEVALS rescheduled for the period September 1981 to February 1982 to accommodate delays in contractor and Navy DT&E. Results contribute to an OSD Program Review scheduled for April 1982. OPEVAL completion slipped until Aug 82 on the flight test schedule. Carrier portions of OPEVAL slipped to October due to carrier availability.

End Board of Inspection and Survey Trials: Combined Fighter and Attack BIS completed in August 82. BIS consolidated into the minimum number of flights. A Navy Technical Evaluation conducted in March and April in lieu of Initial BIS Trials. The Final Trials Phase of Service Acceptance Test completed the second quarter of FY83 using production aircraft.

IOC for first F/A-18 Squadron: Six month slip due to FY79 budget decision on procurement schedule. Congressional direction to purchase additional aircraft in FY80 permitted moving Sep 82 IOC date to Mar 83 IOC. Change to Dec 82 in accordance with Weapon System Planning Document of June 80. Aircraft delivery locations were rearranged so that 11 VMFA-314 aircraft be of the latest configuration coming off the production line.

Review for DSARC Principals: OSD Program Review, scheduled for Oct 84 included data on initial F/A-18 aircraft carrier workups, occurred in March 1985. Operational testing results were presented to OUSDR&E in March 1985; all requirements were met.

c. Current Change Explanations: None

[redacted]

[redacted]

9. (U) SCHEDULE (Continued):

d. (U) References:

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

Approved Program - FY88/89 Amended President's Budget
- DAE Baseline approved 17 Feb 88

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS:

a. (U) Technical	Development Estimate/Approved Program[3]	Demonstrated Performance	Current Estimate
Weight (lbs)			
(U) Empty VF	21649/23014	23014	23014
(U) Empty VA	21720/23014	23014	23014
(b)(1)			
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	Development Estimate/Approved Program	Demonstrated Performance	Current Estimate
Speed			
(U) At Altitude, Combat Weight (Mach)	1.7/1.7	1.7	1.7
(U) 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) Military Thrust	48100/48000	48000	48000
Mission Reliability			
(U) VF @ 2,500 Hr	0.7/0.93	.89[1]	.93

[redacted]

CLASSIFY: [redacted] 5513.2B-26
DECLASSIFY: OADR

[redacted]

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS (Continued):

(U) System Maintenance VF, Mean Flight Hours Between Failure, Fighter Configuration, @ 2500 Hrs Organizational Level.....	1.4/2.0	2.77[2]	2.0
(U) Unscheduled Direct Maintenance Manhours per Flight Hour, VF at 2,500 Hr.....	8/5.8	2.22	5.8
(U) Maint Operating Factor..	12/12		12
(U) Maint Men Per Aircraft			
BIT Development Completion	NA/100%	100%	100%
BIT False Indication Rate	NA/28%	28%	28%
(U) Standard Depot Level Maintenance (Months)	48/48	48	48

Notes:
[1] Reliability demonstration 90% confidence; 96% actually demonstrated.
[2] Measured at 9000 cumulative flight-hours, Maintainability demonstration completed 4 May 1982.
[3] DAE Baseline Approved 17 Feb 1988.

c. Previous Change Explanations:

(U) Weight, empty VF: +1365 lb - Fighter and attack commonality, initial estimated production weight adjusted for weight reduction program, actual FY79 production weight plus modification, FY80 production weight involving changes, roll rate modification, and other minor changes.

(U) Weight, empty VA: +1294 lb Attach changes corresponding to 2.a(1) and the change to common VF and VA aircraft.

(U) Take-off gross weight (Escort mission): +1128 lb Original DSARC II estimate VF and VA configurations commonality, final design review, Lot III production specification weight adjusted for weight reduction, actual production delivery weights, and modifications/changes.

(U) Max take-off gross weight (Interdiction mission): +4756 lb Max take-off weight changes associated with above growth.

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS (Continued):

c. Previous Change Explanations (Continued):

(U) Radius (Fighter escort): -38 Initial design reviews and engine performance estimates revised to reflect demonstrated ranges on tests.

(U) Speed (At Altitude): Mach 2.0 is max speed in a dive and 1.7 is max speed at altitude.

(U) Combat Ceiling (Max Thrust): 53600 as stated in McDonnell Douglas Report A08576 "F/A-18 Substantiating Performance Data, 31 Mar 84, Rev 1 Oct 85.

(U) Combat Ceiling (Military Thrust): -100 ft. Estimate based on flight test data in R&D aircraft.

(U) Mission Reliability: +.1 Changed due to original DSARC II estimate and contract award (Mar 76 SAR). Current Estimate of .93 stated in McDonnell Douglas Report A08576.

(U) System Maintenance VF: 2.77 as reflected in DCP#141. 2.0 derived from Operational Squadron 3M data May 86 - Oct 86.

(U) Unscheduled Direct Maintenance: 5.8 derived from Operational Squadron 3M data May 86 - Oct 86.

(U) BIT Development Completion: BIT Development completed and follow-on testing for BIT enhancement for new system ongoing until approximately FY88.

(U) BIT False Indication Rate: 28% from Lot VII Aircraft Fall 1984 - Spring 1986.

d. (U) Current Change Explanations.

None.

e. (U) References:

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

Approved Program - FY88/89 Amended President's Budget
- DAE Baseline approved 17 Feb 88

11. (U) PROGRAM ACQUISITION COST:

a.

COST	DEVELOPMENT ESTIMATE ($Mil)	CHANGES	CURRENT ESTIMATE ($Mil)
DEVELOPMENT	1437.7	+214.6	1652.3
PROCUREMENT	6560.9	+5842.7	12403.6
Airframe	(3599.6)	(2831.7)	(6431.3)
Engines	(1059.7)	(466.6)	(1526.3)
Avionics	(198.8)	(170.8)	(369.6)
Arms/Other GF	(61.3)	(1314.8)	(1376.1)
Total Flyaway	(4919.4)	(4783.8)	(9703.2)
PGSE	(610.3)	(538.1)	(1148.4)
Training/Other	(517.5)	(426.6)	(944.1)
WEAPONS SYSTEMS	(6047.2)	(5748.5)	(11795.7)
INITIAL SPARES	(513.7)	(104.8)	(618.5)
MILCON	18.0	+3.2	21.2
TOTAL (FY75 Base $)	8016.6	+6060.5	14077.1
Escalation	4858.7	18329.6	23188.3
RDT&E	(396.7)	(354.6)	(751.3)
Procurement	(4451.7)	(17966.3)	(22418.0)
MILCON	(10.3)	(8.7)	(19.0)
TOTAL (Then-year $)	12875.3	24390.1	37265.4

b. QUANTITIES

RDT&E	11	0	11
PROCUREMENT	800	357	1157
TOTAL	811	357	1168

c. UNIT COST

Procurement			
FY75 Base $	8.2	2.5	10.7
Then-Year $	13.8	16.3	30.1
Program			
FY75 Base $	9.9	2.2	12.1
Then-Year $	15.9	16.0	31.9

d. APPROVED DESIGN TO COST GOAL: SECNAV directed that the total program cost for the F/A-18 not exceed $40B.

e. FOREIGN MILITARY SALES: Sales to date (from DD 1513, Offer and Acceptance) total 147 F/A-18 aircraft. Sales to Spain total 72 aircraft for $2.339 Billion. Sales to Australia total 75 aircraft for $2.598 Billion. Canada currently expects to purchase from McDonnell-Douglas a total of 138 aircraft for a total cost of $2.36 Billion.

f. NUCLEAR COSTS: None

12. (U) PROGRAM ACQUISITION/CURRENT PROCUREMENT:

UNIT COST SUMMARY
(Current (Then-year) Dollars in Millions)

		ESTIMATES	
	Current Year		Budget Year
	SAR Current	UCR Baseline	UCR Baseline
	(Dec 87)	(Dec 86)	(Dec 87)
a. Program Acquisition:			
(1) Cost.....	37265.4	37475.4	37265.4
(2) Quantity.....	1168.0	1168.0	1168.0
(3) Unit Cost.....	31.9	32.1	31.9
b. Current Procurement:	FY88 APPROPRIATION ACT		
	(FY 88)	(FY 88)	(FY 89)
(1) Cost (P-1 Proc)	2399.8	2399.8	2359.3
Less CY Adv Proc	-140.0	-140.0	-139.4
Plus PY Adv Proc	+132.6	+132.6	+140.0
Net Total	2392.4	2392.4	2359.0
(2) Quantity.....	84	84	72
(3) Unit Cost.....	28.481	28.481	32.763

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	+5842.3	-1.2	+6031.8
Quantity	0	+2471.7	0	+2471.7
Schedule	+14.6	+5587.1	-0.6	+5601.1
Engineering	+55.6	+2214.8	0	+2270.4
Estimating	+298.8	+4548.4	+15.1	+4862.3
Other	+6.5	0	0	+6.5
Support	+3.0	+3354.7	-1.4	+3356.3
Sub-Totals	+569.2	+24019.0	+11.9	+24600.1
Current Changes:				
Economic	0	+159.0	0	+159
Quantity	0	0.0	0	0
Schedule	0	0.0	0	0
Engineering	0	+51.3	0	+51.3
Estimating	0	-523.4	0	-523.4
Other	0	0.0	0	0
Support	0	+103.1	0	+103.1
Sub-Totals	0	-210.0	0	-210.0
TOTAL CHANGES	+569.2	+23809.0	+11.9	+24390.1
Current Estimate	2403.6	34821.6	40.2	37265.4

COST VARIANCE ANALYSIS

(FY 75 (Base Year) Dollars in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1437.7	6560.9	18.0	8016.6
Previous Changes:				
Economic	0	0	0	0
Quantity	0	+1768.1	0	+1768.1
Schedule	+9.4	+775.8	-0.9	+784.3
Engineering	37.8	+688.5	0	+726.3
Estimating	+161.4	+1616.5	+4.6	+1782.5
Other	+4.5	0	0	+4.5
Support	+1.5	+1121.4	-0.5	+1122.4
Sub-Totals	+214.6	+5970.3	+3.2	+6188.1
Current Changes:				
Economic	0	0	0	0
Quantity	0	0	0	0
Schedule	0	0	0	0
Engineering	0	+16.5	0	+16.5
Estimating	0	-176.9	0	-176.9
Other	0	0.0	0	0
Support	0	32.8	0	32.8
Sub-Totals	0	-127.6	0	-127.6
TOTAL CHANGES	+214.6	5842.7	+3.2	6060.5
Current Estimate	1652.3	12403.6	21.2	14077.1

13. (U) COST VARIANCE ANALYSIS (Continued):

b. PREVIOUS CHANGE EXPLANATIONS

Development

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 and extended testing requirements
Estimating - Revisions for budget changes, flight test costs, equipment price analysis, reprogramming of unobligated balances
Support - Additional operational test time supported
Other - Court ruling on previous year allowable cost to the Government

Procurement

Economic - Revisions to escalation rates/indices
Quantity - 566 additional aircraft and changes in annual procurement. Reduction from 1366 to 1157
Schedule - Fluctuations in production rates and final year of production. Rephases and accelerated program (+57 in 87-90). Program stretchout (208 procured in FY 93-95)
Engineering - Commonality, additional equipment and correction of defects, changes in procurement of additional two-seaters. Refinements to ECP-178 and reduction in two-seaters.
Estimating - Revised procurement strategy and program estimates based on more current information, reduced profit in outyears. Removal of multiyear pricing assumptions.
Support - Changes in projected sites, distribution of aircraft, increased aircraft quantity, decreased spares. Adjusted allocation for support due to change in aircraft procurement schedule.

MILCON

Economic - Revisions to escalation rates.
Schedule - Restructuring of facilities to meet changed aircraft deliveries.
Estimating - Redistribution of requirements and updated estimates
Support - Realignment of facilities; changes in program allocation of MILCON funds.

13. (U) COST VARIANCE ANALYSIS (Continued):

c. CURRENT CHANGE EXPLANATIONS

Procurement

	(Dollars in Millions) Base Year	Then-Year
Economic - Revision to escalation guidance.		+159.0
Engineering - Changes in aircraft configuration (1) ECP 87 added (OP/OA; +134.1M$) (2) Global Positioning System (GPS) Deleted (-82.8M$). It is expected that GPS will be reintroduced in FY92.	+16.5	+51.3
Estimating - Lower based on actual cost data from current contract performance and inclusion of five year defense plan budget which includes a management challenge to reduce outyear costs.	-176.9	-523.4
Support - Reflecting a more realistic funding of support particularly in FY91.	+32.8	+103.1

14. (U) PROGRAM ACQUISITION UNIT COST:

CURRENT BASELINE ESTIMATE TO CURRENT ESTIMATE
(Then-Year Dollars in Millions)

PAUC Development Estimate	CHANGES								PAUC Current Estimate
	Econ	Qnty	Sch	Eng	Est	Other	Spt	Total	
15.876	+5.300	-2.736	+4.795	+1.988	+3.715	0.006	+2.962	+16.029	31.905

15. (U) CONTRACT INFORMATION: (Then-Year Dollars in Millions)

a. Procurement--

FY88 Airframes:	Initial Contract Price Target	Ceiling	Qnty
McDonnell Douglas	$1380.1	NA	84

N00019-83-C-0272, FFP
Award: 31 Oct 83
Definitized: 15 Jun 84

Current Contract Price Target	Ceiling	Qnty	Estimated Price - Completion Contractor	Program Manager
$1380.1	NA	84	1380.1	1380.1

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

Explanation of Change: Not Required on FFP Contracts

---

b. Procurement--

FY84 Engines :	Initial Contract Price Target	Ceiling	Qnty
General Electric	$ 266.7	NA	158

N00019-85-C-0129, FFP
Award: 26 Mar 85
Definitized: 30 Jan 86

Current Contract Price Target	Ceiling	Qnty	Estimated Price - Completion Contractor	Program Manager
$ 266.7	NA	158	$ 266.7	$ 266.7

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

Explanation of Change: Not Required on FFP Contracts

---

c. Procurement--

FY87 Engines :	Initial Contract Price Target	Ceiling	Qnty
General Electric	$ 140.5	NA	86

N00019-86-C-0048, FFP
Award: 29 Jul 87
Definitized: 29 Jul 87

Current Contract Price Target	Ceiling	Qnty	Estimated Price - Completion Contractor	Program Manager
$ 140.5	NA	86	$140.5	$140.5

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

Explanation of Change: Not Required on FFP Contracts

15. (U) CONTRACT INFORMATION (Cont): (Then-Year in Millions)

d. Procurement--

FY85 Airframes:	Initial Contract Price Target	Ceiling	Qnty
McDonnell Douglas	$1241.1	NA	84

N00019-84-C-0063, FFP
Award: 29 Feb 84
Definitized: 31 May 86

Current Contract Price Target	Ceiling	Qnty	Estimated Price - Completion Contractor	Program Manager
$1514.6	NA	84	$1514.6	$1514.6

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

Explanation of Change: Not Required on FFP Contracts

---

e. Procurement--

FY86 Engines :	Initial Contract Price Target	Ceiling	Qnty
Pratt & Whitney	$ 207.2	NA	102

N00019-85-C-0144, FFP
Award: 30 Jul 85
Definitized: 4 Jun 87

Current Contract Price Target	Ceiling	Qnty	Estimated Price - Completion Contractor	Program Manager
$ 207.2	NA	102	$ 207.2	$ 207.2

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

Explanation of Change: Not Required on FFP Contracts

---

f. Procurement--

FY86 Airframes:	Initial Contract Price Target	Ceiling	Qnty
McDonnell Douglas	$1234.8	NA	84

N00019-84-C-0270, FFP
Award: 31 Dec 84
Definitized: 30 Jun 87

Current Contract Price Target	Ceiling	Qnty	Estimated Price - Completion Contractor	Program Manager
$1234.8	NA	84	$1234.8	$1234.8

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

Explanation of Change: Not Required on FFP Contracts

16. (U) PROGRAM FUNDING SUMMARY:

a. PROGRAM STATUS

1. Percent Completed: 61.9% (13 yr/21 yr)
2. Percent Cost Appropriated: 62.0% (23089.5/37265.3)

b. APPROPRIATION SUMMARY
(Then-Year Dollars in Millions)

	Current and Prior Years	Budget Year	Balance to Complete FY DP (90 - 93)	Balance to Complete BEYOND (94 - 97)	TOTAL
RDT&E	2403.6	0	0	0	2403.6
PROCUREMENT (APN)	20648.8	2359.3	8068.4	3745.1	34821.6
MILCON	37.1	0	3.1	0	40.2
TOTAL	23089.5	2359.3	8071.5	3745.1	37265.4

c. ANNUAL SUMMARY

RDT&E
(Current Estimate in Millions of Dollars)

	FY 75 Base-Year Dollars				Then-Year Dollars			
		(Flyaway)			(Advance Procurement)			Escl
FY	QNTY	Non-Recur	Recur	Total	Debit	Credit	Total	Rate
1975	0			19.5			20.0	
1976	0			100.1			110.4	7.5
TQ	0			18.9			22.2	6.5
1977	0			271.3			341.9	7.3
1978	1			462.8			626.8	7.5
1979	8			336.3			496.1	8.9
1980	2			192.8			314.8	10.7
1981	0			96.6			173.2	9.8
1982	0			100.1			190.5	6.2
1983	0			53.9			107.7	5.1
TOTALS	11			1652.3			2403.6	

16. (U) PROGRAM FUNDING SUMMARY (Continued):

PROCUREMENT (APN)
(Current Estimate in Millions of Dollars)

		FY75 Base-Year Dollars (Flyaway)			Then-Year Dollars (Advance Procurement)			ESCL
FY	Qnty	Non-Rec	Recur	Total	Debit	Credit	Total	Rate
1978	0	0.0	0.0	19.8	-34.1	0.0	34.1	
1979	9	22.3	201.2	332.4	-59.6	34.1	580.8	10.9
1980	25	32.5	378.7	598.2	-127.9	59.6	1185.9	13.6
1981	60	.3	670.9	969.0	-114.3	127.9	2116.8	10.9
1982	63	36.4	616.1	1039.7	-187.9	114.3	2470.6	8.8
1983	84	48.4	703.8	1022.1	-247.7	187.9	2581.5	9.0
1984	84	0.0	641.6	923.7	-216.5	247.7	2425.3	8.0
1985	84	59.0	567.5	877.5	-205.8	216.5	2380.1	3.4
1986	84	13.8	546.6	774.1	-188.2	205.8	2168.1	2.8
1987	84	8.5	536.3	795.6	-132.6	188.2	2305.6	2.7
1988	84	41.7	528.6	799.5	-140.0	132.6	2399.8	3.7
1989	72	19.6	472.9	760.7	-139.4	140.0	2359.3	3.8
1990	72	0.2	410.8	651.3	-146.8	139.4	2080.2	3.6
1991	72	0.2	381.8	571.5	-150.1	146.8	1873.0	3.3
1992	72	0.0	438.0	594.7	-153.4	150.1	1994.9	2.8
1993	72	0.0	448.3	617.6	-209.8	153.4	2120.4	2.3
1994	72	0.0	443.1	584.5	-190.1	209.8	2052.6	2.3
1995	64	0.0	396.0	471.8	0.0	190.1	1692.6	2.3
Sub-Total	1157	283.0	8382.1	12403.6	-2644.2	2644.2	34821.6	

MILCON
(Current Estimate in Millions of Dollars)

		FY75 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL
		Flyaway			Advance Proc			
FY	Qnty	Non-Rec	Recur	TOTAL	Debit	Credit	TOTAL	Rate
1977				0.8			1.0	
1978				0.0			0.0	
1979				0.0			0.0	
1980				3.8			6.5	
1981				0.2			0.4	5.6
1982				6.8			12.8	5.6
1983				2.9			5.6	4.9
1984				4.7			9.4	3.8
1985				0.4			0.8	3.4
1986				0.3			0.6	2.8
1987				0.0			0.0	2.7
1988				0.0			0.0	3.7
1989				0.0			0.0	3.8
1990				1.3			3.1	3.6
1991				0.0			0.0	3.3
1992				0.0			0.0	2.8
Sub-Total				21.2			40.2	
TAL	1168	283.0	8382.1	14077.1	2644.2	-2644.2	37265.4	

16. (U) PROGRAM FUNDING SUMMARY (Continued):
d. Obligations & Expenditures (Current Estimate in Millions)

RDT&E

FY	TOTAL	OBLIGATED	EXPENDED
1975	20.0	20.0	20.0
1976	110.4	110.4	110.4
197T	22.2	22.2	22.2
1977	341.9	341.9	341.9
1978	626.8	626.8	626.8
1979	496.1	496.1	496.1
1980	314.8	314.8	314.8
1981	173.2	173.2	169.7
1982	190.5	190.5	194.2
1983	107.7	107.7	89.8
To complete	0.0	0.0	0.0
TOTAL	2403.6	2403.6	2385.9

PROCUREMENT

FY	TOTAL	OBLIGATED	EXPENDED
1978	34.1	34.1	31.5
1979	580.8	556.1	565.7
1980	1185.9	1176.0	1056.2
1981	2116.8	2055.2	1954.0
1982	2470.6	2224.5	2259.3
1983	2581.5	2536.1	2582.0
1984	2425.3	2401.7	2133.7
1985	2380.1	2369.9	2107.1
1986	2168.1	2159.6	1200.6
1987	2305.6	2255.0	274.4
1988	2399.8	461.5	17.6
To Complete	14172.9	NA	NA
TOTAL	34821.6	18231.3	14182.1

MILCON

FY	TOTAL	OBLIGATED	EXPENDED
1977	1.0	1.0	1.0
1978	0.0	0.0	0.0
1979	0.0	0.0	0.0
1980	6.5	6.4	6.4
1981	0.4	0.4	0.4
1982	12.8	10.3	10.3
1983	5.6	4.6	4.6
1984	9.4	7.0	7.0
1985	0.8	0.9	0.9
1986	0.6	1.0	0.9
1987	0.0	0.0	0.0
1988	0.0	0.0	0.0
To Complete	3.1	NA	NA
TOTAL	40.2	31.6	31.5

17. (U) PRODUCTION DATA:

a. ANNUAL PRODUCTION RATE
(Quantity/Year)

FY	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1976	1			
1977	4			
1978	6			
1979	0	5	9	9
1980	0	15	25	25
1981		48	60	60
1982		96	63	76
1983		108	84	103
1984		132	84	94
1985		132	84	83
1986		132	84	90
1987		132	84	120
1988			84	137
1989			72	145
1990			72	145
1991			72	70
1992			72	0
1993			72	0
1994			72	0
1995			64	0
TOTALS	11	800	1157	1157

b. COST VARIANCE
(Dollars in Millions)

	Production Estimate	Variance CE - PdE	Current Estimate	Variance CE - Max	Maximum Economic
Program Acquisition					
Base-Year	8016.6	6060.5	14077.1	-388.5	13688.6
Then-Year	12875.3	24390.1	37265.4	-2529.4	34735.8
PAUC					
Base-Year	9.9	2.2	12.1	-0.3	11.8
Then-Year	15.9	16.0	31.9	-1.9	30.0

17. (U) PRODUCTION DATA (Continued):

c. SCHEDULE VARIANCE

	Production Estimate	Variance CE - PdE	Current Estimate	Variance CE - Max	Maximum Economic
Start Date (Mo/Yr)	11/78	0	11/78	0	11/78
Duration (Months)	132	96mos	228	48mos	180
End Date (Mo/Yr)	11/89	8yrs	11/95	4yrs	11/93

d. DELIVERIES-TO-DATE
(Planned/Actual as of 31 Dec 87)

RDT&E.....11/11
Procurement.....430/428

18. (U) OPERATING AND SUPPORT COSTS:

Not Applicable

~~SECRET~~

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

PROGRAM: BRADLEY FIGHTING VEHICLE SYSTEMS (BFVS)

A-6 BRADLEY FVS

AS OF DATE: December 31, 1987

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87-026

Concur in classification as marked
MAR 27 1988 23
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

1. (U) Designation and Nomenclature (Popular Name): M2/M2A1/M2A2, Infantry Fighting Vehicle (IFV); M3/M3A1/M3A2, Cavalry Fighting Vehicle (CFV); Bradley Fighting Vehicles (BFVS)

2. (U) DoD Component: U.S. Army

3. (U) Responsible Office and Telephone Number:

PM, Bradley Fighting Vehicle Systems
U.S. Army Tank-Automotive Command
Warren, MI 48397-5000

PM: COL William O. Coomer
Assigned: July 1, 1985
AUTOVON 786-5630
Commercial: (313) 574-5630

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

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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)

PROCUREMENT:

APPN 2033	SSN G80702		
APPN 2033	SSN G21100	MILCON:	
APPN 2033	SSN G15100 (sunk)	APPN 2050	PE 22393A (sunk)
APPN 2033	SSN GA0153	APPN 2050	PE 85796A (sunk)
APPN 2033	SSN G20900	APPN 2050	PE 84731A (sunk)

5. (U) Related Programs: M790 Family of 25mm Ammunition; BFVS Improvement Program; Multiple Launch Rocket System (MLRS); Training Devices.

~~Classified by: Multiple Sources~~
~~Declassify on: OADR~~

~~SECRET~~

OASD(PA) DFOISR 88-T-0748

(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 an inherent 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 Bradley will be the primary companion to the M1 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 IFV/CFV (25mm/TOW) program. Secretary of Defense Decision Memorandum (SDDM) was issued on February 1, 1980, approving full production of the M2/M3, with basic TOW. An initial production contract for 75 IFV's and 25 CFV's 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 modification program was initiated in July 1983 to improve IFV/CFV performance. The VCSA approved M2A1/M3A1 vehicle production in May 1985. The first A1 vehicle was delivered in May 1986. The A1 increased vehicle reliability from 580 (basic vehicle) to 841 mean miles between failure (MMBF). A development program (Block 2) was initiated in October 1985 to provide increased survivability changes and improvements into production vehicles, beginning with FY87 buy.

b. (U) Significant Developments Since Last Report: Bradley vehicle production and fielding remained on schedule during the report period. Deliveries of TOW 2 Subsystem (T2SS) components, which have lagged behind contract schedule since 2QFY84, have substantially improved. There are sufficient T2SS component quantities on hand to support vehicle production. On September 10, 1987, DA approved incorporation of high survivability improvements into the BFVS acquisition program. First delivery of improved vehicles, designated M2A2 and M3A2, is scheduled for May 1988. Procurement of reactive armor to support FY87 procurement is planned at Milan Army Ammunition Plant, with competitive procurement to follow. All eighth year (FY87) major production contracts were awarded as fixed price type. Program funding and quantities reflect the FYs 88/89 President's Budget, except as adjusted for FY88 Congressional Direction and FY89 amended budget decisions.

(U) The Bradley Fighting Vehicle System satisfies mission requirement.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: The approved program is in MICV DCP No. 30, April 1972, with Cover Sheet Revision, September 1972, and the SDDM, February 1, 1980 for BFVS. No DCP thresholds were breached during the current reporting period.

9. (U) Schedule: (Ch-1)

a. (U) Milestones --	Development Estimate/ Approved Program	Current Estimate
(1)(U) MICV		
(A)(U) QMR Approved, MICV 20mm	Oct 68/Oct 68	Oct 68
(B)(U) Concept Formulation Complete	Apr 72/Apr 72	Apr 72
(C)(U) Milestone II (DSARC)	Mar 79/Mar 75	Mar 75
(D)(U) Engineering Development Contract Awarded	Nov 72/Nov 76	Nov 76
(E)(U) Terminate MICV 20mm Program	Mar 77/Mar 77	Mar 77
(2)(U) M2/M3		
(A)(U) Milestone III (DSARC)	Jan 80/Jan 80	Jan 80
(B)(U) Low Rate Initial Production Contract Awarded	Feb 80/Feb 80	Feb 80
(C)(U) First Production Delivery	May 81/May 81	May 81
(D)(U) Complete Initial Production Test	Apr 83/May 83	May 83
(E)(U) Initial Operating Capability (IOC)	Dec 83/Dec 83	Dec 83
(3)(U) M2A1/M3A1		
(A)(U) IPR Approval of M2A1/M3A1 Production	May 85/May 85	May 85
(B)(U) First A1 Production Contract Award	Jul 85/Jul 85	Jul 85
(C)(U) First Production Delivery M2A1/M3A2 Production	May 86/May 86	May 86
(D)(U) Complete Initial Prod Test	Jul 87/Jul 87	Sep 87
(E)(U) Initial Operating Capability (IOC) - M2A1/M3A1	Nov 88/Nov 88	Nov 88
(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) First Production Contract Modification Award	NA/Oct 87	Jan 88
(F) (U) First A2 Vehicle Delivered	NA/NA	May 88

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

(G) (U) Initial Production Testing		
Start - 500 HP Engine	NA/Aug 88	Jun 88
Start - 600 HP Engine	NA/NA	Jun 89
Completed - 500 HP Engine	NA/Mar 89	Apr 89
Completed - 600 HP Engine	NA/NA	Jan 90
(H) (U) First A2 Veh Prod Delivery w/30mm HS Protection	NA/Jul 88	Jul 88
(I) (U) Reactive Armor FAT	NA/NA	Nov 88
(J) (U) 600 HP Engine IPR Decision	NA/Nov 88	Nov 88
(K) (U) First Comparison Prod Testing:		
Start - 500 HP Engine	NA/Nov 88	Nov 88
Start - 600 HP Engine	NA/NA	Sep 89
Completed - 500 HP Engine	NA/Jun 89	Aug 89
Completed - 600 HP Engine	NA/NA	Dec 89
(L) (U) First Unit Equipped (FUE)- A2 Vehicle:		
- Europe	NA/Apr 89	Apr 89
- CONUS	NA/Jul 91	Jul 91
(M) (U) First A2 Veh Prod Delivery w/600 HP	NA/May 89	May 89
(N) (U) Initial Operational Capability (IOC)	NA/Aug 89	Aug 89

b. (U) Previous Change Explanations--

(1) Engineering development, PQT-G, Operational Test II, initial production contract award, type classification standard, and first production delivery all were were delayed due to DA's decision to terminate the MICV program and begin the IFV/CFV program development.

(2) 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.

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

c. (U) Current Change Explanations--

(Ch-1) The Milestone Schedule for the Bradley Program was restructured to show the most significant milestones for the MICV, M2/M3, M2A1/M3A1, and M2A2/M3A2. As a result some previously accomplished milestones were eliminated and others were added. Milestones eliminated and added follow:

Eliminated: MICV/M2M3: Prototype Qualification Test - Contractor (PQT-C); Development Test II (PQT-G): Operational Test II (IFV) Development Test III (FVT-G), M2/M3: Type Classification Standard.

Added: MICV: QMR Approved; Milestone II (DSARC); Terminate MICV 20 MM Program; M2/M3; Low Rate Initial Production Contract Awarded; M2A1/M3A1: All milestones as listed in paragraph 9a(3); M2A2/M3A2: All milestones as listed in paragraph 9a(4).

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 80, 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); FY88/89 Amended President's Budget. BFVS Program Baseline, February 26, 1988, USD(A) Memorandum.

10. (U) Technical/Operational Characteristics:

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

	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(1) (U) Technical			
(A) (U) Weight (Combat (Loaded) - lbs.	35-38,000/43-50,000	49,987	50,000
(B) (U) Armor Protection @			
(b)(1) [redacted]			
(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	94.5	94.5
(U) Single Shot Accuracy to 1,000M (rd. to rd. std. dev.) (Stat) (Mils.) (AP)	.50/.50	.50	.50
(U) Dispersion:			
(U) HE (Mils.) (500 rds/min)	.97/.97	.97	.97
(U) AP (Mils.) (100 rds/min)	.59/.59	.59	.59
(U) Receiver Life (rds.)	25,000/25,000	30,000	30,000
(U) Barrel Life (rds.)	3,750/13,000	13,000	13,000
TOW			
(b)(1) [redacted]			

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

			Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. (U) MICV/M2/M3 Configuration (Cont'd)					
(2)(U)Operational (cont'd)					
(B)	(U)	Reliability			
	(U)	System (MMBF)	330/240	580	580
	(U)	25mm Gun (MRBS)	2,000/6,000	9,021	9,021
(C)	(U)	Maximum Speed (MPH)			
	(U)	Land	40-45/40-45	42.0	42.0
	(U)	Water	3.6/4.5	4.5 (Ch-1)	4.5 (Ch-1)
(D)	(U)	Acceleration 0-30 (MPH (sec)	18-22/18-22	18.5	18.5
(E)	(U)	Ground Pressure (p.s.i.)	7.0/7.6	7.8	7.8
(F)	(U)	Maintenance Ratio (Manhours/Oper. Hours)	.60/.60	.40	.60

(3) (U) Previous Change Explanations -

(U) Vehicular data in column 1, Development Estimate, reflects the 20mm MICV program. Vehicular data in column 1, Approved Program, shows the basic Fighting Vehicle System (M2/M3). Armament data for Development Estimate shows the 25mm VRFWS-S program, whereas the armament data for Approved Program is based upon the QMR for 25mm weapon system. Column 2 reflects data in the Materiel Need (MN) for the M2/M3. 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 MN 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 and acceleration changed to 18.5 seconds, both based on average test results of PRVT test vehicles.

(4) (U) Current Change Explanations -- (Ch-1) Maximum water speed changed from 4.4 MPH to 4.5 MPH demonstrated in June 1987 at Waterways Experiment Station (WES).

(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; FY88/89 Amended President's Budget.

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

b. M2A1/M3A1 Configuration (500 HP Engine)

			Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(1)	(U)	Technical 1/			
(A)	(U)	Weight (Combat loaded) - lbs.	50,404/50,404	50,404	50,404
(2)	(U)	Operational 2/			
(A)	(U)	Firepower:			
	(U)	25mm Gun			
	(U)	Barrel Life (rds.)	4,000/13,000	13,000	13,000
	(U)	TOW (T2SS)			
		Characteristics are unchanged Refer to page 5.			
(B)	(U)	Reliability			
	(U)	System (MMBF)	580/580	841 2/	841 2/
(C)	(U)	Maximum Speed (MPH)			
	(U)	Land	38/38	38	38
	(U)	Water	4.5/4.5	4.5 3/	4.5. 3/
(E)	(U)	Ground Pressure (p.s.i.)	7.8/7.8	7.8	7.8
(F)	(U)	Maintenance Ratio (Manhours/Oper. Hours)	.60/.60	.46 2/	.46 2/

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

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

(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; FY88/89 Amended President's Budget.

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

b. (U) M2A1/M3A1 Configuration (cont'd)

(6)(U)Footnotes --

1/ (U) The technical characteristics data shown in 10b(1) and operational characteristics data effected in 10b(2) above have been restructured to report characteristics for the M2A1/M3A1. These characteristics, not previously reported, 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 (65,600 lb. Vehicle with 500 HP and 600 HP Engines)

		Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(1) (U) Technical 1/				
(A) (U) Weight (combat loaded) - lbs.		NA/65,600	TBD 2/	65,600
(B) (U) Length (inches)		NA/258	TBD 2/	258
(C) (U) Width (inches)		NA/140	TBD 2/	140
(D) (U) Height (inches)		NA/119	TBD 2/	119
(E) (U) Armor Protection at 200M		(b)(1)		
(2) (U) Operational 1/				
(A) (U) Firepower				
25mm Gun (U) Stabilization Accuracy on a 4 mil. Target (% of time)		NA/80 to 90	TBD 2/	>90

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

c. (U) M2A2/M3A2 Configuration (65,600 lb. Vehicle with 500 HP and 600 HP Engines (cont'd)

	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(U) Barrel Life (rds.)	NA/13,000	13,000	13,000

TOW

Characteristics are unchanged.
Refer to page 5.

(B) (U) Reliability:

(U) System (MMBF)	NA/240	TBD 2/	550
(U) 25MM Gun (MRBBS)	NA/6000	9,021	9,021

(C) (U) Mobility:

(U) Range (miles):

(U) w/500 HP Engine	NA/240	TBD 2/	240
(U) w/600 HP Engine	NA/251	TBD 2/	251

(U) Maximum Speed (MPH):

(U) Land:

(U) w/500 HP Engine	NA/36	TBD 2/	36
(U) w/600 HP Engine	NA/40	TBD 2/	40

(U) Water:

(U) w/500 HP Engine	NA/4.0	TBD 2/	4.0
(U) w/600 HP Engine	NA/4.0	TBD 2/	4.0

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

		Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
c. (U) M2A2/M3A2 Configuration (cont'd)				
(U) Acceleration 0-30 MPH (sec):				
(U) w/500 HP Engine		NA/30	TBD 2/	30
(U) w/600 HP Engine		NA/20	TBD 2/	20
(D)	(U) Ground Pressure (p.s.i.)	NA/9.9	TBD 2/	9.9
(E)	(U) Maintenance Ratio (Manhours/Oper. Hours)	NA/.60	TBD 2/	.60

(3) (U) Previous change Explanations - None

(4) (U) Current change Explanations - None

(5) (U) References -

(U) Development Estimate: HQ DA Message, DAMA-ZA/DAMO-FDZ, 1614452 July 1984, Subject: High Survivability Program; Decision Coordinating Paper for M2A1E1/M3A1E1 High Survivability BFVS, October 5, 1987.

(U) Approved Program: DA Memorandum, September 30, 1987, Subject: Bradley Fighting Vehicle System (BFVS); FY88/89 Amended President's Budget. Bradley Fighting Vehicle System Program Baseline, February 26, 1988, USD (A) Memorandum.

(6) (U) Footnotes -

1/ (U) The technical characteristics data shown in 10c(1) and operational characteristics data reflected in 10c(2) above have been restructured to report characteristics for the M2A2/M3A2 vehicle. These characteristics, not previously reported, are the same as for the M2/M3 (basic vehicle) shown in 10a(1) and 10a(2) except as specifically noted otherwise.

2/ (U) Performance data not yet demonstrated for the A2, 65,600 lb. vehicle. The 25mm Gun data assumes that the same gun will be mounted on the A2 vehicle. Additional data will be reported in the December 1988 SAR.

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

	(1) Development Estimate	(2) Changes	(3) Current Estimate
a. (U) Cost			
Development (RDT&E)	$98.3	$+208.6	$306.9
Vehicles	(34.3)	(+203.8)	(238.1)
25mm Weapon/Ammo	(64.0)	(+4.8)	(68.8)
Procurement (WTCV)	227.3	+2713.6	2940.9
IFV/CFV	(170.6)	(+2435.8)	(2606.4)
FPW	(N/A)	(+8.8)	(8.8)
25mm Wpn	(54.2)	(+49.1)	(103.3)
Initial Spares	(2.5)	(+146.9)	(149.4)
Training Devices	(0.0)	(+73.0)	(73.0)
Construction (MILCON)	N/A	+11.0	11.0
Total: FY72 BASE YEAR $	325.6	+2933.2	3258.8
Escalation	111.3	+6564.0	6675.3
Development (RDT&E)	(23.8)	(181.9)	(205.7)
Procurement (WTCV)	(87.5)	(+6363.8)	(6451.3)
Construction (MILCON)	(N/A)	(+18.3)	(18.3)
TOTAL: Then Year $	$436.9	$ +9497.2	$9934.1
b. (U) Quantities			
Development	15	+ 6	21
Procurement	1190	+5700	6890
Total	1205	+5706	6911
c. (U) Unit Cost			
Procurement:			
FY72 Base-Year $	$.191	$+.236	$ .427
Then-Year $	.265	+1.098	1.363
Program:			
FY72 Base-Year $	.270	+.202	.472
Then-Year $	$.363	$+1.074	$ 1.437

d. (U) Approved Design to Cost Goal--N/A 1/

	(Average Unit Rollaway Cost) Dev Estimate Appr Program	Current Estimate	Latest Approved Threshold
@ Qty: 6890			
@ Peak Rate: 60/mo			
FY80 Constant $	.543 1/	.722	.597
Then-Year $	.818 1/	1.194	.877

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

e. (U) Foreign Military Sales--- None

f. (U) Nuclear Costs---None

g. Footnotes--

1/ No DTC goals have been established for the M2A1/M3A1 and M2A2/M3A2 programs.

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

			Current Year		Budget Year
			Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a.	(U)	Program Acquisition			
(1)	(U)	Cost	9934.1	9718.1	9934.1
(2)	(U)	Quantity	6911	6903	6911
(3)	(U)	Unit Cost	1.437	1.408	1.437
b.	(U)	Current Procurement	(FY 1988)	(FY 1988) 1/	(FY 1989)
(1)	(U)	Cost	768.0	768.0	761.9
		Less CY Adv Proc	37.6	37.6	34.2
		Plus PY Adv proc	24.0	24.0	35.0
		Net Total	754.4	754.4	762.7
(2)	(U)	Quantity	586	586	581
(3)	(U)	Unit Cost	1.287	1.287	1.313

1/ Updated to FY 88 Appropriation.

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	-1.5	-452.4	-2.2	-456.1
Quantity	+18.0	+2648.1	-	+2666.1
Schedule	+22.1	+664.7	-	+686.8
Engineering	+166.9	+1590.7	-	+1757.6
Estimating	+33.2	+3478.0	+28.1	+3539.3
Other	+17.9	-	-	+17.9
Support	+135.6	+ 934.0	-	+1069.6
Subtotal	+392.2	+8863.1	+25.9	+ 9281.2
Current Changes:				
Economic	-.2	+12.7	-	+12.5
Quantity	-	+9.7	-	+9.7
Schedule	-	+7.3	-	+7.3
Engineering	-	-	-	
Estimating	-1.5	- 20.1	+3.4	- 18.2
Other	-	-	-	-
Support	-	+204.7	-	+204.7
Subtotal	-1.7	+214.3	+3.4	+216.0
Total Changes	+390.5	+9077.4	+29.3	+9497.2
Current Estimate	512.6	9392.2	29.3	9934.1

(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	+905.8	-	+916.9
Schedule	+13.8	+59.4	-	+73.2
Engineering	+82.1	+489.8	-	+571.9
Estimating	+26.1	+912.4	+9.9	+948.4
Other	+11.0		-	+11.0
Support	+65.1	+286.4	-	+351.5
Subtotal	+209.2	+2653.8	+9.9	+2872.9
Current Changes:				
Quantity	-	+2.5	-	+2.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-.6	- 3.3	+1.1	- 2.8
Other	-	-	-	-
Support	-	+ 60.6	-	+ 60.6
Subtotal	- .6	+ 59.8	+1.1	+ 60.3
Total Changes	+208.6	+2713.6	+11.0	+2933.2
Current Estimate	306.9	2940.9	+11.0	3258.8

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

b. (U) Previous change explanations --

RDT&E

Economic:	revised excalation 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:	additional of 5,692 vehicles with 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 rates during FY88 thru FY90.
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, and classroom spares.

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		
Revised Dec 87 economic escalation rates (Economic)	N/A	-.2
Deobligation of -.3M in FY82, -.1M in FY83, -.8M in FY84, and -.3M in FY85 (Estimating)	-.6	-1.5
Total RDT&E change	-.6	-1.7
(2) (U) Procurement		
Revised Dec 87 economic escalation rates (Economic)	N/A	+12.7
Replacement of eight vehicles destroyed in live fire testing quantity	+2.5	+9.7
Reschedule of production rates during FY88 thru FY91 (Schedule)	Ø	+ 7.3
Changes to vehicle and 25mm Gun estimates, based on latest contractual data (Estimating)	-3.3	-20.1
Changes in support:	+60.6	+204.7
o Reduction in initial spares requirements	(-5.2)	(-19.4)
o Reduction in TMDE requirements	(-8.7)	(-14.9)
o Increase in other peculiar spt equipment	(+1.5)	(+ 7.3)
o Incorporation of BFVS training devices in SAR reporting structure	(+73.Ø)	(+231.7)
Total Procurement Change	+59.8	+214.3

	(Dollars in Millions) Base-Year	Then-Year
(3) (U) MILCON		
Ft. Knox, Kentucky ICOFT bldg placed in FY88 appropriation for BFVS. (Estimating)	+1.1	+3.4
Total MILCON Change	+1.1	+3.4

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

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

PAUC (Initial SAR Est)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC (Dev Est)
.204	+.098	—	--	+.061	---	---	---	+.159	.363

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC (Current Est)
.363	-.064	+.088	+.100	+.254	+.509	+.184	+.003	+1.074	1.437

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

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

b. (U) Procurement -

IFV/CFV/MLRS Production
(7th Year Production)
FMC Corporation
San Jose, California
DAAE07-86-C-A047, FFP
Award: July 31, 1986
Definitized: July 31, 1986 **

	Initial Contract Price Target	Ceiling	Qty
TOTAL:	$339.2	N/A	775*
IFV/CFV ONLY:	$317.2	N/A	716

	Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
TOTAL:	$381.3	N/A	779	$381.3	381.3
IFV/CFV Only:	$348.8	N/A	716	$348.8	348.8

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

*Corrects previously reported total initial procurement quantity of 779 vehicles which was in error.
**Corrects date error reported on Dec 86 SAR.

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

IFV/CFV/MLRS Production
(8th Year Production)
FMC Corporation
San Jose, California
DAAE07-87-C-A038, FFP 1/
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:	$332.2	N/A	708	$332.2	$332.2
IFV/CFV Only:	$316.0	N/A	662	$316.0	$316.0

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	$198.4	N/A	2452	$198.4	$198.4
IFV/CFV Only:	$116.8	N/A	1436	$116.8	$116.8

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

Turret Drive System
(FY's 85/86/87)
GEOS
Pittsfield, Massachusetts
DAAE09-85-C-0396, FFP
Award: January 31, 1985
Definitization: July 30, 1985

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

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

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$163.9	N/A	2097	$163.9	$163.9

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

25MM Gun Production
(FY's 86-90)
McDonnell Douglas Helicopter
Mesa, Arizona
DAAE09-86-C-0438, FFP
Award: February 10, 1986
Definitized: December 11, 1986

Initial Contract Price		
Target	Ceiling	Qty
$26.3	N/A	761

	Current Contract Price			Estimated Price at Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
Total:	$91.6	N/A	2495	$91.6	$91.6
IFV/CFV Only:	$88.9	N/A	2419	$88.9	$88.9

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

Bradley STS VI
FMC Corporation
San Jose, California
DAAE07-86-C-R128, CPFF
Award: September 29, 1986
Definitized: September 29, 1986

Initial Contract Price		
$41.4	N/A	N/A

	Current Contract Price			Estimated Price at Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
Total:	$53.8	N/A	N/A	$53.8	$53.8
IFV/CFV Only:	$44.5	N/A	N/A	$44.5	$44.5

Cost and schedule variance information is not required for contract DAAE07-86-C-R128. Costs are being controlled by Work Directive.

(U) Military Construction --

c. No active major contracts.

d. (U) Footnotes --

1/ Contract DAAE07-87-C-A038 was modified and price increased by $40.1M to cover the cost of modifying vehicles to the A2 configuration.

BFVS, December 31, 1987

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

a. (U) Program Status --

(1) (U) Percent Program Completed: 85.7% (24 yrs/28 yrs)

(2) (U) Percent Program Cost Appropriated: 76.3% (7576.1/9934.1)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY66-88)	Budget Year (FY89)	Balance to Complete FYPD FY90-93)	Beyond FYDP (FY94)	Total
RDT&E	512.6	-	-	-	512.6
PROCUREMENT	7034.2	761.9	1596.1	-	9392.2
MILCON	29.3	-	-	-	29.3
TOTAL	7576.1	761.9	1596.1	-	9934.1

c. (U) Annual Summary ---

FISCAL YEAR	QTY	FY72 BASE-YEAR DOLLARS ROLLAWAY NCNREC	ROLLAWAY REC	TOTAL PROGRAM	THEN YEAR DOLLARS ADVANCE PROC DEBIT	ADVANCE PROC CREDIT	TOTAL	($) ESCL RATE
APPROPRIATION: RDT&E								
1966				1.5			1.2	2.7
1967				6.5			5.3	3.3
1968				2.8			2.4	3.6
1969				5.4			4.8	4.7
1970				1.9			1.8	5.5
1971				5.3			5.2	5.1
1972				2.1			2.2	4.6
1973				9.2			10.1	4.3
1974	3			16.9			20.1	8.0
1975	3			12.9			16.6	10.9
1976	7			24.2			32.8	6.6
197T				5.8			8.2	2.9
1977				39.5			57.5	2.6
1978	8			31.8			49.9	6.8
1979				25.3			43.5	8.4

BFVS, December 31, 1987

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

FISCAL YEAR	QTY	FY72 BASE-YEAR DOLLARS ROLLAWAY NCNREC	ROLLAWAY REC	TOTAL PROGRAM	THEN YEAR DOLLARS ADVANCE PROC DEBIT	ADVANCE PROC CREDIT	TOTAL	ESCL RATE
APPROPRIATION: RDT&E								
1980				20.4			38.7	10.6
1981				20.1			41.5	10.6
1982				40.0			88.1	7.6
1983				20.3			46.7	4.9
1984				10.7			25.4	3.8
1985				4.3			10.6	3.4
SUBTOTAL	21			306.9			512.6	
APPROPRIATION: PROCUREMENT								
1969		.4		.4			.4	2.7
1979		16.2	2.6	18.8			39.2	9.0
1980	100	17.6	92.9	118.5			276.7	11.8
1981	400	10.1	213.3	260.7			682.6	11.6
1982	600	1.4	279.2	317.2	59.0		889.2	14.3
1983	600	--	217.4	279.5	49.1	59.0	830.5	9.0
1984	600	12.2	221.6	301.9	29.6	39.5	931.5	8.0
1985	655	.6	237.7	287.5	24.9	39.2	911.8	3.4
1986	716	3.2	216.5	250.7	37.3	20.3	823.3	2.8
1987	662	1.5	234.9	258.8	17.9	30.6	881.0	2.7
1988	586	--	195.8	217.8	37.6	24.0	768.0	3.7
1989	581	--	194.3	209.3	34.2	35.0	761.9	3.8
1990	624	1.8	183.5	202.9	38.2	46.1	760.4	3.6
1991	691	1.3	174.8	187.6		46.9	720.7	3.3
1992	75	--	29.3	29.3	---	---	115.0	2.8
SUBTOTAL	6890	66.3	2493.8	2940.9	327.8	340.6	9392.2	
APPROPRIATION: MILITARY CONSTRUCTION								
1983				3.7			9.4	4.9
1984				2.1			5.5	3.8
1985				4.1			11.0	3.4
1986				---			---	---
1987				---			---	---
1988				1.1			3.4	3.7
SUBTOTAL				11.0			29.3	
TOTAL	6911	66.3	2493.8	3258.8	327.8	340.6	9934.1	

Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional Direction and FY89 amended budget decisions.

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

d. (U Obligations and Expenditures --

THEN YEAR DOLLARS (CURRENT ESTIMATE IN MILLIONS)			
FISCAL YEAR	TOTAL PROGRAM 1/	OBLIGATED	EXPENDED
APPROPRIATION: RDT&E			
1966	1.2	1.2	1.2
1967	5.3	5.3	5.3
1968	2.4	2.4	2.4
1969	4.8	4.8	4.8
1970	1.8	1.8	1.8
1971	5.2	5.2	5.2
1972	2.2	2.2	2.2
1973	10.1	10.1	10.1
1974	20.1	20.1	20.1
1975	16.6	16.6	16.6
1976	32.8	32.8	32.8
197T	8.2	8.2	8.2
1977	57.5	57.5	57.5
1978	49.9	49.9	49.9
1979	43.5	43.5	43.5
1980	38.7	38.7	38.7
1981	41.5	41.5	40.1
1982	88.1	88.1	84.3
1983	46.7	46.7	44.9
1984	25.4	25.4	21.9
1985	10.6	10.6	10.1
TOTAL	512.6	512.6	501.6
APPROPRIATION: PROCUREMENT 2/			
1969	.4	.4	.4
1979	39.2	39.2	39.2
1980	276.7	268.6	268.0
1981	682.6	637.9	632.1
1982	889.2	833.3	821.0
1983	830.5	765.2	752.2
1984	931.5	854.6	819.3
1985	911.8	834.6	755.6
1986	823.3	738.0	466.5
1987	881.0	695.9	31.4
1988	768.0	19.4	
1989	761.9		
1990	760.4		
1991	720.7		
1992	115.0		
TOTAL	9392.2	5687.1	4585.7

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

APPROPRIATION: MILITARY CONSTRUCTION

(U) THEN YEAR DOLLARS (CURRENT) ESTIMATE IN MILLIONS)			
FISCAL YEAR	TOTAL PROGRAM 1/	OBLIGATED	EXPENDED
1983	9.4	4.0	4.0
1984	5.5	4.0	4.0
1985	11.0	6.3	6.3
1986	0	0	0
1987	0	0	0
1988	3.4	0	0
TOTAL	29.3	14.3	14.3

e. (U) Footnotes --

1/ Prior year programs adjusted to obligation level when obligational authority has expired.

2/ Obligation and expenditures for initial spares procurement not included in PA total due to date not being available to the reporting PM. MSCs budget execution system does not provide obligation and expenditure data by system.

17. (U) Production Rate Data:

a. (U) Annual Production Rates -

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum 1/ 2/ Economic
1977	59	N/A		
1978	79	N/A		
1979	465	N/A		
1980	587	100	80 3/	
1981		350	533 4/	
1982		829	600	
1983		1080	600	
1984		1080	600	
1985		1080	655	
1986		1080	716	
1987		1283	662	
1988			586	792
1989			581	792
1990			624	792
1991			691	792 6/
1992			707 5/	519

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

FY87 & Prior production procurement are considered sunk; therefore, costing and scheduling for maximum economic production rate is only feasible for FY88 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$)	2374.4	+ 884.4	3258.8	+ 17.7	3241.1
	(TY$)	6959.1	+2975.0	9934.1	+ 97.9	9836.2
PAUC	(BY$)	.344	+ .128	.472	+ .003	.469
	(TY$)	1.008	+ .429	1.437	+ .014	1.423

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) 7/	2/80	0	2/80	0	2/80
Durations (in Months)	119	+41	160	+10	150
End Date (Mo/Yr) 7/	12/89		5/93		7/92

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

	To Date
RDT&E	21/21
PROCUREMENT	3417/3417

e. Footnotes -

1/ Maximum economic rates not feasible to report for FY87 and prior production.

2/ At present, MLRS Carrier production rate is only four (4) per month, which is very low for existing capacity at FMC. If IFV/CFV produces at the maximum rate and MLRS production is increased beyond nine vehicles per month, there would be a 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 be required to increase maximum present , economic production rate above 66 IFV/CFVs and nine MLRS carriers per month.

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

3/ FY80 funded delivery period for 100 vehicles is 15 months. Corrects December 1986 SAR entry which read current estimate production rate of 125.

4/ FY81 funded delivery period for 400 vehicles is 9 months. Corrects December 1986 SAR entry which read current estimate production rate of 300.

5/ FY92 funded delivery period for 67 vehicles is one month to complete the authorized total quantity of 6,903 vehicles, including 21 development vehicles. This procurement would be a buy-out for the programmed AAO of 6,903 vehicles and would be added to end of FY91 vehicle procurement.

6/ Maximum annual economic production rate is 792 vehicles based on normal vehicle procurement/tooling. However, a quantity of 67 vehicles is shown in FY92 to complete the procurement program of 6,882 IFVs/CFV. A quantity of 173 vehicles would be needed in procurement year FY91 for delivery over a three month period under the maximum economic rate to complete the procurement program of 6,882 vehicles.

7/ Represents production vehicle deliveries only.

18. Operating and Support Costs:

Not applicable.

~~SECRET~~

SAR-87-12D

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

AF-15 GLCM

AS OF DATE: December 31, 1987

INDEX (U)

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SAF/PAS
88-0117-

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 Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-5000

Col T. Sinclair
Assigned: 17 Nov 86
AUTOVON: 785-7636
COMM: (513)255-7636

4. (U)Program Elements:

RDT&E: PE 64362F
Procurement: APPN 3020; ICN MGLCMO; PE 27314F
MILCON: PE 27314F

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

~~Classified by: BGM-109G Security Classification Guide, 31 July 1987~~

(THIS PAGE IS UNCLASSIFIED)

~~Declassify: OADR~~

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FOR OPEN PUBLICATION
AS AMENDED

1

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

~~SECRET~~ RD

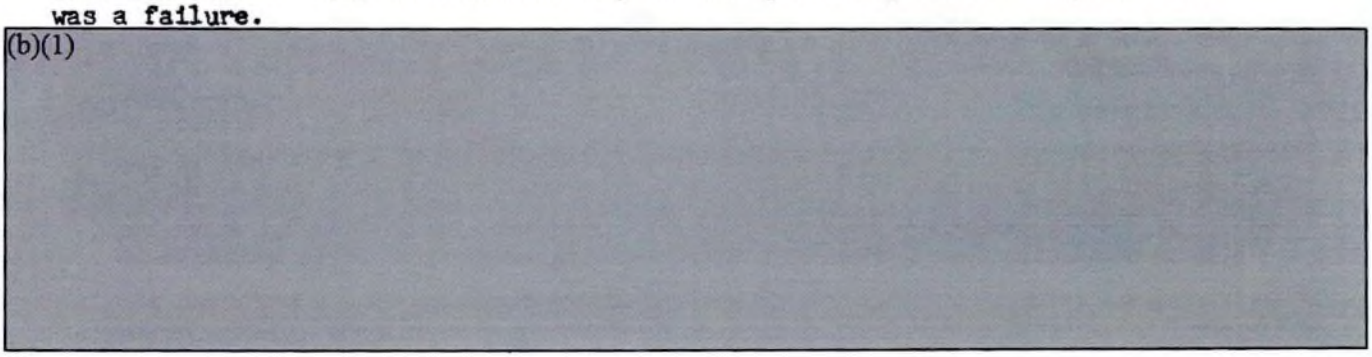
OASD(PA) DFOISR 88-T-1585

6. (U) Mission and Description: The GLCM system is being 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 an 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. (S) 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 to December 1982, six flights were conducted. Four were successful, one was partially successful, and one was a failure.

(b)(1)



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

c. (U) Significant Developments Since Last Report — During the past year, the GLCM baseline was stabilized through a block update, became fully supportable in the field, and activated the European Repair Facility (ERF) in March 1987. These achievements allowed for a successful Program Management Transfer from AFSC to AFLC on 1 October 1987. In addition, the weapon system achieved its follow-on capability in December 1987 - one year early. Finally, a historic Intermediate Nuclear Forces treaty was signed by the United States and the Soviet Union on 8 December 1987 which will phase the GLCM system out of Europe over the next three years. Following treaty signature, a Secretary of Defense Memorandum provided direction to cease over-seas deployment. Additionally, Congressional Authorization an Appropriations Acts for FY88 directed cancellation of FY88 missile buy of 37 missiles.

(U) The GLCM system will meet mission requirements.

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

8. (U) Decision Coordination Paper (DCP) Threshold Breaches: In lieu of a DCP, an Executive Program Summary was submitted in August 1981. No thresholds have been scheduled.

9. (U) Schedule

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

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

b. 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 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. Deleted "Attack (Block IIA)" erroneously reported in Dec 84 SAR.

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: HQ USAF Program Management Directive for BGM-109G Ground Launched Cruise Missile PMD No. R-P8010(15)/64362F, 11 Mar 86.

10. [redacted] Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance*	Current Estimate
a. [redacted] Technical --			
(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)			
3. (U) Air Vehicle:			
Weight (lbs)	NA/NA	2643	2650
Length (in)	NA/NA	219	219
Diameter (in)	NA/NA	20.4	20.4
b. [redacted] Operational --			
1. (U) Range:			
Operational (KM)	2500/2500	2882	2500
(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)			

* Best Case

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

c. (U) Previous Change Explanations --

Operational Characteristic Nos. 2 to 5 - Operational parameters in the Current Estimate were adjusted to values the contractor can be expected to achieve.

Technical Characteristic No. 1 - Current Estimate of warhead mid-life yields based on results of November 1980 Executive Session of the W84 Warhead Project Officer's meeting.

Technical Characteristic No. 3 - Current weight estimate based on calculation using actual weights of 94% of the production configuration components. Length and diameter are actuals.

Operational Characteristic No. 2a and 3 - Demonstrated performance value previously shown reflected performance demonstrated by a SLCM. Value now shown reflects a GLCM demonstrated value. Current estimate value previously shown reflected estimated performance at maturity in 1988. Value shown now is estimate as of 31 December 1983.

Operational Characteristic No. 4 - Demonstrated performance reflects value demonstrated by additional GLCM flight-testing.

Operational Characteristic No. 5 - Demonstrated performance value is as of 31 December 1985. The .80 values are at maturity in 1988.

(b)(1) [redacted]

e. (U) References --

Development Estimate: GLCM System Specification No. SS07878 GLCM 001A, 20 February 1979; TAF ROC 304-77, 14 February 1977.

Approved Program: HQ USAF Program Management Directive for BGM-109G Ground Launched Missile PMD No. R-P8010(15)/64362F, 11 March 1986, USDR&E Letter to Department of Energy, 1 September 1978.

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

		Development Estimate	Changes	Current Estimate
a. (U)	Cost --			
	Development (RDT&E)	74.8	185.7	260.5
	Procurement	927.6	490.6	1418.2
	Airframe	(646.9)	(-146.3)	(500.6)
	Launch Equipment	(131.8)	(492.6)	(624.4)
	Total Flyaway	(778.7)	(346.3)	(1125.0)
	Peculiar Support	(129.0)	(117.1)	(246.1)
	Initial Spares	(19.9)	(27.2)	(47.1)
	Construction	51.2	127.0	178.2
	Total Constant FY77 $	1053.6	803.3	1856.9
	Escalation	473.6	1111.9	1585.5
	Development	(13.9)	(109.3)	(123.2)
	Procurement	(437.8)	(877.9)	(1315.7)
	Construction	(21.9)	(124.7)	(146.6)
	Total Program Cost	1527.2	1915.2	3442.4
b. (U)	Quantities			
	Development (RDT&E)	6	-1	5
	Procurement	696	-136	560
	Total	702	-137	565
c. (U)	Unit Cost			
	Procurement:			
	FY77 Base Year $	1.333	+1.200	2.533
	Then Year $	1.962	+2.920	4.882
	Program:			
	FY77 Base Year $	1.501	+1.786	3.287
	Then Year $	2.175	+3.918	6.093

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

e. (U) Foreign Military Sales -- None

(b)(1)

~~RESTRICTED DATA~~
This material contains Restricted Data as defined in the Atomic Energy Act of 1954. Unauthorized disclosure subject to administrative and criminal sanctions.

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

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition**			
(1) Cost	3442.4	3596.7	3442.4
(2) Quantity	565	602	565
(3) Unit Cost	6.093	5.975	6.093
b. Current Procurement**	(FY 1988)	(FY 1988)*	(FY 1989)
(1) Cost	4.1	4.1	0.6
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	6.1	6.1	0.0
Net Total	10.2	10.2	0.6
(2) Quantity	0	0	0
(3) Unit Cost	0.0	0.0	0.0

*Adjusted to reflect FY88 Congressional 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	88.7	1365.4	73.1	1527.2
Previous Changes:				
Economic	+17.6	+292.6	-28.0	+282.2
Quantity	-13.9	-154.1	0.0	-168.0
Schedule	+29.1	+100.7	+6.6	+136.4
Engineering	+4.6	+57.3	0.0	+61.9
Estimating	+255.7	+693.5	+108.9	+1058.1
Other	0.0	+160.8	-28.0	+132.8
Support	+8.2	+323.9	+234.0	+566.1
Subtotal	+301.3	+1474.7	+293.5	+2069.5
Current Changes:				
Economic	+0.1	-0.7	-1.4	-2.0
Quantity	0.0	-48.3	0.0	-48.3
Schedule	0.0	-0.5	0.0	-0.5
Engineering	0.0	-0.3	0.0	-0.3
Estimating	-6.4	-18.6	-40.4	-65.4
Other	0.0	+3.9	0.0	+3.9
Support	0.0	-41.7	0.0	-41.7
Subtotal	-6.3	-106.2	-41.8	-154.3
Total Changes	+295.0	+1368.5	+251.7	+1915.2
Current Estimate	383.7	2733.9	324.8	3442.4

13. Cost Variance Analysis (cont'd):
(FY77 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	-98.6	0.0	-108.0
Schedule	+18.0	-1.8	0.0	+16.2
Engineering	+3.5	+32.3	0.0	+35.8
Estimating	+168.5	+352.4	+45.1	+566.0
Other	0.0	+90.8	-16.9	+73.9
Support	+8.3	+163.2	+118.2	+289.7
Subtotal	+188.9	+538.3	+146.4	+873.6
Current Changes:				
Quantity	0.0	-21.6	0.0	-21.6
Schedule	0.0	-0.2	0.0	-0.2
Engineering	0.0	-0.1	0.0	-0.1
Estimating	-3.2	-8.6	-19.4	-31.2
Other	0.0	+1.7	0.0	+1.7
Support	0.0	-18.9	0.0	-18.9
Subtotal	-3.2	-47.7	-19.4	-70.3
Total Changes	+185.7	+490.6	+127.0	+803.3
Current Estimate	260.5	1418.2	178.2	1856.9

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

RDT&E:

Economic: Revised economic escalation rates.
Quantity: Reduction of one development missile.
Schedule: Delays/slips in IOC.
Engineering: Increased effort due to unique GLCM warhead decision.
Estimating: 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. b. (U) Previous Change Explanations (cont'd) --

Procurement:

Economic: Revised economic escalation rates.

Quantity: Reducton of 136 missiles.

Schedule: Delays/slips in IOC. Deferral of 25 backup GLCM 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.

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 transferred to RDT&E for Operational Test Launch Payload. ECO funds reduction. Reduction of classified program funds. Reduction due to dual source competition savings. Reestimate of Advance Procurement Requirements. Reestimate of ECO flyaway funds. Deletion of 2nd GLCM Unique Turbine System procurement. Adjustments for prior year escalation.

Other: Reduction in SLCM quantities.

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.

13. b. (U) Previous Change Explanations (cont'd) --

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 for 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.

Other: NATO infrastructure funding allowed MILCON reductions.

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

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Revised economic escalation indices (Economic)	-	+0.1
Reduction in mission operation ability due to Congressional reduction of funds (Estimating)	-3.1	-6.3
Adjustment for prior year escalation (Estimating)	-0.1	-0.1
(2) Procurement		
Revised economic escalation indices (Economic)	-	-0.7
Delete 37 missiles to comply with INF Treaty.	-26.6	-59.5
Deletion of 37 GLCMs (Quantity)	(-21.6)	(-48.3)
Schedule changes applicable to 37 GLCMs since baseline. (Schedule)	(-0.2)	(-0.5)
Engineering changes applicable to 37 GLCMs since baseline. (Engineering)	(-0.1)	(-0.3)
Estimating changes applicable to 37 GLCMs since baseline. (Estimating)	(-2.7)	(-6.1)
Reestimate of funds required for Reliability & Maintainability due to reduction of 37 missiles. (Estimating)	(-1.6)	(-3.5)
Other changes applicable to 37 GLCMs since baseline. (Other)	(-0.4)	(-0.8)
Increase in funds to purchase 10 additional RMUCs & 20 additional guidance sets. (Estimating)	+5.5	+11.1

13. c. (U) Current Change Explanation (cont'd) --

(2) Procurement (cont'd)

	(Dollars in Millions) Base Year	Then Year
Reduction fo support requirements due to compliance with INF Treaty. (Support)	-19.0	-41.8
Reduction due to dual source competition savings. (Estimating)	-4.9	-10.0
Increase in funds for INF Treaty compliance (Other)	+2.1	+4.7
Reestimate of funds required for TEL and Weapon Control System. (Estimating)	-5.4	-11.2
Adjustment for current and prior year escalation (Estimating)	+0.5	+1.1
Adjustment for current and prior year escalation (Support)	+0.1	+0.1

(3) MILCON

Revised Jan 88 economic escalation indices (Economic)	-	-1.4
Reestimate of requirements due to INF Treaty (Estimating)	-20.1	-41.8
Adjustment for prior year escalation (Estimating)	+0.7	+1.4

d. (U) References--

Development Estimate: January 1978 Five Year Defense Plan (FYDP)

14. (U) Program Acquisition Unit Cost (PAUC) History: (TY $ in millions)

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

PAUC (Initial SAR/Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.175	0.496	0.145	0.241	0.109	1.757	0.242	0.928	3.918	6.093

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

a. (U) RDT&E -- NA

b. (U) Procurement --

All-Up-Round Missile (FY85/86)

General Dynamics/Convair, San Diego CA
N00032-84-C-4484, FFP
Award: 19 DEC 84
Definitized: 19 DEC 84

Initial Contract Price		
Target	Ceiling	Qty
164.2	NA	180

Estimated Price at Completion	
Contractor	Program Mgr
410.5	410.5

Current Contract Price		
Target	Ceiling	Qty
410.5	NA	386

Cost Variances: NA

All-Up-Round Missile (FY85/86)

McDonnell Douglas, St Louis MO
N00032-84-C-4485,FFP
Award: FEB 84
Definitized: DEC 84

Initial Contract Price		
Target	Ceiling	Qty
176.7	NA	120

Estimated Price at Completion	
Contractor	Program Mgr
408.7	408.7

Current Contract Price		
Target	Ceiling	Qty
408.7	NA	120

Cost Variances: NA

Launch Equipment (FY85/86)

General Dynamics/Convair, San Diego CA
N00032-86-C-5154,FFP
Award: Jan 85
Definitized: Jun 85

Initial Contract Price		
Target	Ceiling	Qty
156.6	NA	49

Estimated Price at Completion	
Contractor	Program Mgr
159.7	159.7

Current Contract Price		
Target	Ceiling	Qty
159.7	NA	49

Cost Variances: NA

This contract will be dropped on subsequent reports due to being over 90% complete.

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

Launch Equipment (FY86)

General Dynamics/Convair, San Diego CA
N00032-86-C-6100,FFP
Award: Jun 85
Definitized: Feb 86

Current Contract Price

Target	Ceiling	Qty
146.9	NA	48

Initial Contract Price

Target	Ceiling	Qty
148.9	NA	52

Estimated Price at Completion

Contractor	Program Mgr
148.9	148.9

Cost Variances: NA

First time reporting.

All-Up-Round Missile (FY87)

McDonnell Douglas, St Louis MO
N00032-86-C-6124,FFP
Award: 21 Nov 86
Definitized: 21 Nov 86

Current Contract Price

Target	Ceiling	Qty
190.0	NA	50

Initial Contract Price

Target	Ceiling	Qty
187.9	NA	50

Estimated Price at Completion

Contractor	Program Mgr
190.0	190.0

Cost Variances: NA

First time reporting.

All-Up-Round Missile (FY87)

General Dynamics/Convair, San Diego CA
N00032-86-C-6126
Award: Dec 86
Definitized: Dec 86

Current Contract Price

Target	Ceiling	Qty
163.8	NA	26

Initial Contract Price

Target	Ceiling	Qty
170.2	NA	26

Estimated Price at Completion

Contractor	Program Mgr
163.8	163.8

c.(U) MILCON -- NA

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

a. Program Status --

(1) Percent Program Completed: 84.6% (11 yrs/13 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 99.7% ($3433.3/$3442.4)
(Funds Appropriated To Date in Millions/Total Program Funding in Millions)

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

Appropriation	Current $ Prior Yrs (FY78-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90)	Beyond FYDP NA	Total
RDT&E	383.7	0.0	--	--	383.7
Procurement	2724.8	0.6	8.5	--	2733.9
MILCON	324.8	0.0	0.0	--	324.8
Total	3433.3	0.6	8.5	--	3442.4

c. Annual Summary --

Fiscal Year	Qty	FY77 Base Year Dollars			Then Year Dollars			Escl Rate
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	(%)
Appropriation: RDT&E								
1978	0	NA	NA	17.0	NA	NA	18.7	7.6
1979	0	NA	NA	28.8	NA	NA	34.9	8.4
1980	0	NA	NA	44.1	NA	NA	59.4	9.4
1981	0	NA	NA	72.2	NA	NA	107.6	11.9
1982	0	NA	NA	50.3	NA	NA	80.1	9.2
1983	0	NA	NA	16.5	NA	NA	27.6	4.9
1984	0	NA	NA	20.6	NA	NA	35.6	3.8
1985	0	NA	NA	10.0	NA	NA	17.9	3.4
1986	0	NA	NA	1.0	NA	NA	1.9	2.8
1987	0	NA	NA	0.0	NA	NA	0.0	2.7
Subtotal	5	NA	NA	260.5	NA	NA	383.7	

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16. (U) Program Funding Summary (cont'd): (TY $ in Millions)

c. Annual Summary --

Fiscal Year		FY77 Base Year Dollars			Then Year Dollars			Escl Rate (1)
		Flyaway			Advance Proc			
	QTY	Nonrec	Rec	Total	Debit	Credit	Total	(%)
Appropriation: Procurement								
1979	0	0.0	0.0	15.2	20.2	0.0	20.2	8.7
1980	0	0.0	0.0	5.4	8.2	0.0	8.2	9.7
1981	11	7.9	45.5	98.9	13.9	-28.4	164.1	11.9
1982	54	6.8	129.0	197.5	29.8	-13.9	350.5	9.6
1983	84	5.7	201.1	242.9	21.5	-29.8	455.4	9.0
1984	120	6.2	234.1	299.9	23.0	-21.5	587.6	8.0
1985	120	2.5	248.1	288.3	21.5	-23.0	579.8	3.4
1986	95	2.9	179.9	207.1	8.9	-21.5	431.2	2.8
1987	76	2.5	52.8	57.3	6.1	-8.9	123.7	2.7
1988	0	0.0	0.0	1.8	0.0	-6.1	4.1	3.7
1989	0	0.0	0.0	0.3	0.0	0.0	0.6	3.8
1990	0	0.0	0.0	3.6	0.0	0.0	8.5	3.6
Subtotal	560	34.5	1090.5	1418.2	153.1	-153.1	2733.9	
Appropriation: MILCON								
1981	NA	NA	NA	2.4	NA	NA	3.8	11.9
1982	NA	NA	NA	43.4	NA	NA	74.5	9.2
1983	NA	NA	NA	42.1	NA	NA	75.0	4.9
1984	NA	NA	NA	40.6	NA	NA	74.5	3.8
1985	NA	NA	NA	10.1	NA	NA	19.0	3.4
1986	NA	NA	NA	22.4	NA	NA	43.5	2.8
1987	NA	NA	NA	17.2	NA	NA	34.5	2.7
1988	NA	NA	NA	0.0	NA	NA	0.0	3.7
1989	NA	NA	NA	0.0	NA	NA	0.0	3.8
1990	NA	NA	NA	0.0	NA	NA	0.0	3.6
Subtotal	NA	NA	NA	178.2	NA	NA	324.8	
Total	565	34.5	1090.5	1856.9	153.1	-153.1	3442.4	

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

d. Obligations and Expenditures --

Fiscal Year	Then Year Dollars (Current Estimate in Millions) Total	(1) Obligated	(1) Expended
Appropriation: RDT&E			
1978	18.7	18.7	18.7
1979	34.9	34.9	34.9
1980	59.4	59.4	59.4
1981	107.6	107.6	107.6
1982	80.1	80.1	80.1
1983	27.6	27.6	27.6
1984	35.6	35.6	29.6
1985	17.9	14.2	14.2
1986	1.9	1.8	1.8
To Complete	0.0	NA	NA
Total	383.7	379.9	374.9
Appropriation: Procurement			
1979	20.2	20.2	20.2
1980	8.2	8.2	8.2
1981	164.1	164.0	164.1
1982	350.5	350.5	350.5
1983	455.4	445.4	442.8
1984	587.6	586.2	531.8
1985	579.8	498.2	482.6
1986	431.2	329.7	168.7
1987	123.7	99.9	31.1
1988	4.1	0.0	0.0
To Complete	9.1	NA	NA
Total	2733.9	2502.3	2200.0
Appropriation: MILCON			
1981	3.8	3.8	3.8
1982	74.5	67.0	47.7
1983	75.0	52.2	21.5
1984	74.5	48.1	11.4
1985	19.0	10.3	5.0
1986	43.5	27.6	0.0
1987	34.5	0.0	0.0
To Complete	0.0	NA	NA
Total	324.8	209.0	89.4

(1) Reflects Program Office records as of 12 February 1988.

17. (U) Production Rate Data:

a. Annual Production Rates

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum
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	76
1988	--	--	--	--

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less DE)	Current Estimate	Variance (CE less MAX)	MAX Econ
Prog Acq Cost					
(BY$)	1780.0	+76.9	1857.0	0	1857.0
(TY$)	3307.3	+135.1	3442.4	0	3442.4
PAUC (BY$)	3.150	+.137	3.287	0	3.287
(TY$)	5.854	+.239	6.093	0	6.093

c. 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 DE)	Current Estimate	Variance (CE less MAX)	MAX Econ
Start Date (Mo/Yr)	4/82	NA	4/83	NA	4/83
Duration (In Mos)	61	+7	68	+1	67
End Date (MO/Yr)	5/87	NA	12/88	NA	11/88

d. Deliveries (Plan/Actual) --

	To Date
RDT&E:	5/5
Procurement:	
All-Up-Round	451/452
TEL	121/122
LCC	69/71
MILCON	NA

18. (U) Operating and Support Cost: NA

~~CONFIDENTIAL~~

A-16 MLRS

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

87-035

Concur in classification as marked
MAR 27 1988 23

AS OF DATE: December 31, 1987

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

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1. (U) Designation/Nomenclature (Popular Name): HC/Armored Vehicle - Mounted Rocket 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: 205-876-1195

4. (U) Program Elements:

RDT&E: PE 64314A Project D564 (SUNK)
PROCUREMENT: PE 2032 SSN C67600/CA0257
MILCON: Project Codes (FY86, FY89, and FY90) 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, and Army Tactical Missile System.

Concur in Classification as marked
23 MAR 1988
SECURITY REVIEW, DDCSINT, HQDA



~~CLASSIFIED BY: MLRS with XM77 Warhead Security Classification Guide dated 6 February 1986~~
DECLASSIFY BY: OADR

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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 materiel and personnel targets, especially during surge conditions when the threat's forces present targets in sufficient quantities and density to saturate available cannon weapon fire support. The system has the growth potential to adapt follow-on warheads such as terminal homing munitions, scatterable antitank mines, and chemical.

b. (U) The system consists of an armored vehicle mounted rocket launcher (AVMRL), 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:

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 AVMRL's 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.

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

(1) (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.

(2) (U) The fly-to-buy program continues to successfully provide adequate ammunition to support program requirements and MLRS fieldings. Process, manufacturing and test related problems were resolved in the areas of fin restraint, motor case and nontactical test hardware. Twenty-three lots were successfully tested and accepted by the Government. Overall reliability demonstrated during 1987 was .94.

(3) (U) MLRS fieldings are being accomplished on schedule. Five batteries were fielded in FY87: two tactical (Conus-1; Europe-1), three POMCUS batteries, one of which was a Headquarters, Headquarters, and Service Battery in Europe.

(4) (U) Present data available indicate that all mission requirements can be achieved.

c. (U) Changes Since "As of" Date -- This submission reflects an amended FY 89 President's Budget. The SAR incorporates prior year updates, all congressional actions for FY 88, approved program budget decisions (PBDs) for FY 89 and outyear adjustments to be consistent with budget decisions for programs affected by FY 88 and FY 89 actions.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches:

(U) There are currently no DCP (dated 15 May 1979) or SDDM (dated 14 April 1983) threshold breaches.

9. (U) Schedule:

a. (U) Milestones --

	Planning Estimate/ Approved Program	Current Estimate
Milestone I (DAB)	Jan 77/NA	Jan 77
Validation Contract Awards (2)	Sep 77/NA	Sep 77
DT/OT I (Government)		
Start	Nov 79/NA	Nov 79
Complete	Feb 80/NA	Feb 80
Milestone IIIa (DAB)	May 80/NA	May 80
Maturation Contract Award	May 80/NA	Apr 80
Low Rate Production Contract Award	May 80/NA	Apr 80
Initial Production Delivery		
(Rocket)	Jan 82/NA	May 82
(AVMRL)	Feb 82/NA	Sep 82
Production Qualification Test		
Start	Jan 82/NA	May 82
Complete	Sep 82/NA	Feb 83
OT III		
Start	Jun 82/NA	Oct 82
Complete	Sep 82/NA	Mar 83
Milestone IIIb (ASARC)	Nov 82/NA	NA
Milestone IIIb (DAB)	Nov 82/NA	NA
Milestone IIIb (GOPR)	NA/Mar 83	Mar 83
Initial Operational Capability (IOC) (nine launchers fielded with 60 rockets per launcher)	Nov 82/Mar 83	Mar 83

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 AVMRL Delivery was 1-month later than planned due to problems encountered with production startup.

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

d. (U) References --

Planning Estimate: DCP No. 165, 15 May 1979.

Approved Program: FY 1988 - 1989 President's Budget. Program Baseline, 26 Feb 88.

10. (U) Technical/Operational Characteristics:

	Plng Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. (U) Technical --			
(b)(1)	(b)(1)		
(U) Maximum Range (km)	35/NA	31.8	31.8
b. (U) Operational --			
(U) Reliability			
Rocket Preflight, Launch, & Inflight	.97/NA	.94	.96
Launcher (AVMRL)	.92/NA	.87	.87
Mean Fire Cycle Between Failure (MFCBF)	250/NA	NA	NA
Mean Kilometers Between Failure (MKBF)	750/NA	NA	NA
(U) Maintainability			
AVMRL (Mean Time to Repair (MTTR))			
Organizational	1.0/NA	2.3	2.3
Direct/General Support	4.0/NA	2.4	2.4
(U) Availability			
Operational	NA/NA	.78	.78
Essential Unscheduled Maintenance Actions Per 1000 Hours of Launcher Module Operation	NA/NA	23	23
Percent of Items Removed with no Evidence of Failure	NA/NA	7.2%	7%
(b)(1)			

10. (U) Technical/Operational Characteristics (continued) (Reference Program Baseline, February 26, 1988):

	Plng Estimate/ Approved Program 1/	Demonstrated Performance	Current Estimate 2/
c. (U) Rockets - Fly-to-Buy (FTB)			
(U) Acceptance Criteria			
(U) Reliability	N/A/.89	Continuous	.94
(U) Accuracy 3/	(b)(1)		
d. (U) AVMRL's - Production Reliability Acceptance Test (PRAT)			
(U) Acceptance Criteria	N/A/40 Fire Missions w/o Failure	Continuous	40 Fire Missions w/o Failure

NOTE: 1/ Approved program based on contract requirements of FTB (Rockets) and PRAT (AVMRL).

2/ FTB performed on each lot (1 month production, but not more than 500 rocket pods) of rockets. PRAT performed on each AVMRL prior to acceptance includes 50 Km travel.

3/ Precision error standard deviation of a ripple firing of 6 rockets.

Concur in classification as marked

APR 21 1988

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

C[illegible] Classification [illegible]ed

21 APR 1988

SECURITY REVIEW, ODCSINT, HQDA

OASD(PA) DFOISR 88-R-1000

e. (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) [redacted]

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

g. (U) References --

Planning Estimate: Draft DCP, 15 May 1979.

Approved Program: FY 1988 -1989 President's Budget.
Program Baseline: 26 Feb 88.

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

	Planning Estimate	Changes	Current Estimate
a. (U) Cost --			
Development (RDT&E) 1/	261.0	+7.0	268.0
Procurement	1971.3	+293.2	2264.5
M77	(1624.6)	(-168.2)	(1456.4)
Practice Rounds	(97.9)	(+27.9)	(125.8)
AVMRL	(118.9)	(+464.0)	(582.9)
Total Flyaway	(1841.4)	(+323.7)	(2165.1)
Other Weap Sys Cost	(123.0)	(-104.0)	(19.0)
Initial Spares	(6.9)	(+73.5)	(80.4)
Construction (MILCON)	0	+41.9	41.9
Total FY78 Base Year $	2232.3	+342.1	2574.4
Escalation	1221.7	+1312.2	2533.9
Development (RDT&E)	(39.2)	(+27.6)	(66.8)
Procurement	(1182.5)	(+1246.4)	(2428.9)
Construction (MILCON)	(0)	(+38.2)	(+38.2)
Total Then-Year $ 2/	3454.0	+1654.4	5108.4

1/ Does not include $37.6 (escalated) funding by MOU participants.

2/ The SAR matches the President's Budget with the exception that dollars and quantities were deleted for BCW.

11. (U) Program Acquisition Cost (Cont'd)

	Planning Estimate	Changes	Current Estimate
b. (U) Quantities --			
Development (RDT&E)			
Rounds	654	-150	504
AVMRL	10	0	10
Procurement			
M77 Rounds	362832	+89490	452322
Practice Rounds	27648	+17412	45060
AVMRL	173	+419	592
Total			
Rounds	391134	+106752	497886
AVMRL	183	+419	602
c. (U) Unit cost --			
Procurement:			
M77 Rd: FY78 Base Year $	0.004	-0.001	0.003
Then-Year $	0.007	-0-	0.007
Pract Rd: FY78 Base Year $	0.004	-0.001	0.003
Then-Year $	0.006	-0-	0.006
AVMRL: FY78 Base Year $	1.388	-0.235	1.153
Then-Year $	1.931	+0.347	2.278
Program (per AVMRL):			
FY78 Base-Year $	12.2	-7.9	4.3
Then-Year $	18.9	-10.4	8.5

d. (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 / AVMRL				
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	0.007	0.007	
Pract Rd:	Constant $	0.004	0.003	0.003	
	Then-Year $	0.006	0.006	0.006	
AVMRL:	Constant $	0.687	1.178	1.200	1.499
	Then-Year $	1.089	1.912	1.945	

e. (U) Foreign Military Sales — Sales to date to codevelopment partners, Netherlands, NATO Maintenance and Supply Agency (NAMSA) and Special Defense Acquisition Fund (SDAF) equal $293,289,321.

f. (U) Nuclear Costs -- None.

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

		Current Year		Budget Year
		Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a. (U)	Program Acquisition --			
(1)	Cost	5108.4	5180.9	5108.4
(2)	Quantity	602	602	602
(3)	Unit Cost	8.5	8.6	8.5
b. (U)	Current Procurement --	(FY 1988)	(FY 1988 APPN)	(FY 1989)
(1)	Cost	432	432	399.8
	Less CY Adv Proc	0.0	0.0	-20.8
	Plus PY Adv Proc	+ 82.7	+ 82.7	+56.6
	Net Total	514.7	514.7	435.6
(2)	Quantity	24	24	44
(3)	Unit Cost	21.4	21.4	9.9

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	+ 728.6	+ 2.2	+ 749.0
Quantity	-	+1392.1	-	+1392.1
Schedule	-	- 2.0	-	- 2.0
Engineering	-	-	-	-
Estimating	+ 6.9	- 490.7	+78.4	- 405.4
Other	+ 9.5	+ 9.1	-	+ 18.6
Support	-	- 25.4	-	- 25.4
Subtotal	+ 34.6	+1611.7	+80.6	+1726.9
Current Changes:				
Economic		+ 10.7		+ 10.7
Quantity		+ 13.5		+ 13.5
Schedule				
Engineering				
Estimating		- 98.1	-.4	- 98.5
Other				
Support		+ 1.8		+ 1.8
Subtotal	0	- 72.1	-.4	- 72.5
Total Changes	+34.6	+1539.6	+80.2	+1654.4
Current Estimate	334.8	4693.4	80.2	5108.4

1654.4

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

(FY 1978 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	261.0	1971.3	0	2,232.3
Previous Changes:				
Quantity	-	+598.8	-	+598.8
Schedule	-	-27.5	-	-27.5
Engineering	-	-	-	-
Estimating	+3.0	-226.3	+42.1	-181.2
Other	+3.5	+6.5	-	+10.0
Support	-	-27.5	-	-27.5
Subtotal	+6.5	+324.0	+42.1	+372.6
Current Changes:				
Quantity		+6.5		+6.5
Schedule				
Engineering				
Estimating	+0.5	-38.3	-.2	-38.0
Other				
Support		+1.0		+ 1.0
Subtotal	+0.5	-30.8	-.2	-30.5
Total Changes	+7.0	+293.2	+41.9	+342.1
Current Estimate	268.0	2264.5	41.9	2574.4

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 (Cont'd):

Procurement

Economic: Revised escalation indices through December 1986.

Quantity: + 103 AVMRL's for force structure changes; + 57 AVMRL's for POMCUS; + 60 AVMRL's for POMCUS, net reduction of 45 AVMRL's in FY86 Budget; +143 AVMRL's; + 101 AVMRL's, 77490 tactical rockets, 17412 practice rockets, for expanded MLRS force structure.

Schedule: Restoration of production rate; establishment of multiyear procurement.

Estimating: Revised round and AVMRL 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 forcast 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 1986.

Estimating: Addition of MCA funding requirements to SAR reporting; revised estimate, increase in construction requirements. Revised December 1986 economic escalation rates. Refinement of MILCON requirements.

c. (U) Current Change Explanations --

(Dollars in Millions)

	Base-Year	Then-Year
(1) RDT&E		
Correction of previous error in de-escalating from escalated to base year dollars (ESTIMATING)	+0.5	0
(2) Procurement		
Revised February 1988 economic escalation rates. (ECONOMIC)	N/A	+ 10.7

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

c. (U) Current Change Explanations --

(Dollars in Millions)

	Base-Year	Then-Year
Additional 12,000 M77 T. Rkts (QUANTITY)	+6.5	+13.5
PBD Budget cuts sustained in 1988 & 1989 - 79M for PBD 749 - 11.5M for PBD 730 (Then Year $)	-35.4	-90.5
EPA adjustment in 1989	-2.6	-6.7
Increased Rkt Quantity in 1989 (ESTIMATING)	- .3	- .9
Escalation changes in initial spares and "Other support" category. (SUPPORT)	+1.0	+1.8
(3) MILCON - Revised estimates (ESTIMATING)	- .2	- .4

d. (U) References -- DCP, No. 165, 15 May 1979.

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

(U) Planning Estimate to Current Estimate

PAUC (Planning Est)	Changes (Then Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
$18.9	+1.262	-10.828	-.003	-	- .837	-.039	+ .031	-10.4	$8.5

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

a. (U) RDTE -- Contracts complete.

b. (U) Procurement --

SPLL's/RP/C's/Tact/Prac	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

	Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion 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	272.6	N/A	29/12000/658	272.6	272.6
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

SPLL's

*LTV Aerospace & Defense Co., Dallas, TX
DAAH01-87-C-0220
Award: June 1987
Price: $41.3
Qty: 44

	Target	Ceiling	Qty
Initial Contract Price	$41.3	N/A	44/0/0
Current Contract Price	$41.3	N/A	44/0/0
Estimated Price at Completion	$41.3	N/A	44/0/0

*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: 76% (13 yrs/17 yrs)
(2) (U) Percent Program Cost Appropriated: 72.1% ($3682.5/$5108.4)

b. (U) Appropriation Summary --

Appropriation	Current + Prior Yrs (FY76-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP	TOTAL
RDT&E	334.8	0	0	0	334.8
Procurement	3272.5	399.8	1021.1	0	4693.4
MILCON	75.2	3.6	1.4	0	80.2
TOTAL	3682.5	403.4	1022.5	0	5108.4

c. (U) Annual Summary --

Fiscal Year	Qty Rnds/ SPLL's	FY Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E								
1976				1.1			1.0	6.6
197T				0.4			0.4	2.9
1977				7.2			6.9	2.6
1978				44.9			46.4	7.0
1979				62.2			70.9	8.4
1980				54.3			67.9	9.4
1981				50.4			70.0	11.9
1982				27.4			40.2	7.6
1983				17.0			26.1	4.9
1984				2.0			3.2	3.8
1985				1.1			1.8	3.4
Subtotal	504/10			268.0			334.8	

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

c. (U) Annual Summary (Continued)—

Fiscal Year	Qty Rnds/ SPLL's	FY78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement 1/								
1980	1374/ 12	14.7	33.1	49.0			66.9	9.70
1981	2340/ 32	16.4	59.2	77.4			117.9	11.90
1982	2496/ 68	10.0	90.2	112.6			197.2	14.30
1983	23640/ 72	11.6	211.5	234.9	53.2		443.5	9.00
1984	36000/ 76		265.9	281.2	114.1	11.7	544.3	8.00
1985	50472/ 44		250.9	261.0	137.4	55.2	524.3	3.40
1986	72000/ 44		227.5	238.6	41.0	71.7	490.8	2.80
1987	72000/ 44		213.9	213.8		67.8	455.6	2.70
1988	72000/ 24		203.0	195.8		82.7	432.0	3.7
1989	48000/ 44		174.4	175.4	20.8	56.6	399.8	3.80
1990	24000/ 44		143.5	144.0		20.8	337.9	3.60
1991	24000/ 44		144.7	144.7			348.1	3.30
1992	24000/ 44		136.3	136.1			335.1	2.80
S-TOTAL	452,322 /592	52.7	2154.1	2264.5	366.5	366.5	4693.4	

1/ The SAR matches the President's Budget with the exception that dollars and quantities were deleted for BCW.

16. (U) Program Funding Summary (Cont'd): (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	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: MILCON								
1982				11.6			20.4	7.6
1983				14.1			26.6	4.9
1984				3.6			6.7	3.8
1985				4.7			9.4	3.4
1986				5.9			12.1	2.8
1987				0.0			0.0	2.7
1988				0.0			0.0	3.7
1989				1.6			3.6	3.8
1990				0.6			1.4	3.6
Subtotal				41.9			80.2	
Total	452826/ 602	52.7	2154.1	2574.4	345.7	345.7	5108.4	-

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1976	1.0	1.0	1.0
197T	0.4	0.4	0.4
1977	6.9	6.9	6.9
1978	46.4	46.4	46.4
1979	70.9	70.9	70.9
1980	67.9	67.8	67.5
1981	70.0	70.0	70.0
1982	40.2	40.0	39.9
1983	26.1	25.9	25.4
1984	3.2	3.2	3.2
1985	1.8	1.8	1.4
Total	334.8	334.3	333.0

Note: FY85 was last year for receipt of RDT&E funds.

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

d. (U) Obligations and Expenditures (Cont'd) --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: Procurement			
1980	66.9	65.5	65.3
1981	117.9	114.5	113.7
1982	197.2	172.7	170.1
1983	443.5	421.4	401.7
1984	544.3	507.7	387.0
1985	524.3	491.0	293.8
1986	490.8	465.9	180.4
1987	455.6	436.4	14.2
1988	432.0	102.3	
To Complete	1420.9	-	-
Total	4693.4	2777.4	1626.2
Appropriation: MILCON			
1982	20.4	20.4	20.4
1983	26.6	26.6	26.6
1984	6.7	6.7	6.7
1985	9.4	9.4	9.4
1986	12.1	12.1	12.1
1987	0.0	-	-
To Complete	5.0	-	-
Total	80.2	75.2	75.2

17. (U) Production Rate Data:

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

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			44	72
1991			44	72
1992			44	72

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

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	72000
1992			24000	72000

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

Item - AVMRL		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	2216.0	+358.5	2574.5	-0-	2574.4
	(TY $)	4302.7	+805.7	5108.4	-0-	5108.4
PAUC	(BY $)	5.5	- 1.2	4.3	-0-	4.3
	(TY $)	10.7	- 2.2	8.5	-0-	8.5

c. (U) Schedule Variance --

Item - AVMRL	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)	92	+60	152	-0-	152
End Date (Mo/yr)	12/87	N/A	12/93	N/A	10/93

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

c. (U) Schedule Variance (Cont'd)

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)	114	+38	152	-0-	152
End Date (Mo/yr)	10/90	N/A	12/93	N/A	12/93

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

	To Date
RDT&E	
(U) Rockets	504/470 1/
(U) AVMRL	10/10
Procurement	
(U) Tactical Rockets	157,380/157,278
(U) Practice Rockets	14,154/12,600
(U) AVMRL	333/332

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

SAR-87-042

(CONFIDENTIAL)

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: HARM (AGM-88A/B)

N-19 HARM

AS OF DATE: December 31, 1987

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CLEARED AS AMENDED FOR PUBLICATION
APR 14 1988
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD—PA) DEPARTMENT OF DEFENSE
11

1. Designation/Nomenclature (Popular Name): AGM-88A/B High Speed Anti-Radiation Missile (HARM)

2. DoD Component: U.S. Navy (Executive Service) and U.S. Air Force

3. 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. Program Elements:

RDT&E: 0603313N (W1188, W1189); 0603363N (WSH07) (Shared funding)
0604360N (W0553, W1240); 0205601N (W1780) (Shared funding)
0603320N (W1807); 0603303N (W1807) (Shared funding)
0207162F 0603320F
Procurement: 0204162N ICN 302227 APPN: 1507
0207162F APPN 3020 ICN MB8AAG

5. Related Programs: None.

Classified [illegible] 5513.2A-30
Review on: OADR

(THIS PAGE IS UNCLASSIFIED)

(CONFIDENTIAL)

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APR 13 1988
Office of the Chief of Naval Operations
Dept. of the Navy

OASD(PA) DROISE 88-F-0963

6. 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 current 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, and F-4G aircraft, and will be integrated on the F-16, A-6E/F, and F-14A/D aircraft. Performance characteristics include: high speed, large footprint, high sensitivity to weak signals, and software reprogrammability so that it can be changed to counter newer threats. HARM weighs 807 lbs, is 164 inches long and 10 inches in diameter.

7. Program Highlights:

a. Significant Historical Developments — (U) DCP 93 dated July 1972 recommended development of the HARM Weapon System. A DSARC I Management Review in October 1972 authorized Advanced Development. In May 1974, Texas Instruments (TI), Dallas, TX, was awarded a contract through a competitive source selection for integration of the weapon system which included some government furnished equipment (GFE). Twenty-nine Advanced Development missiles were tested and all test objectives were met. At a HARM DSARC II in January 1977 the program was directed to remain in Advanced Development to prototype an expanded capability (EXCAP) in frequency and aerodynamic maneuverability. A DSARC IIA in February 1978 directed the HARM program to proceed to Full Scale Engineering Development with the EXCAP version. The engineering development prototype program was successfully completed in October 1980 with thirteen successes in eighteen firings. The Secretary of Defense notified Congress of readiness for production on 8 December 1980.

(b)(1) [redacted]

(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.

(U) Developmental testing for the Block II update has been successfully completed and incorporated in production. A Block III software upgrade is half complete and will begin flight tests in early 1988. A hardware change to incorporate a reprogrammable guidance computer memory was initiated to provide field software reprogrammability.

[redacted]

a. Significant Historical Developments (Cont'd) -- (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) Congressional language directed that NAVAIRSYSCOM assume the program management of the HARM Low Cost Seeker (LCS) program, which was previously under NWC management. The LCS program is now under PMA-242 cognizance and technical management remains at NWC. Congressional direction requires competing the LCS program with two contractors other than the current HARM prime contractor (TI).

b. Significant Developments Since Last Report -- (U) A HARM Improvement Plan (HIP) has been forwarded to Congress which will both expand the anti-adiation industrial base and provide improved performance to meet new surface-to-air threats in the 1990's. A minimum of 6,000 of the improved performance HARMs is planned beyond 1990 using two competing design approaches -- LCS and Block IV.

(U) The two LCS contractors are competing for Full Scale Development of LCS for contract award in FY 88; one will be selected. Initial production is planned in FY 90 with two years of directed buys.

(U) The HARM Block IV is a TI effort to upgrade the guidance section. Per congressional language, TI is paying the development costs with the government providing support funding and government furnished equipment. Block IV will be introduced in FY 91 with head-to-head competition with LCS in 1992, assuming equal performance of both designs.

(U) This SAR represents the first joint service (USAF/Navy) reporting with the Navy as lead service.

(U) HARM is expected to satisfy the mission requirements.

c. Changes Since "As Of" Date -- (U) Actual contract awards for FY 1987 of 994 Navy and 1,510 Air Force all-up-rounds and 1,531 Air Force FY 1988 all-up-rounds are updates to the procurement quantities shown.

8. Decision Coordinating Paper (DCP) 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. 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/Dec 79	Oct 80	
DSARC IIB	Sep 79/Sep 79	Nov 80	
NTE			
Start	Apr 80/Feb 81	May 81	
Complete	Sep 80/Jun 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/N/A	Dec 81	
Full-Scale Production Contract (Definitized)	N/A/N/A	Sep 82	
DSARC III (Full Rate Production)	Sep 81/Apr 82	Mar 83	
Navy IOC (A-7E)	Oct 81/Oct 83	Nov 83	
Air Force IOC (F-4G)	Aug 82/Aug 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	
NPDM II (LCS)	N/A/Nov 87	Jan 88	(Ch-1)
NPDM IIIA (LCS)	N/A/Jul 90	Jul 90	(Ch-1)
NPDM IIIB (LCS)	N/A/Jul 92	Jul 92	(Ch-1)
NPDM III (Block IV)	N/A/Nov 91	Nov 91	(Ch-1)
IOC (LCS/Block IV)	N/A/Apr 92	Apr 92	(Ch-1)

b. Previous Change Explanations — None.

c. Current Change Explanations — (CH-1) - New milestones for addition of Low Cost Seeker and HARM Block IV.

d. References —

Development Estimate: DCP 93A dated 10 July 1978. NDCP dated 6 August 1987.

Approved Program: FY 1988/89 President's Amended Biennial Budget. DAE Baseline dated 17 February 1988.

10. Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical —			
(U) Length (ft)	13/13.7	13.7	13.7
(U) Weight (lbs)	780/800	807	796
(U) Diameter (in)	10/10	10	10
(U) Frequency Coverage (Band)	(b)(1)		
b. Operational —			
Launch Envelope (Aircraft)			
(b)(1)			
(U) Missile Free Flight	.95/.85	.91	.95
(U) MTBF Missile Captive Carry (Hrs)	125/125	200	225
(U) MTBF Navy Avionics (AWG25)	N/A/351		700
(U) MTBF Navy Avionics (CP-1001)	N/A/351		351
(U) Missile Storage (5 yrs/90% conf)	.90/.90	TBD	.90
(U) Probability of fault detection using BIT (BIT Circuitry only) (90% conf)	(b)(1)		
(U) Avionics and missile Maintainability			
(U) Mean time to fault locate using BIT (sec)	20/30	14	14
(U) Mean time to repair (min)			
(U) Avionics "O" Level	55/60	30	30
(U) Avionics "I" Level	60/60	TBD	60
(U) Missile "O" Level	20/20	20	20
(U) Missile "I" Level	60/60	55	55

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.

c. Previous Change Explanations — (Cont'd)

(U) Changes to approved program were reflected in DCP 93B of 1 December 19[redacted] 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) [redacted]

(U) Reliability: Missile captive MTBF previously reported in probabilities is now converted to hours to reflect the basis for warranty effectivity. Current Estimate: revised on basis of inventory usage data through September 1987.

(b)(1) [redacted]

(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 [redacted] Maintainability Demonstration testing.

[redacted]

c. Previous Change Explanations —(Cont'd)

(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: FY 1988/89 President's Amended Biennial Budget. DAE Baseline dated 17 February 1988.

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

	Development Estimate	Changes	Current Estimate
a. Cost —			
Development (RDT&E)	$ 226.8	$ +232.9	$ 459.7
Procurement	1455.0	+647.3	2102.3
Hardware	(1064.7)	(+635.9)	(1700.6)
Prod Support	(220.9)	(+28.0)	(248.9)
Total Flyaway	(1285.6)	(+663.9)	(1949.5)
Fleet Support	(80.5)	(+13.4)	(93.9)
Initial Spares	(88.9)	(-30.0)	(58.9)
Construction (MILCON)	0.0	0.0	0.0
Total FY 78 Base-Year $	1681.8	+880.2	2562.0
Escalation	728.1	+1693.4	2421.5
Development (RDT&E)	(12.1)	(+156.1)	(168.2)
Procurement	(716.0)	(+1537.3)	(2253.3)
Construction (MILCON)	0.0	0.0	0.0
Total Then-Year $	$2409.9	$+2573.6	$4983.5
b. Quantities —			
Development (RDT&E)	99	0	99
Procurement	13754	+684	14438
Total	13853	+684	14537
c. Unit Cost —			
Procurement:			
FY 78 Base-Year $	$0.106	$+0.040	$0.146
Then-Year $	0.158	+0.144	0.302
Program:			
FY 78 Base-Year $	$0.121	$+0.055	0.176
Then-Year $	0.174	+0.169	0.343

11. Program Acquisition Cost (Cont'd):

d. 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

e. 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 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 $306,639,485. 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 $562,968.

f. Nuclear Costs — None.

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

	Current Year Current Est (Dec 87 SAR)	Current Year UCR Baseline (Dec 86 SAR)	Budget Year UCR Baseline (Dec 87 SAR)
a. Program Acquisition —			
(1) Cost	4983.5	4804.9	4983.5
(2) Quantity	14537	14718	14537
(3) Unit Cost	.343	.326	.343
b. Current Procurement —	(FY88)	(FY88*)	(FY89)
(1) Cost	573.6	573.6	529.2
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	573.6	573.6	529.2
(2) Quantity	2411	2411	2200
(3) Unit Cost	.238	.238	.241

* Reflects FY 1988 Appropriations Act.

13. 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	-6.7	+347.9	-	+341.2
Quantity	-	+100.1	-	+100.1
Schedule	+28.5	+1828.0	-	+1856.5
Engineering	+14.0	-	-	+14.0
Estimating	+117.4	-31.1	-	+86.3
Other	-	-	-	-
Support	0.0	-3.1	-	-3.1
Subtotal	+153.2	+2241.8	-	+2395.0
Current Changes:				
Economic	+0.4	+14.1	-	+14.5
Quantity	-	-33.4	-	-33.4
Schedule	-	-37.0	-	-37.0
Engineering	+236.6	-	-	+236.6
Estimating	-1.2	-11.7	-	-12.9
Other	-	-	-	-
Support	-	+10.8	-	+10.8
Subtotal	+235.8	-57.2	-	+178.6
Total Changes	+389.0	+2184.6	-	+2573.6
Current Estimate	627.9	4355.6	-	4983.5

(FY 1978 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	226.8	1455.0	-	1681.8
Previous Changes:				
Quantity	-	+76.3	-	+76.3
Schedule	+20.0	+591.2	-	+611.2
Engineering	+12.0	-	-	+12.0
Estimating	+63.4	+71.8	-	+135.2
Other	-	-	-	-
Support	-	+0.1	-	+0.1
Subtotal	+95.4	+739.4	-	+834.8
Current Changes:				
Quantity	-	-14.3	-	-14.3
Schedule	-	-20.5	-	-20.5
Engineering	+136.9	-	-	+136.9
Estimating	+0.6	-61.8	-	-61.2
Other	-	-	-	-
Support	-	+4.5	-	+4.5
Subtotal	+137.5	-92.1	-	+45.4
Total Changes	+232.9	+647.3	-	+880.2
Current Estimate	459.7	2102.3	-	2562.0

13. 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.
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 and reduction of FY87 funds to address Low Cost Seeker development.

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.
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.
Support:	Decrease in PGSE and ILS requirements associated with decrease in 1002 missiles and implementation of a comprehensive warranty.

MILCON — None.

13. 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	+0.4
Decrease in program estimate resulting in adoption of Navy escalation factors for combined SAR. (Estimating)	+0.6	-1.2
Addition of Low Cost Seeker and HARM Block IV Improvements. (Engineering)	+136.9	+236.6
(2) Procurement		
Revised escalation rates. (Economic)	N/A	+14.1
Deletion of 181 missiles reflecting recalculation of inventory requirement.	-17.4	-40.6
o Baseline (DE) value of deleting 181 missiles. (Quantity)	(-14.3)	(-33.4)
o Balance of quantity change allocable to schedule. (Schedule)	(-2.7)	(-6.4)
o Balance of quantity change allocable to estimating. (Estimating)	(-0.3)	(-0.8)
Revised procurement: (Schedule)	-17.8	-30.6

	85	86	87	88	89	90	91
Prior	1684	2141	2462	2514	2659	1925	0
New	1684	2150	2398	2411	2200	1911	450

Decrease in program estimate resulting in adoption of Navy escalation factors for combined SAR. (Estimating)	-61.5	-10.9
Increase in spares requirements in FY 87 and fleet support in FY 89 through FY 91 for depot initiatives. (Support)	+4.5	+10.8

c. References — Development Estimate: DCP 93A dated 10 July 1978.

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

a. Current Baseline Estimate to Current Estimate

PAUC (Dev. Est.)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.174	+.025	-.004	+.125	+.017	+.005	+.001	.000	+.169	.343

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

a. RDT&E -- None.

b. Procurement -- HARM All-Up-Round

Texas Instruments, Inc. (FY86 Buy)
Lewisville, TX
N00019-85-C-0447, FFP
Award/Definitization: June 9, 1986

Initial Contract Price		
Target	Ceiling	Quantity
$658.3	N/A	2,253

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Quantity	Contractor	Program Manager
$658.3	N/A	2,253	$658.3	$658.3

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			Estimated Price At Completion	
Target	Ceiling	Quantity	Contractor	Program Manager
$556.0	N/A	2,575	*$1,091.3	*$1,091.3

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	2,496

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Quantity	Contractor	Program Manager
$499.3	N/A	2,496	*$1,091.3	*$1,091.3

* FY88 production is option to FY87 contract

16. Program Funding Summary:

a. Program Status --

(1) Percent Program Completed: 81.0% (17 yrs/21 yrs)
(2) Percent Program Cost Appropriated: 77.0% ($3839.3/4983.5)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY72-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-93)	Balance to Complete Beyond FYDP (FY94)	Total
RDT&E	577.3	21.3	29.3	0.0	627.9
Procurement	3262.0	529.2	564.4	0.0	4355.6
MILCON	-	-	-	-	-
Total	3839.3	550.5	593.7	0.0	4983.5

c. Annual Summary — Total Program (Navy and Air Force)

Fiscal Year	Qty	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1972				2.1			2.1	4.6
1973				6.7			6.7	4.4
1974				9.7			9.7	8.0
1975				14.3			14.3	10.9
1976	13			27.4			27.4	6.6
197T				3.9			3.9	2.9
1977	16			31.9			31.9	2.6
1978	25			32.3			33.7	6.8
1979				40.7			46.9	8.4
1980	45			51.6			65.7	10.5
1981				59.3			82.3	10.6
1982				18.1			26.5	7.6
1983				6.8			10.5	4.9
1984				30.6			48.4	3.8
1985				22.3			36.3	3.4
1986				23.5			39.5	2.8
1987				33.8			58.4	2.7
1988				18.5			33.1	3.7
1989				11.4			21.3	3.8
1990				7.6			14.7	3.6
1991				3.6			7.2	3.3
1992				3.6			7.4	2.8
Subtotal	99			459.7			627.9	
Appropriation: Procurement								
1981	80	7.8	31.1	75.0			120.3	11.6
1982	236	20.0	24.8	121.4			211.5	14.3
1983	283	3.0	13.5	88.8			163.7	9.0
1984	635	35.3	16.5	193.2			370.7	8.0
1985	1684	23.7	10.2	299.2			592.8	3.4
1986	2150	10.4	6.5	298.2			610.1	2.8
1987	2398	1.6	8.8	292.1			619.3	2.7
1988	2411	1.1	13.7	261.1			573.6	3.7
1989	2200	1.1	9.0	233.0			529.2	3.8
1990	1911	1.8	4.6	194.9			455.5	3.6
1991	450	1.8	2.8	45.4			108.9	3.3
Subtotal	14438	107.6	141.5	2102.3			4355.6	
TOTAL	14537			2562.0			4983.5	

MILCON: None.

c. Annual Summary — Navy

Fiscal Year	Qty	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1972				2.1			2.1	4.6
1973				6.7			6.7	4.4
1974				9.7			9.7	8.0
1975				14.3			14.3	10.9
1976	13			27.4			27.4	6.6
197T				3.9			3.9	2.9
1977	16			31.4			31.4	2.6
1978	25			28.5			29.7	6.8
1979				38.7			44.6	8.4
1980	45			50.1			63.8	10.5
1981				52.3			72.6	10.6
1982				15.2			22.2	7.6
1983				3.7			5.7	4.9
1984				24.5			38.8	3.8
1985				19.4			31.6	3.4
1986				13.0			22.0	2.9
1987				23.2			40.1	3.1
1988				10.0			17.8	3.5
1989				4.7			8.8	3.5
1990				3.6			7.0	3.3
1991				3.6			7.2	2.9
1992				3.6			7.4	2.8
Subtotal	99			389.6			514.8	
Appropriation: Procurement								
1981	80	7.8	31.1	75.0			120.3	11.6
1982	118	10.5	14.8	63.3			110.3	14.3
1983	160	0.0	11.6	47.8			88.2	9.0
1984	318	18.5	10.9	102.2			196.0	8.0
1985	813	10.8	3.6	144.8			286.8	3.4
1986	766	1.0	3.2	106.1			217.0	2.8
1987	988	0.7	3.1	117.9			249.9	2.7
1988	766	0.4	4.6	89.8			197.3	3.7
1989	1307	0.7	4.0	134.9			306.3	3.8
1990	1649	1.5	2.8	166.6			389.5	3.6
1991	450	1.8	2.8	45.4			108.9	3.3
Subtotal	7415	53.7	92.5	1093.8			2270.5	
TOTAL	7514			1483.4			2785.3	

MILCON: None.

c. Annual Summary -- Air Force

Fiscal Year	Qty	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1977				0.5			0.5	2.6
1978				3.8			4.0	6.8
1979				2.0			2.3	8.4
1980				1.5			1.9	10.5
1981				7.0			9.7	10.6
1982				2.9			4.3	7.6
1983				3.1			4.8	4.9
1984				6.1			9.6	3.8
1985				2.9			4.7	3.4
1986				10.5			17.5	2.9
1987				10.6			18.3	3.1
1988				8.5			15.3	3.5
1989				6.7			12.5	3.5
1990				4.0			7.7	3.3
Subtotal	0			70.1			113.1	
Appropriation: Procurement								
1982	118	9.5	10.0	58.1			101.2	14.3
1983	123	3.0	1.9	41.0			75.5	9.0
1984	317	16.8	5.6	91.0			174.7	8.0
1985	871	12.9	6.6	154.4			306.0	3.4
1986	1384	9.4	3.3	192.1			393.1	2.9
1987	1410	0.9	5.7	174.2			369.4	3.1
1988	1645	0.7	9.1	171.3			376.3	3.5
1989	893	0.4	5.0	98.1			222.9	3.5
1990	262	0.3	1.8	28.3			66.0	3.3
Subtotal	7023	53.9	49.0	1008.5			2085.1	
TOTAL	7023			1078.6			2198.2	

MILCON: None

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1984 & Prior	410.0	406.0	403.4
1985	36.3	36.3	36.1
1986	39.5	39.5	37.6
1987	58.4	40.8	23.6
To Complete	83.7	N/A	N/A
Total	627.9	522.6	500.7

d. Obligations and Expenditures (Cont'd) —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: Procurement			
1984 & Prior	866.2	822.4	809.4
1985	592.8	574.5	521.9
1986	610.1	598.4	177.2
1987	619.3	554.4	16.0
To Complete	1667.2	N/A	N/A
Total	4355.6	2549.7	1524.5

MILCON: None

17. 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	2150	2150
1987		3275	2398	2398
1988		3761	2411	2411
1989		3084	2200	2200
1990		1778	1911	1911
1991		0	450	450

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	-649.1	2562.0	0	2562.0
(TY $)	6363.4	-1379.9	4983.5	0	4983.5
PAUC (BY $)	.183	-.007	.176	0	.176
(TY $)	.363	-.020	.343	0	.343

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	0	120	0	120
End date (Mo/Yr)	11/92	0	11/92	0	11/92

d. Deliveries (Plan/Actual) —

	To Date
RDT&E	99/99
Procurement	3264/3274

18. Operating and Support Costs: N/A

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: HARPOON (AGM/RGM/UGM-84A/C/D)

N-20 HARPOON AS OF DATE: DECEMBER 31, 1987

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No Security Objection to Open Publication (AS AMENDED) APR 12 1988 Office of the Chief of Naval Operations Dept. of the Navy

1. Designation/Nomenclature (Popular Name) AGM-84A,C,D/RGM-84A,C,D/UGM-84A,C,D/Harpoon

2. DoD Component: U.S. Navy

3. Responsible Office and Telephone Number:

Anti-Ship Weapon System Program Office
PMA-258
Naval Air Systems Command
Washington, DC 20361

PM: CAPT D.L. Finch
Assigned: June 18, 1986
Telephone: (202) 692-3340
Autovon: 222-3340

4. Program Elements:
RDT&E,N: 063312N, 064364N - Development of AGM-84/RGM-84
063364N - Development of UGM-84
025603N - Harpoon Improvements (FY 79 only)
063306N - Standoff Land Attack Missile (SLAM); Project 1958. (Shared Funding)

PROCUREMENT: APPN 1507 ICN 2224 024229N
02427IN
024284N

AS AMENDED DECLASSIFIED FOR PUBLIC RELEASE APR 13 1988 11 DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

5. Related Programs: TOMAHAWK

~~Classified by: OPNAVINST 5513.2(31)~~
~~Declassify On:~~ OADR

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OASD(PA) DFOISR 88-T-0934

6. 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, surveilance etc.) enemy shipping. The Stand-Off Land Attack Missile (SLAM) is effective against fixed targets and ships in harbor.

The Harpoon utilizes altitude reference mid-course guidance with an active or passive seeker for target acquisition and terminal guidance. Missile is capable of being launched from the following platforms:

Ships: FF-1052, DDG, CG, CGN, PHM, DD-963, FFG-7, BB.
AIR: P-3, A-6, F-18, S-3, B-52 (USAF)
Submarine: SSN-594/637/688 Class

7. (U) Program Highlights:

a. (U) Significant Historical Developments - The Weapon System Development phase was completed in July 1975. The OPEVAL phase was completed March 1977 and PASU was granted 18 July 1977. DNSARC reviewed the program July 1977 resulting in the approval to procure 225 U.S. plus 229 FMS missiles in FY 1977, not to exceed production of 40 missiles per month. DT&E of seeker changes (Block 1A) that improve performance against countermeasures was completed January 1978. OPEVAL (OT&E) was completed June 1978 with successful results and the final report was released by OPTEVFOR in August 1979.

(b)(1)

(U) Test an evaluation of Block 1C has been completed and Approval for Limited Production (ALP) was received June 83. A second Approval for Limited Production (ALP) of Block 1C was received September 1984. Approval for full production will be granted upon successful completion of full system tests aboard the various launch platforms.

(U) The Harpoon Missile has met or exceeded all mission requirements.

b. (U) Significant Developments Since Last Report: All testing 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 (the 3700-4) was also completed. A third Approval for Limited Production (ALP) of Block 1C was received November 1987. This improved seeker has enhanced performance in passive and active countermeasures environments.

b. (U) Significant Developments Since Last Report: Block 1C missile tests aboard a surface platform with the improved command and launch system (AN/SWG-1A) were completed October 1986. A seeker product improvement effort to improve performance in passive and active countermeasure environments have been started. Also, an advanced Strike Weapon System based on the Harpoon airframe will be initiated this fiscal year to provide a stand-off land attack capability.

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

8. NDCP Threshold Breaches - There are currently no NDCP (dated May 13, 1978) threshold breaches.

9. Schedule

a. Milestones	Dev /Approved Est/ 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
DSARC IIIA Production Approval	Jun 75/Jun75	Jun 75
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/NA	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 (CH-1)
Block 1C Missile - AFP	Jun 87/Aug 88(CH-1)	Aug 88 (CH-1)
SLAM Missile		
Milestone II	NA /Jun 87	Jun 87 (CH-2)
Milestone IIIA	NA /May 86	May 86 (CH-2)
Milestone IIIB	NA /May 88	May 88 (CH-2)
Milestone IIIC	NA /Jan 89	Jan 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.

c. Current Change Explanations -

CH-1 = 3rd ALP granted by NPDM November 1987, and AFP re-scheduled to August 1988. (AFP to be granted following resolution of LRP issues - July 1988).

CH-2 = Incorporation of milestones for new missile program (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 and FY88/89 Bi-annual Amended President's Budget.

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

	Dev/Approved Est/ Program	Demo. Perform.	Current Estimate
(b)(1)			
(U) Reliability			
Missile (Free flt %)	90/90	92 (CH-1)	90
Missile (Ready storage, ship 6 mos)	.90/.90	.93 (CH-1)	.90
A/C C&L sys (MTBF hrs)	150/251	251	251
Ship C&L sys (MTBF hrs)	100/500.5	500.5	500.5
Missile (Air carry MTBF hrs)			
P-3	250/250	381	250
A-6	250/250	148	250
(b)(1)			
(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 -

CH-! = Changes due to updated results of captive-carry program.

d. (U) References -

Development Estimate: Decision Coordinating Paper No. 77 dated May 16, 1973 amended by DSARC IIB June 25, 1984 and DSARC IIIB Sep 1977.

Approved Program: DAE baseline dated Feb 17, 1988 and FY88/89 Bi-annual Amended President's Budget.

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PROGRAM ACQUISITION COSTS
SYSTEM: HARPOON (AGM/RGM/UGM-84A/C/D)

11. PROGRAM ACQUISITION COSTS	(1) Development estimate	(2) Changes	(3) Current Estimate
a. Cost			
Development	272.0	+16.0	288.0
Field Stations	(55.9)	(+0.0)	(55.9)
Ordanance Section	(11.2)	(+0.0)	(11.2)
Contract (GFE Engine)	(28.2)	(+0.0)	(28.2)
Contract (Prime)	(176.7)	(+16.0)	(192.7)
Procurement	523.0	+752.6	1275.6
Fly-a-way	(457.6)	(+592.8)	(1050.4)
Fleet Support	(31.4)	(+117.4)	(148.8)
Initial Spares	(34.0)	(+42.4)	(76.4)
Construction	0.0	+0.3	0.3
Total Constant FY 70$	795.0	+768.9	1563.9
Escalation	236.8	+2023.9	2260.7
Development	(43.9)	(+62.4)	(106.3)
Procurement	(192.9)	(+1961.1)	(2154.0)
Construction	(0.0)	(+0.4)	(0.4)
TOTAL PROGRAM COST	1031.8	+2792.8	3824.6
b.Quantities			
Development	52	0	52
Procurement	2870	+1101	3971
TOTAL	2922	+1101	4023
c. Unit Cost			
Procurement			
FY 70 Base Year $	0.182	+0.139	0.321
Then Year $	0.249	+0.614	0.864
Program			
FY 70 Base Year $	0.272	+0.117	0.389
Then Year $	0.353	+0.598	0.951

d. Approved Design to Cost Goal

(Average Unit Fly Away Cost)

	Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ QTY: 2870			
@ Peak Rate: 46/MO			
FY 70 Base-Year $	.159/.159	.265	.159
Then Year	.218/.218	.704	.218

(b)(1) [redacted]

f. Nuclear Costs: None

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

	Current Year Current Estimate	Current Year UCR Baseline (Dec 86 SAR)	Budget Year UCR Baseline (Dec 87 SAR)
a. Program Acquisition -			
(1) Cost	3824.5	3781.3	3824.5
(2) Quantity	4023	4023	4023
(3) Unit Cost	.951	.940	.951

	FY 1988 Appropriation Act (FY 1988)	(FY 1988)	(FY 1989)
b. Current Procurement -			
(1) Cost	153.0	153.0	176.6
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	153.0	153.0	176.6
(2) Quantity	124	124	138
(3) Unit Cost	1.234	1.234	1.280

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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		+119.9		+119.9
Quantity		+852.5		+852.5
Schedule				
Engineering	+73.3			+73.3
Estimating		+1184.8		+1184.8
Other				
Support		+518.3	+0.7	+519.0
Subtotal	+73.3	+2675.5	+0.7	+2749.5
Current Changes				
Economics	+0.1	+7.7		+7.8
Quantity				
Schedule		-5.8		-5.8
Engineering		+2.1		+2.1
Estimating	+5.0	+34.3		+39.3
Other				
Support		-0.1		-0.1
Subtotal	+5.1	+38.2	+0.0	+43.3
Total Changes	+78.4	+2713.7	+0.7	+2792.8
Current Estimates	394.3	3429.6	0.7	3824.6

(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			+14.3
Estimating		+290.6		+290.6
Other				
Support		+172.6	+0.3	+172.9
Subtotal	+14.3	+743.6	+0.3	+758.2
Current Changes				
Quantity				
Schedule				
Engineering		+0.6		+0.6
Estimating	+1.7	+9.1		+10.8
Other				
Support		-0.7		-0.7
Subtotal	+1.7	+9.0	+0.0	+10.7
Total Changes	+16.0	+752.6	+0.3	+768.9
Current Estimate	288.0	1275.6	0.3	1563.9

b. Previous Change Explanations -

RDT&E

Engineering:	Revised escalation rates.
Estimating:	Prior Yr. Funding Adjustment.

PROCUREMENT

Economic:	Revised escalation rates.
Quantity:	Addition of 754 missiles.
Engineering:	Added Reliability/Quality Assurance Requirements. Increased Seeker Improvements. Implemented Product Improvements.
Estimating:	Increase because of underestimation of Rate Tooling, Engineering Change Proposal and Government In-house Costs. Prior year funding adjustments.
Support:	Increase spares requirements due to increased missile requirements. Increase out year support cost due to program stretch. Decrease due to revision of Fleet Support/Spares Requirement.
Milcon:	Building modification at NWS, Concord.

C. Current Change Explanations -

	Base Year	Then Year
(1) RDT&E		
Economics		.1
Estimating (Revision of Test and Evaluation Program)	+1.7	+ 5.0
(2) Procurement		
Economics - Revised Indices		+7.7
Schedule - Proc. Early	--	- 5.8
Engineering - ECP For -4 Seeker (PMP #84-1 Approved Feb 86, Funded FY88)	+.6	+ 2.1
Estimating - Revision of Cost (Congressional Budget for 1986 SAR Based on Multi-Year Procurement. Congressional Disapproval of this required repricing 1987 SAR as a annual procurement.	+9.1	+34.3
Support -	- .7	- 0.1

c. References -

- Dev. Est.: DCP No. 77 of May 16 1973, Amended by DSARC IIB, June 25, 1974 and DSARC IIIB SEP 1977..
- Approved Program: DAE Baseline dated Feb 17, 1988 and the FY 88/89 Biennial Amended Presidents Budget.

14. Program Acquisition Unit Cost (PAUC) History:

a. Initial SAR Estimate To Current Baseline Estimate

First Authorization: FY 1970

Program Acquisition Unit Cost

First Authorization : .251

Development Estimate: .353

b. Current Baseline Estimate to Current Estimate

PAUC (Development Estimate)	Changes (Then Year Dollars in Millions)								PAUC (Current) (Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.353	.032	.115	-.001	.019	.304	.129	--	.598	.951

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

a. RDT&E

Missile	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Astronautics St. Charles, Mo N00019-87-C-0020/FFP (RDT&E) Award: Feb 1987 Definitized: Feb 1987	$ 33.4	$ 33.4	0

Current Contract Price Target	Contract	Qty	Estimate Price at Completion Contractor	Program Mgr
FPP	$ 33.4	0	$ 33.4	$ 33.4

	Cost Variance	Schedule Variance
Previous Cumulative Variance	N/A	N/A
Cumulative Variance to Date	N/A	N/A
Net Change	N/A	N/A

Explanation of Change: Not reportable for FFP contracts.

b. Procurement

Missile	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Astronautics St. Charles, Mo N00019-87-C-0020/FFP Award: Feb 1987 Definitized: Feb 1987	$ 17.2	$ 17.2	0

Current Contract Price Target	Contract	Qty	Estimate Price at Completion Contractor	Program Mgr
$FFP	$ 17.2	0	$17.2	$17.2

	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 Astronautics
St. Charles, Mo
N00019-85-C-0161/FFP
Award: March 28, 1985
Definitized: March 28, 1985

Initial Contract Price		
Target	Ceiling	Qty
$330.2	$330.2	565

Current Contract Price		
Target	Contract	Qty
FFP	$398.9	565

Estimate Price at Completion	
Contractor	Program Mgr
$398.9	$398.9

	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.

Missile
McDonnell Douglas Astronautics
St. Charles, Mo
N00019-85-C-0415/FFP
Award: June 30, 1986
Definitized: June 30, 1986

Initial Contract Price		
Target	Ceiling	Qty
$285.0	$285.0	404

Current Contract Price		
Target	Contract	Qty
FFP	$348.3	404

Estimate Price at Completion	
Contractor	Program Mgr
$348.3	$348.3

	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 Astronautics
St. Charles, Mo
N00019-86-C-0308/FFP
Award: July 1987
Definitized: July 1987

Initial Contract Price		
Target	Ceiling	Qty
$200.1	$200.1	260

Current Contract Price		
Target	Contract	Qty
FFP	$200.1	260

Estimate Price at Completion	
Contractor	Program Mgr
$200.1	$200.1

	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.

16. Program Funding Summary:

a. Program Status Summary:

(1) Percent Program Completed: 82.6% (19/23 YRS)

(2) Percent Program Cost Appropriated: 80.2% ($3066.0/$3824.6)

b. Appropriation Summary -

Approp	Current & Prior Yrs (FY 70-88)	Budget Year (FY 89)	Balance FY DP (FY 90-92)	To Complete Beyond FYDP	Total
RDT&E	371.7	22.6			394.3
PROC	2693.6	176.6	559.4		3429.6
MILCON	.7				.7
TOTAL	3066.0	199.2	559.4		3824.6

c. Annual Summary

Fiscal Year	Qty	FY 70 Base-Year Dollars			Then-Year Dollars			Esc Rate
		Flyaway			Advanced Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	%
Appropriation: RDT&E								
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1970	--	--	--	5.0	--	--	5.1	5.51
1971	12	--	--	18.1	--	--	19.3	5.14
1972	--	--	--	38.1	--	--	42.3	4.61
1973	--	--	--	61.6	--	--	71.8	4.35
1974	40	--	--	74.0	--	--	92.0	7.97
1975	--	--	--	51.7	--	--	69.1	10.94
1976	--	--	--	13.9	--	--	19.7	6.61
1979	--	--	--	0.8	--	--	1.5	8.40
1987	--	--	--	6.6	--	--	19.0	2.70
1988	--	--	--	10.8	--	--	31.9	3.70
1989	--	--	--	7.4	--	--	22.6	3.80
1990	--	--	--		--	--		
TOTAL	52	0	0	288.0	0	0	394.3	
Appropriation: Procurement								
1975	100	7.0	42.8	58.3	--	--	82.4	8.81
1976	170	7.4	68.6	87.6	--	--	133.3	6.59
197T	66	1.0	22.6	27.5	--	--	43.9	3.56
1977	220	--	78.3	89.3	--	--	150.8	3.78
1978	234	--	63.6	73.8	--	--	139.2	6.80
1979	240	--	59.4	66.1	--	--	137.4	8.72
1980	240	--	56.2	64.3	--	--	147.4	11.80
1981	240	--	61.0	84.8	--	--	216.8	11.60
1982	240	--	67.7	82.7	--	--	229.6	14.30
1983	223	--	60.7	79.2	--	--	232.3	9.00
1984	315	--	77.8	95.3	--	--	291.1	8.00
1985	354	--	78.3	94.7	--	--	298.5	3.40
1986	395	6.1	77.0	91.9	--	--	299.4	2.80
1987	96	3.9	24.3	41.1	--	--	138.5	2.70
1988	124	3.2	31.9	43.7	--	--	153.0	3.70
1989	138	3.2	34.2	48.9	--	--	176.6	3.80
1990	188	3.5	30.4	46.1	--	--	171.6	3.60
1991	181	3.2	30.7	45.0	--	--	171.9	3.30
1992	207	0.7	45.7	55.3	--	--	215.9	2.80
1993								
TOTAL	3971	39.2	1011.2	1275.6	--	--	3429.6	
Appropriation: Milcon								
1979	--	--	--	0.3	--	--	0.7	9.31
TOTAL	0	0	0	0.3	0	0	0.7	

d. Obligations and Expenditures

Fiscal Year	Then Year Dollars (Millions) Total	Obligated	Expended
Appropriation RDT&E			
1970	5.1	5.1	5.1
1971	19.3	18.9	18.9
1972	42.3	42.3	42.3
1973	71.8	71.8	71.7
1974	92.0	91.9	91.8
1975	69.1	69.1	68.7
1976	19.7	19.7	16.7
1979	1.5	1.5	1.5
1987	19.0	18.9	11.7
1988	31.9	2.7	0.2
1989	22.6		
Total	394.3	341.9	328.6
Appropriation Procurement			
1975	82.4	82.4	82.2
1976	133.3	133.2	130.8
197T	43.9	43.9	43.9
1977	150.8	150.8	148.4
1978	139.2	139.1	136.5
1979	137.4	137.4	134.3
1980	147.4	145.2	145.2
1981	216.8	216.8	209.9
1982	229.6	227.2	199.2
1983	232.3	230.8	191.0
1984	291.1	287.6	263.9
1985	298.5	297.8	247.1
1986	299.4	291.0	196.3
1987	138.5	114.8	34.9
1988	153.0		
To Complete	736.0		
Total	3429.6	2498.0	2163.6
Appropriation Milcon			
1979	0.7	0.7	0.7
Total	0.7	0.7	0.7

17. Production Rate Data:

a. Annual Production Rates: (NOTE: Maximum rate is attainable only with additional customer participation.)

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Original Production Estimate	Current Estimate	Economic Maximun
1987		Note 1	72	660
1988			124	660
1989	N/A		138	
1990			188	
1991			181	
1992			207	
1993				

*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	Maximun Economic
Program Acq Cost	(BY$)	795.0	+768.9	1563.9	+48.1	1515.8
	(TY$)	1031.8	+2792.8	3824.6	+158.7	3665.9
PAUC	(BY$)	0.272	+0.117	0.389	+0.012	0.377
	(TY$)	0.353	+0.598	0.951	+0.040	0.911

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 CE less Max	Maximun Economic
Start Date (MO/YR)	N/A	NONE	Aug-87	N/A	Aug-87
Duration (In Months)	N/A	NONE	84	49	35
End Date (MO/YR)	N/A	NONE	Jul-94	N/A	Apr-90

d. Deliveries (plan/actual)-- To Date

RDT&E	52/52
Procurement	2594/2813

18. Operating and Support Costs: N/A

SAR-87-044

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: LAMPS MK III

N-22, LAMPS MK III

AS OF DATE: December 31, 1987

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APR 13 1988
Office of the Chief of Naval Operations
Dept. of the Navy

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 R.G. Harrison
Assigned: May 23, 1984
AV 286-1534; COMM (202)746-1534

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

RDT&E,N: PE 0604212N Project W1707 (Shared Funding)

PROCUREMENT: APPN 1506 ICN 0180 PE 0204243N, PE 0204262N
APPN 1810 ICN 4255 PE 0204243N

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5. (U) Related Programs: Army UH-60A BLACK HAWK; Army EH-60A Quickfix; Air Force MH-60A NIGHT HAWK combat SAR Helicopter; Kidd Class Guided Missile Destroyer (DDG-993 Class); Arleigh Burke Class Guided Missile Destroyer (DDG-51 Class); Perry Class Guided Missile Frigate (FFG-7 Class); Spruance Class Destroyer (DD-963 Class); Ticonderoga Class Aegis Cruiser (CG-47 Class); Tactical Towed Array Sonar (TACTAS) AN/SQR-19; Penguin Missile Program; Aircraft Carrier Inner Zone Anti-Submarine Warfare Helo (SH-60F); Helicopter Combat Support (HCS)/Coast Guard Medium Range Recovery (HRR) (HH-60) 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). Secondary missions include Anti-Ship Surveillance and Targeting (ASST), 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.

7. (U) Program Highlights:

a. Significant Historical Developments -- Development of the LAMPS Program was initiated in 1969 with the requirement for a manned helicopter aboard destroyer-class ships to enhance ASW and ASST. The Validation Phase was completed in December 1976. Authorization was granted at DSARC IIC, in February 1978, to proceed with Full Scale Development. The first flight of the SH-60B helicopter was conducted in December 1979, followed by a successful total weapon system demonstration in May 1980. Following the installation of LAMPS MK III ship equipments in USS MCINERNEY (FFG-8), weapon system testing at sea was successfully conducted. Provisional Approval for Service Use (PASU) was granted in September 1981 following a successful OPEVAL of the Helicopter Landing System (HLS) and exercise of the entire weapon system in various operational scenarios. A Secretary of Defense Decision Memorandum (SDDM) in November 1981 provided guidance to proceed with limited production and directed that specific goal and threshold parameters be addressed at DSARC III. ASU was granted for the HLS and the Sonar Signal Processing System (AN/SSQ-28) on June 25, 1982. PASU was granted for the LAMPS MK III Weapon System and the Radio Terminal Set (AN/SRQ-4). DSARC Milestone III was conducted on June 29, 1982. A SDDM was issued on December 8, 1982, granting approval for production.

The baseline program estimated procurement of 204 aircraft over a four year period and procurement of 110 ship systems. The December 1982 SAR estimate extended the aircraft procurement to an eleven year period and reduced ship systems to 94. The December 1983 SAR estimate increased ship systems to 97. With the addition of the reserve FFG-7 class ships and the DDG-51 class ships the total number of ship systems to be procured is 142.

The first production aircraft was delivered in September 1983, one month ahead of schedule. The first LAMPS MK III training squadron was established at Naval Air Station, North Island on January 21, 1983. Initial Operational Capability was achieved in July 1984.

A Chief of Naval Operations Executive Board (CEB) decision made in April 1984 will add an ASUW capability to the LAMPS MK III weapon system by incorporating the Norwegian manufactured PENGUIN anti-ship missile.

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

b. Significant Developments Since Last Report — As of December 31, 1987, the Navy has accepted a total of 113 production SH-60B airframes, 96 full avionics populated SEAHAWKS, and 73 AN/SSQ-28s, 67 AN/SSQ-4s and 71 HLSs for ship installation. Based on current projections, LAMPS MK III is expected to fulfill all mission requirements. For SAR reporting purposes, the SSQ-4 and SSQ-28 were transferred to PEC-411 and are reported in SSQ-87. 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

c. Changes Since "As Of" Date — N/A

8. (U) Decision Coordinating Paper (DCP) 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 18-27-21-24-18-18-18-18-18-18-6. 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.

9. (U) Schedule:

a. Milestones	Development 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
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

(U) Schedule Cont'd:

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: FY 88/89 Amended President's Budget.

10. (U) Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. (U) Technical —			
(U) Weight (Lbs)(Maximum Gross)	20,829/21,884	21,884	21,884
(U) Dimensions			
(U) Length (Ft)			
Overall	64.8/64.8	64.8	64.8
Folded	41.1/41.1	41.1	41.1
(U) Width (Ft)			
Normal (W/O Main Rotor)	14.3/14.3	14.3	14.3
Folded	10.8/10.8	10.8	10.8
(U) Height (Ft)			
Normal	17.2/17.0	17.0	17.0
Folded	13.3/13.2	13.2	13.2
b. (U) Operational --			
(U) System Performance			
(U) Operate in Sea State	5/5	5	5
(U) Data Transfer Reliability (%)	(b)(1)	(b)(1)	
(U) Mean Flight Hours Between Failures SH-60B SEAHAWK (Air Vehicle Avionics)	2.0/2.3	1.6	13.2 (Ch-1)

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

b. (U) Operational (Cont'd)	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(U) Maintainability			
(U) Direct Maintenance Man-Hours/Flight Hour SH-60B SEAHAWK (O-Level Total)	N/A / 15.9	8.1	15.0 (Ch-2)
(U) Mean Time to Repair (Hrs) (Elapsed Maintenance Time/ Maintenance Action)			
Air Vehicle	1.0/2.0	1.3	2.0 (Ch-2)
Ship Electronics	1.5/2.0	2.0	2.0

(b)(1)

[redacted]

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) The decrease in Mean Flight Hours Between Failures SH-60B SEAHAWK is the result of a broader statisical base.

(Ch-2) The changes in Demonstrated Performance Direct Maintenance Man-Hours/Flight Hour SH-60B SEAHAWK and Mean Time to Repair Air Vehicle are derived from most recent operational testing (OT-IIIC). The change in Current Estimate is base upon current 3M data.

e. (U) References --

Development Estimate: DCP No. 85 dated March 5, 1979.

Approved Program: FY 88/89 Amended President's Budget. USD(A) Memo of 17 Feb 88 Approval of Major Program Baselines.

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

a. Cost --	Development Estimate	Changes	Current Estimate
Development (RDT&E,N)	$579.7	-22.8	556.9
Procurement (Aircraft)	1482.8	(+512.1)	1994.9
Airframe & Changes	(342.1)	(+219.2)	(561.3)
Engine	(67.9)	(+33.2)	(101.1)
Electronics & Comm.	(399.6)	(-239.9)	(159.7)
Armament & Other GFE	(18.1)	(-3.8)	(14.3)
Weapons System Integration	(62.2)	(+426.0)	(488.2)
Total Flyaway	(889.9)	(+435.0)	(1324.9)
Peculiar Support Eq.	(169.9)	(-31.0)	(138.9)
Other Support	(269.6)	(+70.2)	(339.8)
Total Support	(439.5)	(+38.7)	(478.2)
Initial Spares	(153.4)	(+38.2)	(191.6)
Procurement (Ship Systems)	325.2	-154.5	170.7
Equipment (OPN)			
Sailaway *	(124.4)	(-124.4)	(0.0)
Support	(40.3)	(+27.1)	(67.4)
Spares	(36.0)	(-33.2)	(2.8)
Total (OPN)	(200.7)	(-130.5)	(70.2)
Installation (O&MN)(FMP)**	(124.5)	(-24.0)	(100.5)
Construction (MILCON)	9.0	+3.3	12.3
Total FY 76 Base-Year	2396.7	+338.1	2734.8
Escalation	1510.9	+1594.9	3105.8
Development (RDT&E)	(142.1)	(+22.4)	(164.5)
Procurement	(1362.4)	(+1569.7)	(2932.1)
Construction (MILCON)	(6.4)	(+2.8)	(9.2)
Total Then-Year $ ***	$3907.6	+1933.0	$5840.6

b. Quantities -- See page 6a for Aircraft and page 6b for Ship Systems.
c. Unit Cost -- See page 6a for Aircraft and page 6b for Ship Systems.
d. Approved Design to Cost Goal -- See page 6a for Aircraft and page 6b for Ship Systems.
e. Foreign Military Sales -- See page 6a for Aircraft and page 6b for Ship Systems.
f. Nuclear Costs -- None.

* Sailaway costs not applicable due to transferrance of SQQ-28 and SRQ-4 to PMS-411 for SAR reporting responsibilities.

** 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.

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
(1) Aircraft --			
Development (RDT&E,N)	$527.2	+16.5	$543.7
Procurement (Aircraft)	1482.8	(+512.1)	1994.9
Airframe & Changes	(342.1)	(+219.2)	(561.3)
Engine	(67.9)	(+33.2)	(101.1)
Electronics & Comm.	(399.6)	(-239.9)	(159.7)
Armament & Other GFE	(18.1)	(-3.8)	(14.3)
Weapons System Integration	(62.2)	(+426.0)	(488.2)
Total Flyaway	(889.9)	(+435.0)	(1324.9)
Peculiar Support Eq.	(169.9)	(-31.0)	(138.9)
Other Support	(269.6)	(+70.2)	(339.8)
Total Support	(439.5)	(+38.7)	(478.2)
Initial Spares	(153.4)	(+38.2)	(191.6)
Construction (MILCON)	7.2	+2.6	9.8
Total FY 76 Base-Year	2017.2	+531.2	2548.4
Escalation	1222.3	1690.9	2913.2
Development (RDT&E,N)	(131.8)	(+29.2)	(161.0)
Procurement	(1085.5)	(+1659.4)	(2744.9)
Construction (MILCON)	(5.0)	(+12.3)	(7.3)
Total Then-Year $	$3239.5	+2222.1	$5461.6
b. Quantities --			
(1) Aircraft			
Development (RDT&E,N)	5	-	5
Procurement	204	-	204
Total	209	-	209
c. Unit Cost --			
(1) Aircraft			
Procurement:			
FY 76 Base-Year $	$7.3	+2.5	$9.8
Then-Year $	12.6	+10.6	$23.2
Program:			
FY 76 Base-Year $	$9.7	+2.5	$12.2
Then-Year $	15.5	+10.6	$26.1

d. Approved Design to Cost Goal --

(1) Aircraft (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

e. 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.

f. Nuclear Costs -- None

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
(2) Ship Systems			
Development (RDT&E,N)	$52.5	-39.3	$13.2
Procurement (Ship Systems)	325.2	-154.5	170.7
Equipment (OPN)			
Sailaway *	(124.4)	(-124.4)	(0.0)
Support **	(40.3)	(+27.1)	(67.4)
Spares	(36.0)	(-33.2)	(2.8)
Total (OPN)	(200.7)	(-130.5)	(70.2)
Installation (O&MN)(FMP)***	(124.5)	(-24.0)	(100.5)
Construction (MILCON)	1.8	+0.7	2.5
Total FY 76 Base-Year	379.5	-193.1	186.4
Escalation	288.6	-96.0	186.4
Development (RDT&E,N)	(10.3)	(-6.8)	(3.5)
Procurement	(276.9)	(-89.7)	(187.2)
Construction (MILCON)	(1.4)	(+0.5)	(1.9)
Total Then-Year $	$668.1	-289.1	$379.0
b. Quantities --			
(2) Ship Systems			
Development (RDT&E,N)	N/A	N/A	N/A
Procurement	N/A	N/A	N/A
Total	N/A	N/A	N/A
c. Unit Cost --			
(2) Ship Systems			
Procurement:			
FY 76 Base-Year $	N/A	N/A	N/A
Then-Year $	N/A	N/A	N/A
Program:			
FY 76 Base-Year $	N/A	N/A	N/A
Then-Year $	N/A	N/A	N/A

d. Approved Design to Cost Goal --
(2) Ship Systems - Not Applicable.

e. Foreign Military Sales -- 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.

f. Nuclear Costs -- None

* Sailaway Costs no longer applicable due to transfer of SRQ-4 and SQQ-28 SAR reporting responsibilites to PMS-411. Quantities no longer applicable.

** Includes trainers and HLS costs.

*** FMP - Fleet Modernization Program.

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

	Current Year SAR Current Estimate	Current Year UCR Baseline Estimate	Budget Year UCR Baseline Estimate
(Aircraft)	Dec 87	Dec 86	Dec 87
a. Program Acquisition --			
(1) Cost	5461.6	5421.8	5461.6
(2) Quantity	209	209	209
(3) Unit Cost	26.1	25.9	26.1
b. Current Procurement --	(FY 1988) APPN ACT	(FY 1988) APPN ACT	(FY 1989)
(1) Cost	129.7	129.7	121.1
Less CY Adv Proc	(-26.3)	(-26.3)	(-21.0)
Plus PY Adv Proc	(+20.5)	(+20.5)	(+26.3)
Net Total	123.9	123.9	126.4
(2) Quantity	6	6	6
(3) Unit Cost	20.7	20.7	21.1

	Current Year SAR Current Estimate	Current Year UCR Baseline Estimate	Budget Year UCR Baseline Estimate
(Ship Systems)	Dec 87	Dec 86	Dec 87
a. Program Acquisition --			
(1) Cost	379.0	361.0	379.0
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A
b. Current Procurement --	(FY 1988) APPN ACT	(FY 1988) APPN ACT	(FY 1989)
(1) Cost	25.8	25.8	27.5
Less CY Adv Proc	--	--	--
Plus PY Adv Proc	--	--	--
Net Total	25.8	25.8	27.5
(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,N	PROC	MILCON	TOTAL
Development Estimate	721.8	3170.4	15.4	3907.6
Previous Changes:				
Economic	+22.7	-283.6	+6.1	-259.8
Quantity	-	-228.9	-	-228.9
Schedule	-	+1566.4	-	+1566.4
Engineering	+92.3	+213.0	-	+305.3
Estimating	-117.0	+343.2	+5.0	+231.2
Other	-	-	-	-
Support	+1.6	+259.4	-	+261.0
Subtotal	-0.4	+1869.5	+6.1	+1875.2
Current Changes:				
Economic	+0.4	+3.8	-	+4.2
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	+43.5	-	+43.5
Estimating	-0.4	+87.2	-	+86.8
Other	-	-	-	-
Support	-	-76.7	-	-76.7
Subtotal	-	+57.8	-	+57.8
Total Changes	-0.4	+1927.3	+6.1	+1933.0
Current Estimate	721.4	5097.7	21.5	5840.6

(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	+68.6	-	+112.6
Estimating	-67.7	+216.2	+3.3	+151.8
Other	-	-	-	-
Support	+1.2	-21.7	-	-20.5
Subtotal	-22.5	+342.6	+3.3	+323.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	+14.0	-	+14.0
Estimating	-0.3	+35.6	-	+35.3
Other	-	-	-	-
Support	-	-34.6	-	-34.6
Subtotal	-0.3	+15.0	-	+14.7
Total Changes	-22.8	+357.6	+3.3	+338.1
Current Estimate	556.9	2165.6	12.3	2734.8

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/ON&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/ON&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
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/ON&N(FMP))
Support: refinement of support requirements, equipment and spares to support revised aircraft procurement schedules and based on more accurate cost history (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

c. Current Changes Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E,N		
Revised escalation indices. (Economic)	N/A	+0.4
Revised cost estimates. (Estimating)	-0.3	-0.4
(2) Procurement - APN		
Revised escalation indices. (Economic)	N/A	+2.7
Refinement of prior estimates based on additional procurement history. (Estimating)	+31.0	+72.0
New Mid-East Force ECP for electronics, armament and installation. (Engineering)	+14.0	+43.5
Refinement of estimates for support equipment and spares; refinement of estimates for pubs/ technical data; refinement of cost estimates based on additional procurement data. (Support)	-35.6	-78.4

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

Procurement - OPN		
Revised escalation indices. (Economic)	N/A	+0.1
Revised cost estimates. (Estimating)	+2.1	+4.8
Refinement of support and spares estimates. (Support)	+1.0	+1.7
Procurement - OM&N		
Revised escalation indices. (Economic)	N/A	+1.0
Revised cost estimates. (Estimating)	+2.5	+10.4

(3) MILCON - None

d. References --

Development Estimate: DCP No. 85 dated March 5, 1979.
Approved Program: FY88/89 Amended President's Budget

14. (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 (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
15.5	-0.9	--	+7.6	+1.7	+0.1	--	+2.1	+10.6	26.1

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, N00019-84-C-0377, Lot V, FFP, Award: March 22, 1985 Definitized May 21, 1986	$109.1	N/A	18

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$110.3	N/A	18	$116.0	$116.0

Cost/schedule variance is not applicable to firm fixed price contract. The current estimates at completion include anticipated engineering change proposals.

	Target	Ceiling	Qty
2. 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
a. Sikorsky Aircraft Division, Stratford, CT, N00019-84-C-0352, Lot V, FFP, Award: January 22, 1985 Definitized August 25, 1986	$ 81.7	N/A	18

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 81.7	N/A	18	$ 87.4	$ 87.4

Cost/schedule variance is not applicable to firm fixed price contract. The current estimates at completion include anticipated engineering change proposals.

	Target	Ceiling	Qty
2. 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: 69.0% (20 yrs/29 yrs)
(2) Percent Program Cost Appropriated: 69.1% ($4035.2/$5840.6)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY69-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-93)	Beyond FYDP (FY94-00)	Total
RDT&E,N	714.1	2.0	5.3	--	721.4
PROCUREMENT	3274.8	148.6	722.1	952.2	5097.7
MILCON	21.5	--	--	--	21.5
Total	4010.4	150.6	727.4	952.2	5840.6
(Aircraft)					(5461.6)
(Ship Systems)					(379.0)

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

c. Annual Summary --

Fiscal Year	Qty	FY 76 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E,N. 1/								
1969				0.8			0.8	
1970				3.0			3.0	
1971				3.4			3.4	
1972				22.7			22.7	
1973				18.6			18.6	
1974				9.5			9.5	
1975				16.1			16.1	
1976				20.9			20.9	
197T				3.1			3.3	2.9
1977				60.6			66.1	2.6
1978				106.3			124.9	6.8
1979				67.0			87.0	8.4
1980				113.9			163.4	10.6
1981				58.6			91.8	10.6
1982				39.6			65.3	7.6
1983				4.8			8.3	4.9
1984				0.8			1.4	3.8
1985				0.0			0.0	3.4
1986				0.9			1.7	2.8
1987				1.0			1.9	2.7
1988				2.0			4.0	3.7
1989				0.9			2.0	3.8
1990				0.5			1.1	3.6
1991				0.9			2.0	3.3
1992				1.0			2.2	2.8
Subtotal				556.9			721.4	
Appropriation: APN								
1981				52.5	104.4		104.4	11.6
1982	18	40.7	205.9	351.5	127.0	104.4	706.1	14.3
1983	27	8.7	181.4	350.7	56.4	127.0	743.5	9.0
1984	21		102.0	220.1	58.8	56.4	486.1	8.0
1985	24	8.3	120.9	179.8	57.6	58.8	410.4	3.4
1986	18	2.8	87.5	112.5	48.4	57.6	265.5	2.8
1987	17	0.7	85.3	93.9	20.5	48.4	229.0	2.7
1988	6	1.3	31.2	51.2	26.3	20.5	129.7	3.7
1989	6		33.3	46.3	21.0	26.3	121.1	3.8
1990	6	10.4	35.2	63.3	33.1	21.0	170.4	3.6
1991	12	1.1	67.0	93.6	32.2	35.1	258.1	3.3
1992	12		66.9	78.7	32.8	32.2	222.0	2.8
1993	12		66.2	82.8	33.7	32.8	239.2	2.3
1994	12		65.9	82.5	35.1	33.7	243.6	2.3
1995	13	10.1	90.6	112.4		35.1	338.7	2.3
1996				11.7			36.0	2.3
1997				11.4			36.0	2.3
Subtotal	204	84.1	1239.3	1994.9	687.3	687.3	4739.8	

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

c. Annual Summary --

Fiscal Year	Qty	FY 76 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: OPN 2/								
1982				10.2			18.0	7.6
1983				13.9			25.4	4.9
1984				9.3			17.6	3.8
1985				9.4			18.2	3.4
1986				10.0			20.1	2.8
1987				4.3			8.9	2.7
1988				6.3			13.6	3.7
1989				2.1			4.6	3.8
1990				4.5			10.4	3.6
1991				0.1			0.2	3.3
1992				0.1			0.2	2.8
Subtotal				70.2			137.2	
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	3.7
1989				10.6			22.9	3.8
1990				8.9			19.9	3.6
1991				10.4			24.1	3.3
1992				7.1			16.8	2.8
1993				16.6			40.2	2.3
1994				7.5			18.5	2.3
Subtotal				100.5			220.7	
Appropriation: MILCON								
1982				7.3			12.5	7.6
1983				5.0			9.0	4.9
Subtotal				12.3			21.5	
TOTAL				2734.8			5840.6	
(Aircraft)				(2548.4)			(5461.6)	
(Ship Systems)				(186.4)			(379.0)	

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.

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E,N 1/			
1969	0.8	0.8	0.8
1970	3.0	3.0	3.0
1971	3.4	3.4	3.4
1972	22.7	22.7	22.7
1973	18.6	18.6	18.6
1974	9.5	9.5	9.5
1975	16.1	16.1	16.1
1976	20.9	20.9	20.9
1977	3.3	3.3	3.3
1978	66.1	66.1	66.1
1979	124.9	124.9	124.9
1980	87.0	87.0	87.0
1981	163.4	163.4	163.4
1982	91.8	91.8	91.8
1983	65.3	65.3	65.3
1984	8.3	8.3	8.3
1985	1.4	1.4	1.4
1986	0.0	0.0	0.0
1987	1.7	1.7	1.3
1988	1.9	1.9	1.2
To Complete	4.0	1.4	0.0
Total	7.3	N/A	N/A
	721.4	711.5	709.0
Appropriation: APN			
1981	104.4	104.4	107.8
1982	706.1	730.8	662.3
1983	743.5	685.6	649.1
1984	486.1	472.5	419.9
1985	410.4	405.2	345.9
1986	265.5	261.4	189.6
1987	229.0	224.8	33.2
1988	129.7	50.5	0.4
To Complete	1665.1	N/A	N/A
Total	4739.8	2935.2	2408.2
Appropriation: OPN 2/			
1982	18.0	18.0	16.2
1983	25.4	23.4	21.7
1984	17.6	17.5	17.5
1985	18.2	18.1	14.3
1986	20.1	18.3	9.4
1987	8.9	2.3	2.8
1988	13.6	2.7	0.0
To Complete	15.4	N/A	N/A
Total	137.2	100.3	81.9

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: O&MN (FMP) 3/			
1984	1.2		
1985	15.4		
1986	16.5		
1987	33.0		
1988	12.2		
To Complete	142.4		
Total	220.7		
Appropriation: MILCON			
1982	12.5	12.5	12.5
1983	9.0	9.0	9.0
Total	21.5	21.5	21.5

1/ Excludes SRQ-4 and SQQ-28 and $47.0 for Penguin Missile.
2/ Excludes costs for SRQ-4 and SQQ-28.
3/ Ship alterations are done on a per ship basis. Excludes costs 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			12	60
1992			12	60
1993			12	60
1994			12	60
1995			13	60

17. (U) 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
Prog Acq Cost (BY $)	2017.2	+531.4	2548.6	+157.6	2391.0
(TY $)	3239.5	+2222.1	5461.6	+782.1	4679.5
PAUC (BY $)	9.7	+2.5	12.2	+0.8	11.4
(TY $)	15.5	+10.6	26.1	+3.7	22.4

* Development Estimate used.

c. Schedule Variance --

Item	Production Estimate	Variance (CE Less PdE)	Current Estimate	Variance (CE Less Max)	Maximum
Start Date (mo/yr)	10/83	N/A	10/83	N/A	10/83
Duration (in months)	59	109	168	127	41
End Date (mo/yr)	8/88	N/A	9/97	N/A	2/87

* Development Estimate used.

d. Deliveries (Plan/Actual) --

Aircraft:	To Date
RDT&E,N	5/5
Procurement	95/95

Ship Systems:	To Date
RDT&E,N	3/3
Procurement	34/34**

** OPN ship systems only.

18. (U) Operating and Support Costs: N/A.

SAR-87-069

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AGM-65D & AGM-65G

AF-17 IR MAVERICK

AS OF DATE: DECEMBER 31, 1987

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CLEARED
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AS AMENDED
MAR 25 1988
DIRECTORATE FOR FREEDOM OF INFORMATION
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DEPARTMENT OF DEFENSE
SAF/PAS
88-0140-1

1. Designation/Nomenclature (Popular Name): AGM-65D & G/IR Maverick

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

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

Mr T. McMillin
Assigned: July 4, 1987
AV 785-4523; COMM (513) 255-4523

4. Program Elements:

RDT&E: PE 64608F
PROCUREMENT: PE 27313F 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 Weapon

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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.

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.

Program Highlights (Cont'd):

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.

(b) (U) Significant Developments Since Last Report

Production Reliability Acceptance Tests (PRAT) are conducted on at least three production units every month. Data from the PRAT shows we are far exceeding the design specification and TAC requirement of 36 hours Mean Time Between Failures (MTBF). Cumulative data from 31 PRAT lots demonstrates that we have an MTBF of more than 139 hours.

As of 31 Dec 87 the Air Force IR Maverick has been fired 229 times scoring 190 hits. The hit rate is 82.9%.

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. The third of the planned five shots is scheduled for the end of Jan 88, and is against an aircraft shelter.

Hughes Aircraft Company delivered 5,590 missiles and 310 spare guidance sections through 31 Dec 87. One Quality Assurance Disassembly Inspection (QADI) was held with no significant faults.

The new Hughes guidance and control manufacturing facility in La Grange, GA (HGI) delivered its 100th IR guidance section in May 1987. The facility has delivered 900 guidance sections through 31 Dec 87. The first QADI on a HGI GCS was held in July 87 with no significant faults.

Raytheon Company delivered its first missile in April 1987. Total missile delivery through 31 Dec 87 is 99. The first QADI at Raytheon was held in December 1987 with one major and one significant fault.

Multiyear assumptions are no longer included in the FY88/89 Amended President's Budget. The program funding and quantities are based on split competitive annual buys.

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 Congressional actions and FY89 PBDs. Proper adjustments will be completed and reported on a future SAR.

The IR Maverick system will satisfy the mission requirements.

Significant Developments (Cont'd):

(c) (U) Change since "As Of" date - None

8. (U) Decision Coordinating Paper Threshold Breaches: DCP #154, 20 Sep 1976. IOC Threshold of Dec 81 was breached due to Congressional action on FY 1978 budget.

9. (U) Schedule:

a. (U) Milestones	Dev Appr	Estimate/ Program	Current Estimate
DSARC II (JRMB)	Sep 76	/Sep 76	Sep 76
Engineering Development Contract Award	Apr 77	/NA	Oct 78
DT&E/IOT&E Flight Tests Start	Nov 78	/NA	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	/NA	Aug 82
DSARC III B(JRMB)(Pilot Production Full Go-Ahead)	Mar 80	/Sep 82	Sep 82
DSARC III (JRMB)	N/A	/Sep 81	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

Significant 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

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 -- None

d. (U) References --

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System."

Approved Program: Same as Development Estimate, DCP 154 as revised, July 1978.

10. (U) Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance*	Current Estimate
a. (U) Technical			
(b)(1)	(b)(1)		
(U) Boresight Accuracy (mr)	4.0/ NA	4.0	4.0
b. (U) Operational			
(U) Minimum Launch Range (ft) (0.2 Mach, 15 degree offset)	2,500/2,500	3,500 at .3 Mach 10 offset	2,500
(U) Maximum Launch Range (ft) (1.2 Mach, 0 degree offset)	85,000/85,000	73,000 at .9	85,000
(U) Lookdown Offset (Degrees below LOS),	15/15	15	15
(U) Launch Range (ft) (exercised tank target, forward hemisphere 5KM visibility, 400 ft/mm Abs humidity, Night)	32,000- / 22,000 30,000 / 30,000	23,000	30,000
(U) Probability of Hit	.87/.87	.85	.87
(U) Mission Success Probability	.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 -- N/A

e. (U) References --

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System."

Approved Program: Same as Development Estimate, DCP 154 as revised, July 1978.

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

	Development Estimate (FY75-86)	Changes	Current Estimate (FY75-97)
a. (U) Cost --			
Development (RDT&E)	$ 100.0	+6.7	$ 106.7
Procurement	895.1	+1717.2	2612.3
Total Flyaway	(792.1)	(+1653.0)	(2445.1)
Peculiar Support	(99.1)	(+ 9.2)	(108.3) 1/
Other Weapon System Cost	---		---
Initial Spares	(3.9)	(+55.0)	(58.9)
Construction(MILCON)	---		---
Total Constant FY75 $	995.1	+1723.9	2719.0
Escalation	597.8	+4304.0	4901.8
Development (RDT&E)	(34.4)	(+26.9)	(61.3)
Procurement	(563.4)	(+4277.1)	(4840.5)
Total Program Cost (TY$)	1592.9	+6027.9	7620.8

1/ Includes $57.8 in recurring flyaway costs for 891 training missiles.

b. (U) Quantities --

Development (RDT&E)	35	-2	33
Procurement	31078	+29586	60664
Total	31113	+29584	60697

c. (U) Unit Cost --

Procurement:			
Constant FY75 $	$ 0.029	$+ 0.014	$ 0.043
Current (TY $)	0.047	+ 0.076	0.123
Program:			
Constant FY75 $	0.032	$+ 0.013	0.045
Current (TY $)	0.051	+ 0.075	0.126

d. (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	0.057	0.032
Current (TY $)	0.050/0.072	0.138	0.050

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

e. (U) Foreign Military Sales -- None

f. (U) Nuclear Costs -- None

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

	Current Year	Budget Year	
	Current Estimate Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	7620.8	7083.7	7620.8
(2) Quantity	60697	60697	60697
(3) Unit Cost	.126	.117	.126
b. Current Procurement--	(FY 1988)	(FY 1988)*	(FY 1989)**
(1) Cost	298.3	298.3	270.2
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	298.3	298.3	270.2
(2) Quantity	2700	2700	2540
(3) Unit Cost	.110	.110	.106

*Adjusted to reflect FY88 appropriation 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	TOTAL
Development Estimate	134.4	1458.5	1592.9
Previous Changes			
Economic	+10.4	-181.1	-170.7
Quantity	-1.1	+1564.4	+1563.3
Schedule	+18.6	+2345.7	+2364.3
Engineering	0.0	+30.0	+30.0
Estimating	-0.2	+1466.2	+1466.0
Other	0.0	0.0	0.0
Support	+5.9	+232.0	+237.9
Subtotal	+33.6	+5457.2	+5490.8
Current Changes			
Economic	0.0	+35.6	+35.6
Quantity	0.0	0.0	0.0
Schedule	0.0	-88.4	-88.4
Engineering	0.0	0.0	0.0
Estimating	0.0	+600.8	+600.8
Other	0.0	0.0	0.0
Support	0.0	-10.9	-10.9
Subtotal	0.0	+537.1	+537.1
Total Changes	+33.6	+5994.3	+6027.9
Current Estimate	168.0	7452.8	7620.8

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	+443.6	+450.0
Engineering	0.0	+10.6	+10.6
Estimating	-2.5	+540.4	+537.9
Other	0.0	0.0	0.0
Support	+3.5	+68.0	+71.5
Subtotal	+6.7	+1575.3	+1582.0
Current Changes			
Quantity	0.0	0.0	0.0
Schedule	0.0	-33.4	-33.4
Engineering	0.0	0.0	0.0
Estimating	0.0	+179.1	+179.1
Other	0.0	0.0	0.0
Support	0.0	- 3.8	- 3.8
Subtotal	0.0	+141.9	+141.9
Total Changes	+6.7	+1717.2	+1723.9
Current Estimate	106.7	2612.3	2719.0

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.

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.

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 prior year inflation adjustment.

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	Base Year $	Then Year $
Revised Economic Escalation Indices (Economic)	---	+35.6
Schedule changes due to procuring different quantities per FY as a result of incorporation of split competitive prices and congressional budget cuts (Schedule)	-33.4	-88.4
Change in estimate due to deletion of single source multiyear assumption. (Estimating)	+ 182.2	+ 610.1
Adjustment for current and prior year escalation (Estimating)	+ .5	+ 1.1
Adjustment for FY90-92 escalation (Estimating)	- 3.6	- 10.4
Spares schedule change due to procuring different quantities per FY as a result of missile buy schedule changes. (Support)	+0.2	+ 1.0
Change in data estimate due to incorporation of competitive prices. (Support)	- 3.7	-11.5
Adjustment for current and prior year escalation (Support)	- .3	- .4

d. (U) References --

Development Estimate: DCP 154, dated September 20, 1976, subject "Imaging Infrared Maverick Missile System."

Approved Program: Same as Development Estimate

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

Initial SAR Estimate to Current Estimate

Changes (Then-Year Dollars in Millions)									
PAUC Initial SAR Development Estimate	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC Current Estimate
.051	-.002	.001	.038	.000	.034	.004	.000	.075	.126

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.

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
$152.9	$169.6	800	$153.6	$160.0

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$+2.8	$+0.3
Cumulative Variance to Date(22 Nov 87)	$-5.4	$+0.9
Net Change(After Correction)	$-8.2	$+0.6

Explanation of change: The negative cost variance is attributable to problems with the rocket motor and increased engineering activity. The favorable schedule variance is due to early delivery of actuation systems and circuit card assemblies. The target price increased for redesign of two LSI circuits.

Note: Contract #F33657-84C-2220 for Hughes Aircraft Company has been deleted. It is completed and was last reported on the Dec 87 UCR.

15. (U) Contract Information (Cont'd):

Hughes Aircraft Company *
#F33657-85-C-0086, FFP
Award: May 21, 1986
Definitized: May 21, 1986

Initial Contract Price

Target	Ceiling	Qty
$ 460.2	N/A	2600

Current Contract Price

Target	Ceiling	Qty
$324.0	N/A	2600

Estimated Price At Completion

Contractor	Program Manager
$324.0	$324.0

Hughes Aircraft Company*
#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

Target	Ceiling	Qty
$236.0	N/A	1436

Estimated Price At Completion

Contractor	Program Manager
$236.0	$236.0

Note: Contract price includes 120 Navy AGM-65Fs and 225 GBU-15s.

Hughes Aircraft Company*
#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

Target	Ceiling	Qty
$230.6	N/A	2156

Estimated Price at Completion

Contractor	Program Manager
$230.6	$230.6

Note: Contract price includes 248 Navy AGM-65Fs and 16 TGM-65Fs.

Raytheon Co. Missile Systems Div.*
#F33657-87-C-0131, FFP
Award: 20 Apr 87
Definitized: 20 Apr 87

Initial Contract Price

Target	Ceiling	Qty
$147.8	N/A	1203

Current Contract Price

Target	Ceiling	Qty
$147.8	N/A	1203

Estimated Price at Completion

Contractor	Program Manager
$147.8	$147.8

Note: Contract price includes 57 Spare Guidance Control Sections.

*CPR data is not available 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: 60.9% (14/23)

(2) Percent Program Cost Appropriated: 31.0% ($2358.9/$7620.8)

b. (U) Appropriation Summary --

(Then Year Dollars in Millions)

Appropriation	Current & Prior Years (FY75-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93-97)	Total
RDT&E	$ 168.0	$ 0.0	$ 0.0	$ 0.0	$ 168.0
Procurement	$ 2190.9	$ 270.2	$ 1072.3	$ 3919.4	$ 7452.8
MILCON	$ ---	$ ---	$ ---	$ ---	$ ---
	$ 2358.9	$ 270.2	$ 1072.3	$ 3919.4	$ 7620.8

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 ADV PROCUREMENT DEBIT	ADV PROCUREMENT CREDIT	TOTAL	ESCL RATE
APPROPRIATION: RDT&E								
1975	--	--	--	3.6	--	--	3.9	9.6
1976	--	--	--	3.7	--	--	4.3	9.6
1977	--	--	--	8.2	--	--	10.2	9.9
1978	--	--	--	--	--	--	--	7.4
1979	--	--	--	29.8	--	--	43.4	8.4
1980	--	--	--	30.6	--	--	49.5	9.4
1981	--	--	--	21.9	--	--	39.3	11.9
1982	--	--	--	6.1	--	--	11.6	9.2
1983	--	--	--	2.0	--	--	4.1	4.9
1984	--	--	--	0.8	--	--	1.7	3.8
SUBTTL	33	**	**	106.7	--	--	168.0	---
APPROPRIATION: PROCUREMENT								
1982	200	14.3	62.4	104.9	--	--	221.5	9.6
1983	900	30.3	59.8	111.4	--	--	248.7	9.0
1984	1980	6.5	100.1	129.6	--	--	302.0	8.0
1985	2600	0.4	117.6	151.2	14.7	--	361.8	3.4
1986	2371	8.1	146.7	159.4	--	14.7	394.9	2.8
1987	3224	0.0	138.2	141.7	--	--	363.7	2.7
1988	2700	0.6	108.1	112.3	--	--	298.3	3.7
1989	2540	0.0	94.4	98.4	--	--	270.2	3.8
1990	2902	0.0	117.5	122.5	--	--	346.1	3.6
1991	2890	0.0	117.2	123.4	--	--	357.4	3.3
1992	2882	0.0	116.7	124.4	--	--	368.8	2.8
1993	7000	6.3	238.4	250.0	--	--	758.5	2.3
1994	7000	0.0	235.3	240.6	--	--	747.1	2.3
1995	7000	0.0	231.2	236.4	--	--	750.5	2.3
1996	7000	0.0	229.9	235.1	--	--	763.2	2.3
1997	7475	0.0	265.1	271.0	--	--	900.1	2.3
SUBTTL	60664	66.5	2378.6	2612.3	14.7	14.7	7452.8	---
TOTAL	60697	**	**	2719.0	--	--	7620.8	---

*FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 Congressional actions and FY89 Amended Budget Submission. Proper adjustments will be completed and reported in a future SAR.
**Not Available

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

d. (U) Obligations and Expenditures 1/ --

Fiscal Year	Then Year Dollars in Millions		
	Total	Obligated	Expended
	APPROPRIATION: RDT&E		
1975	3.9	3.9	3.9
1976	4.3	4.3	4.3
1977	10.2	10.2	10.2
1978	---	----	----
1979	43.4	43.4	43.4
1980	49.5	49.5	49.5
1981	39.3	34.5	34.5
1982	11.6	10.5	10.5
1983	4.1	3.7	3.7
1984	1.7	1.7	1.7
TOTAL	168.0	161.7	161.7
	Appropriation: Procurement		
1982	221.5	220.2	215.4
1983	248.7	246.2	236.5
1984	302.0	301.4	295.1
1985	361.8	361.5	293.5
1986	394.9	343.9	121.2
1987	363.7	338.9	12.2
TO COMP	5560.2	N/A	N/A
TOTAL	7452.8	1812.1	1173.9

1/ Reflects Program Office records as of 31 December 1987.

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	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	*Maximum
1979	240			
1980	3100			
1981	5400			
1982	6000	114	114	1800
1983	6000	1080	1080	4200
1984	6000	2376	2376	4200
1985	4338	2600	2600	4200
1986		1642	1497	6000
1987		4700	3224	6000
1988		7000	2360	6000
1989		7000	2540	6000
1990		7000	2902	6000
1991		7000	2890	6000
1992		10000	2882	6000
1993		9684	7000	4264
1994			7000	
1995			7000	
1996			7000	
1997			7815	

*Based on available tooling.

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

Item	Development Estimate	Variance (CE less DE)	Current Estimate	Variance (CE less Max)	*Maximum
Prog Acq Cost (BY$)	995.1	+1723.9	2719.0	+ 27.2	2691.8
Prog Acq Cost (TY$)	1592.9	+6027.9	7620.8	+ 316.5	7304.3
PAUC (BY$)	.032	+.013	.045	+ .007	.038
PAUC (TY$)	.051	+.075	.126	+ .025	.101

*FY87 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	+131	204	+51	153
End Date (Mo/Yr)	12/87	N/A	11/99	N/A	8/95

d. (U) Deliveries including spares (Plan/Actual)* --

	To Date
RDT&E	33/33
Procurement	5812/5999

*Reflects Program Office records as of 31 December 1987.

18. (U) Operating and Support Costs

Not Applicable

SAR-87-050

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

PROGRAM: Torpedo MK 48 ADCAP

N-27 MK-48 ADCAP TORPEDO

AS OF DATE: December 31, 1987

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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 0604675N Project S0366

PROCUREMENT: PE 24284N 3111 MK 48 ADCAP APPN 1507
PE 24284N 5120 Spares

MILCON: PE 24896N

No Security Objection to Open Publication (AS AMENDED)
88-C-0399
APR 08 1988
Office of the Chief of Naval Operations
Dept. of the Navy

5. Related Programs: Submarine Fire Control and Launch Systems, Mobile ASW Target

~~CLASSIFIED BY: [illegible] of 26 NOV 85~~
~~DECLASSIFY ON: OADR~~

AS AMENDED

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APR 7 1988 9

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

~~SECRET~~

OASD(PA) DFOISR 88-T-0874

(b)(1)



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 Gould, respectively. OPEVAL commenced in December 1987. Product improvements are planned for the ADCAP to upgrade the propulsion subsystem and to provide periodic block improvements to the tactical software.

b. (U) Significant Development Since Last Report -- ADCAP NPDM authorized release of FY86 and FY87 WPN funds in September 1987.

(U) Mission Requirements - ADCAP is expected to satisfy all current mission requirements.

c. (U) Change Since "As of" Date -- None

8. (U) Navy Decision Coordinating Paper (NDCP) Threshold Breaches: Milestone III and IOC threshold breaches to the NDCP approved January 1985 are due to technical problems requiring a program restructure. Revision 1 to the NDCP, dated 6 AUG 87, reflects this restructured program.

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	Apr 88
(U) DNSARC III	Jan 87/ N/A	Aug 88(CH-1)
(b)(1)		
* (U) MILESTONE IIIA	N/A /Sep 85	Sep 85
* (U) MILESTONE IIIA	N/A /Sep 87	Sep 87
(U) MILESTONE IIIB	N/A /Jul 88	Jul 88

(b)(1)

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 production MK 48 ADCAP Torpedoes to the fleet.

* Two separate limited production approvals.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(b)(1)			

c. (U) Previous Change Explanations -- Not Applicable

d. (U) Current Change Explanations -- Not Applicable

e. (U) References --

Development Estimate:

(1) NDCP Rev. 1, dated 6 Aug 87, 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 Feb 1988.

(b)(1)

3/ (U) Availability (90-day patrol) = $\frac{\text{loadouts - backhauls}}{\text{loadouts}}$

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	1,092.1	10.2	1,102.3
Procurement	4,471.7	-392.7	4,079.0
Total Swimaway	(3,932.3)	(-446.4)	(3,485.9)
Other Weapon System Cost	(417.1)	(89.0)	(506.1)
Initial Spares	(122.3)	(-35.3)	(87.0)
Construction (MILCON)	0.7	10.7	11.4
Total FY86 Base-Year $	5,564.5	-371.8	5,192.7
Escalation	749.5	39.2	788.7
Development	(- 68.3)	(6.4)	(-61.9)
Procurement	(817.8)	(31.5)	(849.3)
Construction (MILCON)	(0.0)*	(1.3)	(1.3)
Total Then-Year $	6,314.0	-332.6	5,981.4
b. Quantities --			
Development (RDT&E)	(b)(1)		
Procurement			
Total			
c. Unit Cost --			
Procurement:			
FY86 Base-Year $	1.33	-0.11	1.22
Then-Year $	1.58	-0.11	1.47
Program:			
FY86 Base-Year $	1.64	-0.11	1.53
Then-Year $	1.86	-0.10	1.76

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

* less than $ 0.1

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

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est (DEC 87 SAR)	UCR Baseline (DEC 86 SAR)	UCR Baseline (DEC 87 SAR)
a. Program Acquisition --	(b)(1)		
(1) Cost			
(2) Quantity			
(3) Unit Cost			
b. Current Procurement --	(FY88 Approp ACT)	(FY88 Approp ACT)	(FY 1989)
(1) Cost	255.7	255.7	443.0
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	255.7	255.7	443.0
(2) Quantity	100	100	261
(3) Unit Cost	2.56	2.56	1.70

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1,023.8	5,289.5	0.7	6,314.0
Previous Changes:				
Economic	0.2	-38.5		-38.3
Quantity				0.0
Schedule	40.0	364.3		404.3
Engineering				0.0
Estimating	-7.9	-617.2	12.0	-613.1
Other				0.0
Support		-40.2		-40.2
Subtotal	32.3	-331.6	12.0	-287.3

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

Current Changes:				
Economic	0.7	47.9		48.6
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-16.4	-73.3		-89.7
Other				0.0
Support		-4.2		-4.2
Subtotal	-15.7	-29.6	0.0	-45.3
Total Changes	16.6	-361.2	12.0	-332.6
Current Estimate	1,040.4	4,928.3	12.7	5,981.4

a. Summary -- (FY 1986 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1,092.1	4,471.7	0.7	5,564.5
Previous Changes:				
Quantity				0.0
Schedule	33.3	267.4		300.7
Engineering				0.0
Estimating	-8.1	-555.1	10.7	-552.5
Other				0.0
Support		-32.4		-32.4
Subtotal	25.2	-320.1	10.7	-284.2
Current Changes:				
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-15.0	-69.0		-84.0
Other				0.0
Support		-3.6		-3.6
Subtotal	-15.0	-72.6	0.0	-87.6
Total Changes	10.2	-392.7	10.7	-371.8
Current Estimate	1,102.3	4,079.0	11.4	5,192.7

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

b. Previous Change Explanations --

(1) RDT&E

ECONOMIC:	REVISED JAN 87 ECONOMIC ESCALATION RATES
SCHEDULE:	DEPARTMENT PROGRAM/BUDGET ADJUSTMENT ADCAP BASELINE DNSARC III ESTIMATED TO COMPLETE JUL 88 VS JAN 87 AND PRODUCT IMPROVEMENT COMPLETION IN FY 94 VS FY 92
ESTIMATING:	NIF ACTIVTY RATE ADJUSTMENT, CONGRESSIONAL ADJUSTMENTS AND OTHER BUDGET ADJUSTMENTS

(2) Procurement

ECONOMIC:	REVISED JAN 87 ECONOMIC ESCALATION RATES
SCHEDULE:	DEPARTMENT ACTIONS TO ADJUST FY 87 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 ACTIVITIE

(3) Milcon

ESTIMATING:	ADDITION OF ADCAP UNIQUE COSTS

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
REVISED JAN 88 ECONOMIC ESCALATION RATES.(ECONOMIC)	N/A	0.7
CONGRESSIONAL ADJUSTMENTS AND OTHER BUDGET ADJUSTMENTS. (ESTIMATING)	-10.2	-11.1
OSD DIRECTED PROGRAM RESTRUCTURING. (ESTIMATING)	-2.0	-2.2
DEPARTMENT DECISION TO FUND COMBAT SYSTEM INFORMATION PROGRAM, SBIR, AND TACTICAL EMBEDDED COMPUTER. (ESTIMATING)	-2.3	-2.4
OFFSET OF ESCALATION INDICES. (ESTIMATING)	-0.5	-0.7

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

c. Current Change Explanations (Cont'd) --	(Dollars in Millions) Base Year $	Then Year $
(2) Procurement		
REVISED JAN 88 ECONOMIC ESCALATION RATES. (ECONOMIC)	N/A	47.9
DEPARTMENT REVIEW AND OSD INFLATION ADJUSTMENT. (ESTIMATING)	-0.3	-0.1
DEPARTMENT DECISION TO DEFER FY89 EXECUTION AND SUBSEQUENT CHANGE IN FY86 FIXED PRICE INCENTIVE CONTRACT TO FIRM FIXED PRICE. (ESTIMATING)	-30.3	-25.3
OFFSET OF ESCALATION INDICES. (ESTIMATING)	-38.4	-47.9
ADCAP PORTION OF OSD SPARES REDUCTION. (SUPPORT)	-3.6	-4.2

d. References -- FY 1989 Amended Biennial Budget

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

a. Initial SAR Estimate to Current Baseline Estimate --

Initial SAR is Current Baseline.

PAUC (Baseline Est)(DE)	Changes (Then Year Dollars in Millions) Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC (Current Est 12/86)
1.857	0.003	0.0	0.119	0.0	-0.207	-0.013	0.0	-0.098	1.759

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

a. RDT&E --

Prime Contractor (Torpedo):	Initial Contract Price Target	Ceiling	Qty
Hughes Aircraft Company, Fullerton, CA, N00024-82-C-6296, CPAF Award: August 5, 1982 Definitized: May 9, 1983	$257.5	N/A	37

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$313.0	N/A	32	$313.0	$313.0

Cost Variance	Schedule Variance
NOT REQUIRED BY THE CONTRACT.	

Previous Cumulative Variances
Cumulative Variances To Date (12/31/1987)

Net Change

NO COST PERFORMANCE REPORTING UNDER THIS CONTRACT.

Propulsion System:	Target	Ceiling	Qty
Gould, Cleveland, OH, N00024-82-C-6389, CPAF Award: August 10, 1982 Definitized: July 27, 1983	$40.3	N/A	50

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$53.9	N/A	45	$53.9	$53.9

Cost Variance	Schedule Variance
NOT REQUIRED BY THE CONTRACT.	

Previous Cumulative Variances
Cumulative Variances To Date (12/31/1987)

Net Change

NO COST PERFORMANCE REPORTING UNDER THIS CONTRACT.

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

b. WPN --

Prime Contractor (Torpedo):	Initial Contract Price Target	Ceiling	Qty
Hughes Aircraft Company, Fullerton, CA, N00024-85-C-6098, CPIF/AF	$159.3	N/A	28

Award: March 6, 1985
Definitized: April 14, 1986

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$290.1	N/A	28	$290.1	$290.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-3.6	-10.8
Cumulative Variances To Date (11/21/87)	-17.4	-23.1
Net Change	-13.8	-12.3

Explanation of Change: The negative cost and schedule variance is being driven by circuit card production delays and test equipment design changes and greater than planned design complexity. Schedule delays have also been created by delays in shipment of subcontracted hardware.

Prime Contractor (Torpedo):	Initial Contract Price Target	Ceiling	Qty
Hughes Aircraft Company, Fullerton, CA, N00024-88-C-6148, FFP	$188.1	N/A	123

Award: December 24, 1987
Definitized: December 24, 1987

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$188.1	N/A	123	$188.1	$188.1

	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

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

Prime Contractor (Torpedo):	Initial Contract Price Target	Ceiling	Qty
Hughes Aircraft Company, Fullerton, CA, N00024-87-C-6056, FPI	$98.1	$108.8	VARIOUS

Award: September 21, 1987
Definitized: September 21, 1987

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$98.1	$108.8	VARIOUS	$108.8	$108.8

	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

NOTE: Various types of test equipment were purchased on this contract.

Prime Contractor (Torpedo):	Initial Contract Price Target	Ceiling	Qty
Gould, Inc., Cleveland, Ohio N00024-86-C-6162(CLIN 0017 - 0021), FPI	$51.0	$58.1	50

Award: April 15, 1986
Definitized: October 7, 1987 *

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$51.0	$58.1	50	$59.5	$59.5

	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

* Indicates date option (P0003) was exercised.

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

a. Program Status --
(1) Percent Program Completed: 56.3% (9 yrs/16 yrs)
(2) Percent Program Cost Appropriated: 33.6% ($2009.8/5981.4)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY79-88)	Budget Year (FY89)	Balance FYDP (FY90-93)	To Complete Beyond FYDP (FY94)	Total
RDT&E	932.8	27.7	79.9	0.0	1,040.4
Procurement	1,064.3	443.0	2,835.1	585.9	4,928.3
MILCON	12.7	0.0	0.0	0.0	12.7
Total	2,009.8	470.7	2,915.0	585.9	5,981.4

c. Annual Summary --

Fiscal Year	Qty	FY 86 Base-Year Dollars: Swimaway Nonrec	FY 86 Base-Year Dollars: Swimaway Rec	FY 86 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: RDT&E								
1979				25.7			17.9	8.4%
1980				68.2			52.6	10.6%
1981				107.7			90.6	10.6%
1982				174.4			154.4	7.6%
1983				195.0			180.4	4.9%
1984				180.6			173.1	3.8%
1985				127.5			125.9	3.4%
1986				59.6			60.5	2.8%
1987				53.2			55.7	2.7%
1988				20.0			21.7	3.7%
1989				24.6			27.7	3.8%
1990				6.4			7.5	3.6%
1991				24.9			29.9	3.3%
1992				34.5			42.5	2.8%
Subtotal	48	N/A	N/A	1102.3			1040.4	

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

c. Annual Summary (Cont'd) --

Fiscal Year	Qty	FY 86 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Swimaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement								
1984	(b)(1)	24.8	33.2	76.8	20.9		75.9	8.0%
1985		14.3	70.6	106.2		20.9	108.5	3.4%
1986		75.3	225.1	357.0			376.5	2.8%
1987		48.6	102.3	226.6			247.7	2.7%
1988		21.1	148.8	225.8			255.7	3.7%
1989		25.7	273.5	378.5			443.0	3.8%
1990		27.1	385.7	488.1			588.1	3.6%
1991		9.1	506.3	579.6			716.0	3.3%
1992		7.5	550.1	618.1			781.4	2.8%
1993		3.9	535.4	579.6			749.6	2.3%
1994		1.1	396.4	442.7			585.9	2.3%
Subtota		258.5	3,227.4	4,079.0	20.9	20.9	4,928.3	
Appropriation: MILCON								
1986				0.7			0.7	2.8%
1987				0.0			0.0	2.7%
1988				10.7			12.0	3.7%
Subtotal				11.4			12.7	
Total	(b)(1)			5,192.7			5,981.4	

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1979	17.9	17.9	17.8
1980	52.6	52.6	52.4
1981	90.6	90.6	89.9
1982	154.4	154.4	152.6
1983	180.4	180.4	175.6
1984	173.1	172.7	170.3
1985	125.9	125.5	125.2
1986	60.5	60.5	59.9
1987	55.7	55.5	43.4
1988	21.7	16.8	2.3
To Complete	107.6	N/A	N/A
Total	1,040.4	926.9	889.4
Appropriation: Procurement			
1984	75.9	75.9	70.3
1985	108.5	108.3	94.2
1986	376.5	367.5	48.7
1987	247.7	224.2	33.2
1988	255.7	33.5	2.5
To Complete	4,119.7	N/A	N/A
Total	5,184.0	809.4	248.9

17. (a) Production Rate Data:

a. Annual Production Rates -- Note: The annual production rates reflect the following delivery periods: FY85 - 19 months, FY86 - 9 months, FY87 11 months, and FY88 - 4 months. FY 88 and out reflects two contractors (leader/follower) and FY 87 supports one contractor.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum
1984	(b)(1)	N/A	(b)(1)	N/A
1985		N/A		N/A
1986		N/A		N/A
1987		N/A		N/A
1988		N/A		N/A
1989		N/A		N/A
1990		N/A		N/A
1991		N/A		N/A
1992		N/A		N/A
1993		N/A		N/A
1994		N/A		N/A

b. 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	5,192.7	N/A	N/A
	(TY $)	N/A	N/A	5,981.4	N/A	N/A
PAUC	(BY $)	N/A	N/A	1.53	N/A	N/A
	(TY $)	N/A	N/A	1.76	N/A	N/A

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

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	N/A	N/A	3/85	N/A	N/A
Duration (in Months)	N/A	N/A	144	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	7/97	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	48/48
Procurement	6/6

18. (U) Operating and Support Costs:

Operating and Support Costs are currently not available.

SAR-87-057

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
Program: Sparrow (AIM/RIM-7M)
(USN/USAF)

CLEARED
FOR OPEN PUBLICATION

AS AMENDED

N-33 SPARROW

AS AMENDED 4 1988 11 1987

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

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No Security Objection
to Open Publication
(AS AMENDED)
88-C-0448
APR 13 1987
Office of the Chief of
Naval Operations
Dept. of the Navy

1. (U) Desination 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 Number:

Air-to-Air Missile Systems Program Office PMA-259 Washington, DC 20381	PM: CAPT J.J. Stewart, USN Assigned: Feb 14, 1986 Autovon: 222-8222 Com: (202) 692-8226
PMA-259B	PM: LTC Jerry R. McMahan, USAF Assigned: July 1, 1987 Autovon: 222-8222 Com: (202) 692-8224

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

RDT&E,N:	064354N (W0457) (W1927)	(Shared Funding)		
	027161F (Shared Funding)			
Procurement:	024162N, 26138M (AIM-7M)	ICN 2202, 5120	APPN: 1507	
	024229N (RIM-7M)			
	027161F (Shared Funding)	ICN M07FA1	APPN: 3020	

(U) Related Programs: Electronic counter-countermeasures (NAVAIR Element 064354N (W1927); low altitude fuze Improvement (NAVSEA Element 063609N (S1821); AMRAAM (USAF Element 063316F).

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OASD(PA) DFOISR 88-T-0960

6. (U) Mission and Description: The AIM/RIM-7M missile is a semi-active radar-guided intercept missile for use with a number of Air-to-Air and Ship-to-Air weapon systems. Provides all-aspect attack capability in all weather conditions against a broad spectrum of targets and in a variety of countermeasures environments. The AIM/RIM-7M utilizes an inverse monopulse seeker to guide semi-actively to a target illuminated by radar signals emanating from the launching aircraft or ship. The missile incorporates on board digital processing to provide improved counter-countermeasures capabilities and better capabilities to track targets against a clutter background, a new autopilot band with low altitude capability for surface-to-surface firing, and a new active fuze for improved burst control and low altitude capability. The RIM-7M is the ship-to-air version of the AIM-7M which can be launched from NATO SEASPARROW Surface Missile Systems. The AIM/RIM-7M motor, warhead, wings, fins and autopilot design are the AIM-7F design. A blast fragmentation warhead was developed and was introduced in the FY81 buy. The AIM/RIM 7M missiles will replace the AIM-7E, AIM-7F and RIM-7H series missiles in the present inventory. The AIM-7M is specified as a primary weapon for use on F-4, F-14, F-15 and F-18 series aircraft. The RIM-7M will be the primary weapon for use with the NATO SEASPARROW Missile System aboard ships of the U.S. Navy and NATO SEASPARROW consortium nations.

7. (U) Program Highlights:

a. Significant Historical Developments--DSARC II held in April 1978 approved engineering development of the AIM/RIM-7M. The FY1980 AIM/RIM-7M Sparrow guidance and control section production was approved by the Office of the Secretary of Defense in September 1980 (UNDERSECDEF memo of 9/22/80). The second OSD Program Review of 9 March 1981 authorized go-ahead of the FY1981 procurement program. DNSARC III held in November 1982 authorized full rate production of the AIM/RIM-7M (ASN memo of 11/2/82). Approval for service use for the AIM-7M was granted in November 1982 (CNO ltr ser 401E/394759 of 11/8/82). A decision was made during the FY88/89 budget cycle to cancel the procurement of AIM/RIM-7M after FY1987 for the Navy and after 1988 for the Air Force. Funding for the development of a modified AIM-7 SPARROW missile with Electronic Counter-CounterMeasures (ECCM) was also deleted after FY1986.

b. Significant Developments Since Last Report--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). This increases the SAR by 6,321 missiles. During the FY88/89 budget cycle Congress appropriated $79.0M for 600 USN missiles in FY 1988. The USAF has included 354 in FY1989 in the amended FY88/89 Biennial Request and also added 55 in FY1987 that were Congressional approved from contract savings. This is a total increase of 1,009 missiles since the FY1988/89 Congressional budget of Jan 1987.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: Beginning of IOT&E slipped beyond threshold date of October 1980. Early IOT&E events occurred 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:

a. Milestones	Development Estimate/ Approved Program	Current Estimate
Prototype Seeker Firings	N/A/Jan 77 Ch-1	Jan 77 Ch-1
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	—
IOC (1st delivery to Fleet)	Jul 81/Jan 83 Ch-1	Jan 83
DNSARC III	— /Nov 82 Ch-1	Nov 82

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 JTE firing missiles.
New milestones resulted from restarting 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; ASU for RIM-7M granted July 1983.

c. Current Change Explanations — Ch-1 Incorporation of DAE approved Baseline of 17 Feb 1988.

d. References — Development Estimate: DCP #89, Revision B, dated 19 April 1979 and full approval for service use dated 8 November 1982.

Approved Program: Same as Development Estimate/DAE baseline of 17 Feb 1988 /FY88/89 Biennial Budget as amended.

10. (U) Technical/Operational Characteristics:

a. (U) Technical —	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(U) Weight			
Launch, lbs	510/510	510	510
Warhead, lbs,	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 Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(b)(1)			

c. (U) Previous Change 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 intercep 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/FY1988/89 Amended Biennial Budget.

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

a. (U) Cost	Development Estimate (FY75-85)	Changes	Current Estimate (FY75-89)
Development (RDT&E)	54.5	- 1.2	53.3
Procurement	859.2	+577.4	1436.6
G,C&A	(681.7)	(+489.3)	(1171.0)
Propulsion	(46.7)	(+ 14.0)	(60.7)
Other Hardware	(35.8)	(- 13.4)	(22.4)
Procurement	(66.4)	(+19.1)	(85.5)
Total Flyaway	(830.6)	(+509.0)	(1339.6)
Fleet Support	(19.9)	(+ 47.5)	(67.4)
Initial Spares	(8.7)	(+ 20.9)	(29.6)
Construction	-	-	-
Total FY78 Base Year $	913.7	+576.2	1489.9
Escalation	344.4	+ 924.3	1268.7
Development (RDT&E)	(2.8)	(+ 5.1)	(7.9)
Procurement	(341.6)	(+ 919.2)	(1260.8)
Construction	-	-	-
Total Then-Year $	1258.1	+1500.5	2758.6
b. Quantities --			
Development (RDT&E)	44	-	44
Procurement	11095	+4179	15274
Total	11139	+4179	15318

c. Unit Cost --

Procurement:			
FY78 Base-Year	$.077	+.017	.094
Then-Year	.108	+.069	.177
Program:			
FY78 Base-Year $	.082	+.015	.097
Then-Year	.113	+.067	.180

d. Approved Design to Cost Goal --

	Dev Estimate/ Appr Program	Current Estimate	Latest App Threshold
@ Qty: 1000			
@ Peak Rate: 100/mo			
FY78 Base-Year $	.092/.092	.092	.108
Then-Year $	.199/.199	.199	.234

e. Foreign Military Sales (Includes RIK): Signed letters of offer to date total up to 4022 for $874.7 including support to the following: Greece, 270/$67.9; Taiwan, 100/$27.9; Australia, 223/$52.3; Israel, 150/$32.7; Canada, 847/$183.5; Egypt, 450/$113.4; Turkey, 125/$30.2; NATO 978/$232.4; SDAF 850/$122.0; Bahrain 5/$4.9; Portugal 24/$7.5.

f. Nuclear Costs: None.

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

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	2758.6	2684.2	2758.6
(2) Quantity	15318	14309	15318
(3) Unit Cost	.180	.188	.180
b. Current Procurement --	(FY1988)	(FY1988)*	(FY1989)
(1) Cost	163.5	163.5	56.1
Less CY Adv Proc	0	0	0
Plus FY Adv Proc	0	0	0
Net Total	163.5	163.5	56.1
(2) Quantity	1158	1158	354
(3) Unit Cost	.141	.141	.158

* FY 1988 appropriated.

13. (U) Cost Variance Analaysis: (Total USN/USAF)

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate (DE)	57.3	1200.8	0	1258.1
Previous Changes:				
Economic	+3.4	+125.1	0	+128.5
Quantity	0	+394.5	0	+394.5
Schedule	+5.7	+205.6	0	+211.3
Engineering	0	0	0	0
Estimating	-5.2	+542.8	0	+537.6
Support	0	+154.2	0	+154.2
Subtotal	+3.9	+1422.2	0	+1426.1
Current Changes:				
Economic	0	- .2	0	- .2
Quantity	0	+155.4	0	+155.4
Schedule	0	+ 16.8	0	+ 16.8
Engineering	0	0	0	0
Estimating	0	-106.9	0	-106.9
Support	0	+ 9.3	0	+ 9.3
Subtotal	0	+ 74.4	0	+ 74.4
Total Changes	+3.9	+1496.6	0	+1500.5
Current Estimate	61.2	2697.4	0	2758.6

(FY 1978 Constant (Base Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate (DE)	54.5	859.2	0	913.7
Previous Changes:				
Quantity	0	+143.0	0	+143.0
Schedule	+3.0	+ 69.6	0	+ 72.6
Estimating	-4.2	+298.9	0	+294.7
Support	0	+ 71.0	0	+ 71.0
Subtotal	-1.2	+ 582.5	0	+ 581.3
Current Changes:				
Quantity	0	+ 68.5	0	+ 68.5
Schedule	0	+ 6.5	0	+ 6.5
Estimating	0	- 84.3	0	- 84.3
Support	0	+ 4.2	0	+ 4.2
Subtotal	0	- 5.1	0	- 5.1
Total Changes	-1.2	+ 577.4	0	+ 576.2
Current Estimate	53.3	1436.6	0	1489.9

b. Previous Change Explanations --

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

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

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

Procurement

Economic:	Revised escalation rates
Quantity:	Production quantities increased by 3170 missiles
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, reprogramming, and re-estimate of prior year rates.
Support:	Restructured support to reflect revised Air Force and Navy strategies.

MILCON None.

c. Current Change Explanations --

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E	0	0
(2) Procurement		
Revised economic escalation rates. (Economic)	N/A	- .2
o Add on 1009 USN/USAF missiles from previous budget (600 USN/409 USAF)	- 5.1	+ 74.6
o Increase of 1009 missiles (Quantity)	(+ 68.5)	(+155.4)
o Associated schedule (Schedule)	(+ 6.5)	(+ 16.8)
o Associated estimate (Estimating)	(- 84.3)	(-106.9)
o Increase in support due to 1009 missiles. (Support)	(+ 4.2)	(+ 9.3)

(3) MILCON: None.

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

d. References - Development Estimate: DCP #89, Revision B, dated 19 April 1979 and full approval for service use dated 8 November 1982.

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

a. Initial SAR Estimate (DE) to Current Estimate (CE) --

PAUC	Changes (Then Year Dollars in Millions)								PAUC
Initial SAR EST (DE)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	Current Estimate
.113	+.008	+.005	+.015	0	+.028	+.011	0	+.067	$ .180

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

a. Procurement --

GC&A
Raytheon Company, Lowell, MA
N00019-86-C-0147, FFP
Award: March 1986
Definitized: March 1986

	Initial Contract Price		
	Target	Ceiling	Qty
	$227.6	N/A	1679
(AF)	(47.7)	N/A	(236)
(FMS/Other)	(43.8)	N/A	(376)

	Current Contract Price		
	Target	Ceiling	Qty
	227.6	N/A	1679
(AF)	(47.7)	N/A	(236)
(FMS/Other)	(43.8)	N/A	(376)

Estimated Price at Completion	
Contractor	Program Manager
$227.6	$227.6
(47.7)	(47.7)
(43.8)	(43.8)

GC&A
Raytheon Company, Lowell, MA
N00019-87-0140, FFP
Award: March 1987
Definitized: March 1987

	Initial Contract Price		
	Target	Ceiling	Qty
	$215.3	N/A	1927
(AF)	(30.6)	N/A	(274)
(FMS/Other)	(69.3)	N/A	(614)

	Current Contract Price		
	Target	Ceiling	Qty
	215.3	N/A	1927
(AF)	(30.6)	N/A	(274)
(FMS/Other)	(69.3)	N/A	(614)

Estimated Price at Completion	
Contractor	Program Manager
$215.3	$215.3
(30.6	(30.6)
(69.3)	(69.3)

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

GC&A
General Dynamics, Camden, AR
N00019-86-C-0148, FFP
Award: 13 March 1986
Definitized: 13 March 1986

	Initial Contract Price		
	Target	Ceiling	Qty
	$221.8	N/A	1668
(AF)	(42.5)	N/A	(233)
(FMS/Other)	(44.5)	N/A	(374)

	Current Contract Price		
	Target	Ceiling	Qty
	$221.8	N/A	1668
(AF)	(35.8)	N/A	(233)
(FMS/Other)	(44.5)	N/A	(374)

Estimated Price at Completion	
Contractor	Program Manager
$221.8	$221.8
(35.8)	(35.8)
(44.5)	(44.5)

GC&A
General Dynamics, Camden, AR
N00019-87-C-0139, FFP
Award: March 1986
Definitized: March 1986

	Initial Contract Price		
	Target	Ceiling	Qty
	$182.5	N/A	1391
(AF)	(26.4)	N/A	(189)
(FMS/Other)	(59.0)	N/A	(449)

	Current Contract Price		
	Target	Ceiling	Qty
	182.5	N/A	1391
(AF)	(26.4)	N/A	(189)
(FMS/Other)	(59.0)	N/A	(449)

Estimated Price at Completion	
Contractor	Program Manager
$182.5	$182.5
(26.4)	(26.4)
(59.0)	(59.0)

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: 93% (14 yrs/15 yrs)

(2) Percent Program Cost Appropriated: 98% ($2702.5/$2758.6)

b. Appropriaion Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs	Budget Year	Balance to Complete FYDP	Balance to Complete Beyond FYDP	Total
RDT&E	61.2	-	-	-	61.2
Procurement	2641.3	56.1	-	-	2697.4
Total	2702.5	56.1	-	-	2758.6

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

c. Annual Summary — (Total USN/USAF)

Fiscal Year	Qty	FY78 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
			Appropriation: RDT&E					
1975	-	-	-	2.4	-	-	2.4	10.9
1976	-	-	-	7.8	-	-	7.8	6.6
197T	-	-	-	.8	-	-	.8	2.9
1977	38	-	-	12.8	-	-	12.8	2.6
1978	-	-	-	-	-	-	-	-
1979	6	-	-	11.1	-	-	12.8	8.4
1980	-	-	-	12.0	-	-	15.2	10.5
1981	-	-	-	2.2	-	-	3.1	-
1982	-	-	-	3.7	-	-	5.4	7.6
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	.5	-	-	.9	2.8
SUB TOTAL	44	-	-	53.3	-	-	61.2	-
			Appropriation: WPN/MPF					
1980	390	7.8	72.4	82.1	-	-	118.1	11.8
1981	1490	10.2	177.4	201.3	-	-	323.2	11.6
1982	1516	12.8	171.7	200.2	-	-	349.0	14.3
1983	1970	-	170.7	185.5	-	-	341.8	9.0
1984	1700	-	145.9	163.2	-	-	313.1	8.0
1985	2131	-	163.7	172.0	-	-	340.7	3.4
1986	2445	-	177.1	195.7	-	-	400.5	2.8
1987	2120	-	132.6	137.5	-	-	291.4	2.7
1988	1158	-	73.1	74.4	-	-	163.5	3.7
1989	354	-	24.2	24.7	-	-	56.1	3.8
SUB TOT	15274	30.8	1308.8	1436.6	-	-	2697.4	
TOTAL	15318	30.8	1308.8	1489.9	-	-	2758.6	-

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

c. Annual Summary — (USN)

Fiscal Year	Qty	FY78 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
			Appropriation: RDT&E					
1975	-	-	-	2.4	-	-	2.4	10.9
1976	-	-	-	7.8	-	-	7.8	6.6
197T	-	-	-	.8	-	-	.8	2.9
1977	38	-	-	12.8	-	-	12.8	2.6
1978	-	-	-	-	-	-	-	-
1979	6	-	-	11.1	-	-	12.8	8.4
1980	-	-	-	10.9	-	-	13.8	10.5
1981	-	-	-	-	-	-	-	-
1982	-	-	-	3.7	-	-	5.4	7.6
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	.5	-	-	.9	2.8
SUB TOTAL	44	-	-	50.0	-	-	56.7	-
			Appropriation: WPN					
1980	60	2.8	19.4	23.8	-	-	34.3	11.8
1981	625	1.2	81.6	87.8	-	-	141.0	11.6
1982	559	7.7	62.2	73.1	-	-	127.5	14.3
1983	670	-	61.5	69.1	-	-	127.3	9.0
1984	695	-	60.8	75.2	-	-	144.2	8.0
1985	1671	-	131.4	139.7	-	-	276.8	3.4
1986	1948	-	141.8	160.1	-	-	327.6	2.8
1987	1716	-	106.9	111.1	-	-	235.5	2.7
1988	600	-	36.0	36.0	-	-	79.0	3.7
SUB TOT	8544	11.7	701.6	775.9	-	-	1493.2	-
TOTAL	8588	11.7	701.6	825.9	-	-	1549.9	-

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

c. Annual Summary — (USAF)

Fiscal Year	Qty	FY78 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
			Appropriation: RDT&E					
1980	-	-	-	1.1	-	-	1.4	9.4
1981	-	-	-	2.2	-	-	3.1	11.9
Subtotal	-	-	-	3.3	-	-	4.5	-
			Appropriation: Procurement					
1980	330	5.0	53.0	58.3	-	-	83.8	11.8
1981	865	9.0	95.8	113.5	-	-	182.2	11.6
1982	957	5.1	109.5	127.1	-	-	221.5	14.3
1983	1300	-	109.2	116.4	-	-	214.5	9.0
1984	1005	-	85.1	88.0	-	-	168.9	8.0
1985	460	-	32.3	32.3	-	-	63.9	3.4
1986	497	-	35.3	35.6	-	-	72.9	2.8
1987	404	-	25.7	26.4	-	-	55.9	2.7
1988	558	-	37.1	38.4	-	-	84.5	3.7
1989	354	-	24.2	24.7	-	-	56.1	3.8
Subtot	6730	19.1	607.2	660.7	-	-	1204.2	-
Total	6730	19.1	607.2	664.0	-	-	1208.7	-

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

d. Obligation and Expenditures --(USN)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation: RDT&E		
1975	2.4	2.4	2.4
1976	7.8	7.8	7.8
1971	.8	.8	.8
197T	12.8	12.8	12.8
1978	-	-	-
1979	12.8	12.8	12.8
1980	13.8	13.8	13.8
1981	-	-	-
1982	5.4	5.4	5.4
1983	-	-	-
1984	-	-	-
1985	-	-	-
1986	.9	.9	.9
TOTAL	56.7	56.7	56.7
	Appropriation: WPN		
1980	34.3	34.3	34.3
1981	141.0	141.0	141.0
1982	127.5	127.5	127.5
1983	127.3	127.3	127.3
1984	144.2	144.2	132.0
1985	276.8	276.8	242.3
1986	327.6	327.9	240.3
1987	235.5	226.4	47.5
1988	79.0	0.0	0.0
TOTAL	1493.2	1405.4	1092.2

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

d. Obligation and Expenditures —(USAF)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation: RDT&E		
1980	1.4	1.4	1.4
1981	3.1	3.1	3.1
Total	4.5	4.5	4.5
	Appropriation: Procurement		
1980	83.8	83.8	83.8
1981	182.2	182.2	182.2
1982	221.5	221.5	221.5
1983	214.5	214.5	214.5
1984	168.9	168.9	168.9
1985	63.9	63.9	60.8
1986	72.9	72.9	50.1
1987	55.9	51.5	12.0
1988	84.5	0.0	0.0
1989	56.1	0.0	0.0
TOTAL	1204.2	1059.2	993.8

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
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	4560
1988	-	875	1158	4560
1989	-	N/A	354	4560
1990	-	N/A	0	4560
1991	-	N/A	0	4560

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
Prog Acq Cost (BY $)	1389.3	+100.6	1489.9	+ 788.4	701.5
(TY $)	2511.4	+247.2	2758.6	+1309.1	1449.5
PAUC (BY $)	.071	+ .026	.097	+ .051	.046
(TY $)	.128	+ .052	.180	+ .085	.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	-	12/81
Duration (in months)	99	12	111	-	111
End Date	3/90	12	3/91	-	3/91

d. Delivers (Plan/Actual) --

	To Date
RDT&E	44/44
Procurement	10733/10733

18. (U) Operating and Support Costs: N/A

SAR-87-057

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~~(CONFIDENTIAL)~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: SSN 688 NUCLEAR ATTACK SUBMARINE

N-35 SSN-688

AS OF DATE: December 31, 1987

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AS AMENDED

APR 11 1988

1. Designation and Nomenclature: SSN 688 Class Nuclear Attack Submarine (Los Angeles Class)

2. DoD Component: Department of Navy

3. Responsible Office and Telephone Number: NAVSEASYSCOM RADM (SEL) J.R. Lang PMS 393 Program Office Assigned: March 1988; AV 222-3407; COMM (202) 692-3405

4. Program Elements/Procurement Line Items:

RDT&E: PE 0603564N, 0604567N, 0603371N, 0604367N, 0604524N, 0604524, 0604561,0603569; PROCUREMENT: 24281N, 24284N, 11228N

5. Related Programs: HARPOON, TOMAHAWK, SSBN (TRIDENT), BSY-1 Advanced Combat System, SSN 21

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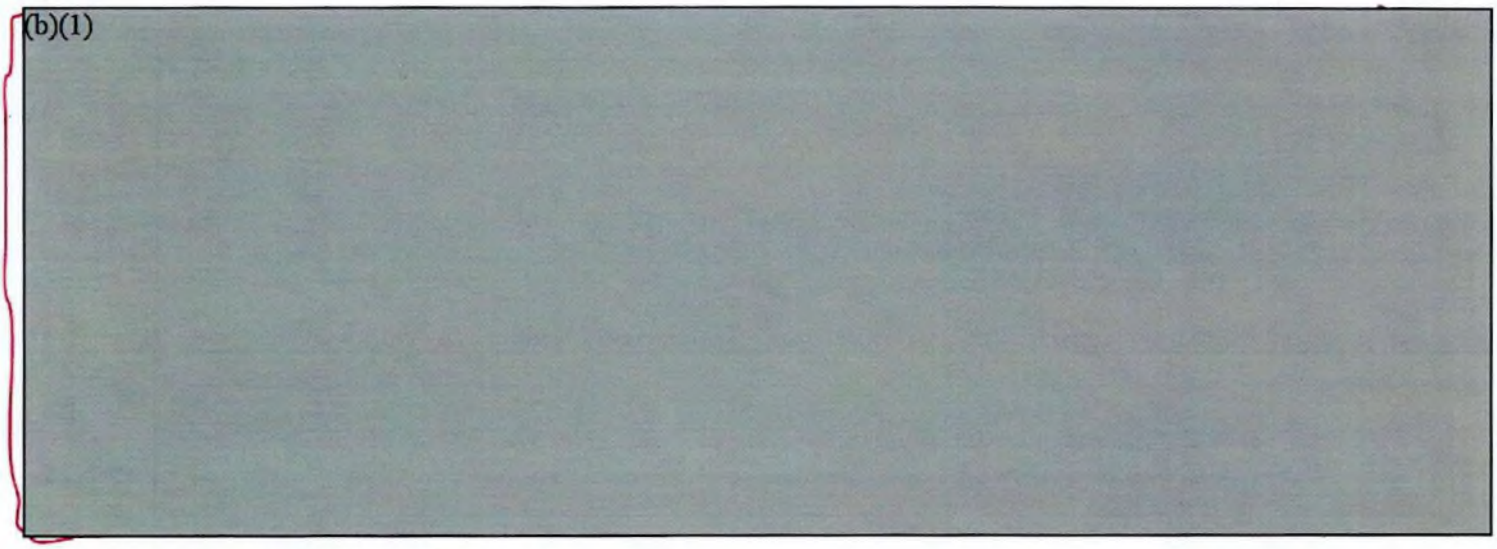

[U]7. Program Highlights:

a. Significant Historical Developments--The SSN 688 Class submarine construction program consists of 56 awarded ships from FY 70 to the present: 31 awarded to General Dynamics Corporation, Electric Boat Division, and 25 to Newport News Shipbuilding. Prior to the period covered by this SAR, 35 ships had been delivered to the Navy--21 by Electric Boat and 14 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 1987: the USS HELENA (SSN 725) on 23 June 1987; and Newport News Shipbuilding delivered one SSN 688 Class submarine to the Navy in 1987: the USS Key West on 4 September 1987. The total number of ships delivered since program inception is 37. In addition, two SSN 688's were launched in 1987: PASADENA (SSN 752) on 12 Sept 1987 at Electric Boat, and ALBANY (SSN 753) on 13 June 1987 at Newport News. Three more ships were authorized for new construction for fiscal year 1988 but have yet to be awarded. The current total of authorized ships for the program is 59, of which 56 have been awarded.

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

[U]8 Decision Coordinating Paper (DCP) 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 87 submarine.

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9. **Schedule:**

a. Milestones--

	Development Estimate/ Approved Program	Actual
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 Delivery	MAY 96/MAY 96	

b. Previous Change Explanations

Early ships experienced schedule delays due primarily 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.

c. Changes Since Previous Report: None

d. References

Development Estimate: Ship Construction Awards dated 8 January 1987.
Approved Program: DAE Baseline, 17 Feb 1988.

10. Technical/Operational Characteristics.

A. Technical-	Dev Estimate Appr Program	Demonstrated Performance	Current Estimate
Submarine			
(a) Length	360 ft.	360 ft.	360 ft.
(b) Beam Max.	33 ft.	33 ft.	33 ft.
(c) Draft Dev.	32 ft.	32 ft.	32 ft.
(d) Displacement	6900 tons	6900 tons	6900 tons

(UNCLASSIFIED)

(CONFIDENTIAL) SSN 688, December 31, 1987

10. [U] Technical/Operational Characteristics:

	Dev Estimate Appr Program	Demonstrated Performance	Current Estimate
[U] A. Technical-			
(b)(1)			
[U] (g) Crew	133	133	133
[U] AN/BQQ-5B			
(a) Maintainability (MTTR)	40	177	177
(b) Hardware Reliability			
Passive	1,400	599 [CH-1]	599
Active	480	N/A [CH-2]	N/A
(b)(1)			
[U] Fuel	Nuclear	Nuclear	Nuclear
(b)(1)			
[U] (c) Armament	4 torpedo tubes 12 external VLS tubes	4 torpedo tubes 12 external VLS tubes	4 torpedo tubes 12 external VLS tubes

[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
E. References: DAE Baseline, 17 Feb 1988.

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

	Development Estimate	Changes	Current Estimate
a. Cost	(FY70-76)		(FY70-97)
Development (RDT&E)	$0.0	+24.5	$24.
Procurement (SCN)	5,126.8	+7,346.1	12,472.
Basic Ship Cost	2,484.6	(+4,803.2)	(7,287.
GFE	2,248.0	(+2,437.0)	(4,685.
Other	234.2	(-101.1)	(133.
OF/PD	160.0	(+207.0)	(367.
Construction (MILCON)	0.0	+20.4	20.
Total: FY 71 Base Year $	$5,126.8	$+7,391.0	$12,517.

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

	Development Estimate	Changes	Current Estimate
Escalation	620.7	+16,957.1	17,577.8
Development (RDT&E)	0	(+23.3)	(23.3)
Procurement(SCN)	620.7	(+16,925.9)	(17,536.6)
Construction (MILCON)	0	(+17.9)	(17.9)
Total Then-Year $	$5,747.5	$+24,348.1	$30,095.6
b. Quantities			
Development (RDT&E)	-	-	-
Procurement (SCN)	32	+34	66
Total	32	+34	66
c. Unit Cost			
Procurement:			
FY 71 Base-Year $	160.2	+28.8	189.0
Then-Year $	179.6	+275.1	454.7
Program			
FY 71 Base-Year $	160.2	+29.5	189.7
Then-Year $	179.6	+276.4	456.0

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- SSN 688 draws upon general reactor plant research and development work performed by the Department of Energy, but this contribution cannot be quantified.

12. Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	SAR Current Estimate (DEC 87 SAR)	UCR Baseline Estimate (DEC 86 SAR)	UCR Baseline Estimate (DEC 87 SAR)
a. Program Acquisition -			
(1) Cost	30,095.6	30,094.1	30,095.6
(2) Quantity	66	66	66
(3) Unit Cost	456.0	456.0	456.0
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	1,717.2	1,717.2	1,571.1
Less CY Adv Proc	(227.5)	(227.5)	(304.3)
Plus PY Adv Proc	354.7	354.7	327.8
Less OF/PD	(40.3)	(40.3)	(77.5)
Net Total	1,804.1	1,804.1	1,517.1
(2) Quantity	3	3	2
(3) Unit Cost	601.367	601.367	758.550

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate		5747.5		5747.5
Previous Changes:				
Economic	5.9	-4387.2	-5.0	-4386.3
Quantity		25089.5		25089.5
Schedule		87.3		87.3
Engineering	40.0	2005.3		2045.3
Estimating	3.1	-137.0	0.1	-133.8
Other		412.8		412.8
Support		1188.6	43.2	1231.8
Subtotal	49.0	24259.3	38.3	24346.6
Current Changes:				
Economic	0.3	-8.4		-8.1
Estimating	-1.5	17.9		16.4
Support		-6.8		-6.8
Subtotal	-1.2	2.7	0.0	1.5
Total Changes	47.8	24262.0	38.3	24348.1
Current Estimate	47.8	30009.5	38.3	30095.6

13. Cost Variance Analysis (Cont'd):

(FY 1971 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate		5126.8		5126.8
Previous Changes:				
Quantity		6412.0		6412.0
Schedule		14.6		14.6
Engineering	23.2	536.4		559.6
Estimating	1.9	-150.4		-148.5
Other		298.5		298.5
Support		212.5	20.4	232.9
Subtotal	25.1	7323.6	20.4	7369.1

13. Cost Variance Analysis (Cont'd):

(FY 1971 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Current Changes:				
Estimating	-0.6	25.0		24.4
Support		-2.5		-2.5
Subtotal	-0.6	22.5	0.0	21.9
Total Changes	24.5	7346.1	20.4	7391
Current Estimate	24.5	12472.9	20.4	12517.8

b. Previous Change Explanations --

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 29 SSNs at the established baseline value
Schedule: postponing the construction of 3 SSNs
Engineering: Changes to the proplusion 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

13 Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 88 economic escalation rates (Economic)		+.3
Revised program requirements (Estimating)	-.6	-1.5
(2) Procurement		
Revised Dec 88 economic escalation rates (Economic)		-8.4
Refinement of ship cost estimates. (Estimating)	+25.0	+17.9
Refinement of Outfitting/Post Delivery Estimates (Support)	-2.5	-6.8

d. References --

Development Estimate: DCP #104 dated September 1970, revised and reapproved 13 April 1978. USDR&E letter 13 March 1979 cancelled DCP #104 and returned surveillance to the Navy. DCP #27, dated 19 March 1970.

Approved Program: FY 1988/89 Amended Biennial Budget
DAE Baseline, dated 15 September 1987

14. Program Acquisition Unit Cost (PAUC) History: (Million of then-year $)

Initial SAR Estimate to Current Baseline Estimate

PAUC (Init Est)	Changes								PAUC (Baseline Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
165.8	+18.3	-5.2					+ .6	+ 13.8	179.6

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
179.6	-66.6	+287.6	+1.3	+31.0	-1.8	+6.3	+18.6	+276.4	456.0

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

a. RDT&E -- N/A

b. Procurement -- SCN

Construction of SSNs 753,756,758,759

	Initial Contract Price		
	Target	Ceiling	Qty
Newport News Shipbuilding and Dr[redacted]ock Company Newport News, VA 23607 N00024-84-C-2064, FPIF	278.0	317.4	1

Award: 29 Nov 1983

Definitized: (Award of Options) 26 Nov 1984

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
1073.3	1208.4	4	1203.0	1208.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-30.0	-39.5
Cumulative Variances to Date (11/22/87)	-106.2	-68.7
Net Change	-76.2	-29.2

Explanation of Change: The cost and schedule variances are indicative of an ongoing decline in shipbuilder productivity, as well as an indication of an overly-optimistic budget due to the effects of aggressive competition in submarine new construction. The Program Manager's assessment of total program cost is currently under review.

~~(BUSINESS SENSITIVE)~~

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

Construction of SSNs 721-723, 750

Newport News Shipbuilding and Drydock Company
Newport News, VA 23607
N00024-81-C-2075, FPIF
Award: 13 Aug 1981
Definitized: (Award of Option) 19 Apr 1982

Initial Contract Price		
Target	Ceiling	Qty
675.0	746.6	3

Current Contract Price		
Target	Ceiling	Qty
981.2	1084.0	4

Estimated Price At Completion	
Contractor	Program Manager
1030.5	1049.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (10/25/87)	(C/SCSC not invoked on this contract)	
Net Change		

Explanation of Change: N/A

Construction of SSNs 764-767

Newport News Shipbuilding and Dry[illegible]k Comp.
New[illegible]t News, VA 23607
N00024-87-C-2007
Award: 6 Feb 1987
Definitized: 6 Feb 1987

Initial Contract Price		
Target	Ceiling	Qty
1018.1	1209.3	4

Current Contract Price		
Target	Ceiling	Qty
1018.1	1209.3	4

Estimated Price At Completion	
Contractor	Program Manager
1035.5	1156.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (9/27/87)	-9.5	-42.0
Net Change	N/A	N/A

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. The Program Manager's assessment on total program costs is currently under review.

Construction of SSNs 751-752

Ele[illegible]ic Boat Division
Gro[illegible], CT 06340
N00024-C-83-2039, FPIF

Initial Contract Price		
Target	Ceiling	Qty
560.2	631.7	2

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

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
1037.1	1176.1	4	1171.5	1173.1
			Cost Variance	Schedule Variance
Previous Cumulative Variances			-4.2	-7.3
Cumulative Variances to Date (9/27/87)			-27.1	-29.9
Net Change			-22.9	-22.6

Explanation of Change: The schedule variance is due to E. B.'s difficulty in hiring adequate production personnel due to low unemployment rates in their area. The cost variance is largely due to an optimisitc 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.

c. MILCON - N/A

16. 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: 81.2% ($24,427.5/$30,095.6)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs	Budget Year	Balance to Complete FYDP	Beyond FYDP	Total
	(FY69-88)	(FY89)	(FY90-92)	(FY93-97)	
RDT&E	47.8	-	-	-	47.8
Procurement (SCN)	24,343.1	1571.1	3879.9	215.4	30009.5
MILCON	36.6	-	1.7	-	38.3
TOTAL	24427.5	1571.1	3881.6	215.4	30095.6

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: 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	10.6
1981	0			2.2	0	0	4.7	10.6
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		24.0	24.0		26.5	26.5	
1970	3		534.6	534.6	-26.5	111.3	601.1	5.6
1971	4		499.5	499.5	-69.6	67.5	617.0	5.1
1972	5		665.6	665.6	-109.3	135.9	909.1	4.4
1973	6		615.5	617.3	-135.9	125.4	1042.2	5.3
1974	5		454.1	456.0	-125.4	130.0	932.2	9.0
1975	3		243.2	246.0	-78.0	0.0	532.4	14.1
1976	2		295.4	299.7	-52.0	102.0	579.9	11.5
197T	0		88.5	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		827.2	832.5	-179.9	212.9	1413.4	6.2
1978	1		211.9	218.7	-91.6	0.0	452.5	8.2
1979	1		522.0	532.9	-85.7	27.1	759.3	9.6
1980	2		389.2	406.5	-138.6	76.2	998.4	9.9
1981	2		423.7	441.6	-111.2	188.8	1147.1	9.6
1982	2		669.6	687.4	-150.4	397.9	1512.8	7.5
1983	2		644.6	662.2	-169.4	406.0	1631.4	3.8
1984	3		669.1	685.1	-278.6	389.7	1966.1	3.6
1985	4		879.2	898.4	-408.7	547.2	2649.4	2.1
1986	4		758.9	770.2	-530.5	462.6	2341.0	2.8
1987	4		709.6	740.1	-500.4	284.8	2325.2	2.7
1988	3		516.9	529.3	-354.7	227.5	1717.1	3.7
1989	2		446.9	470.1	-327.8	304.3	1571.1	3.8
1990	2		438.1	475.5	-312.5	237.4	1632.2	3.6
1991	2		373.3	399.6	-292.9	61.4	1405.5	3.3
1992	1		205.3	234.0	-181.7	0.0	842.2	2.8
1993	0		0.0	29.0	0.0	0.0	106.6	2.3
1994	0		0.0	16.0	0.0	0.0	60.4	2.3
1995	0		0.0	9.4	0.0	0.0	36.4	2.3
1996	0		0.0	3.0	0.0	0.0	11.6	2.3
1997	0		0.0	0.1	0.0	0.0	0.4	2.3
Subtotal	66	0	12105.9	12472.9	-4711.3	4711.3	30009.5	
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	3.7
1989	0			0.5	0.0	0.0	1.7	3.8
Subtotal	0	0.0	0.0	20.4	0.0	0.0	38.3	
Total	66	0.0	12105.9	12517.8	-4711.3	4711.3	30095.6	

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	1042.2	1042.8	1022.5
1974	932.2	931.3	920.0
1975	532.4	532.4	527.4
1976	579.9	573.3	567.6
197T	189.0	188.9	188.6
1977	1413.4	1405.1	1381.2
1978	452.5	450.3	445.8
1979	759.3	753.5	742.7
1980	998.4	967.0	918.0
1981	1147.1	1132.1	1098.0
1982	1512.8	1461.6	1395.2
1983	1631.4	1548.3	1422.3
1984	1966.1	1860.1	1347.4
1985	2649.4	2524.4	1439.9
1986	2341.0	2177.0	695.6
1987	2325.2	2046.7	295.2
1988	1717.1	192.7	7.1
To Complete	5666.4	0.0	0.0
Total	30009.5	21941.3	16563.8

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/ 0	0
To Complete	1.7	N/A	N/A
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	37/37

18. Operating and Support Costs: N/A

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

PROGRAM: STINGER Weapon System FIM 92A/92B

A-24 STINGER

As of Date: December 31, 1987

87-018

INDEX

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Concur in classification as marked
MAR 28 1988 23
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD—PA) DEPARTMENT OF DEFENSE

1. (U) Designation and Nomenclature (popular name): FIM 92A/92B 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
Redstone Arsenal, AL 35898-5000

COL ROBERT DROLET
Assigned: 6 Jan 86
AUTOVON: 746-6191
Commercial: 202-876-6191

Concur in Classification as marked
28 MAR 1988
SECURITY REVIEW, ODCSINT, HQDA

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

RDT&E: PE 64306 Project D646 (Shared Funding).
Procurement: APPN 2032 SSN C18500

5. (U) Related Programs: None

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 utilizes a passive infrared homing guidance system which operates independently after aiming and launching by the operator. The system is comprised of the weapon (missile in launcher and reusable gripstock), an identification friend or foe (IFF) unit, trainers, and ancillary equipment. The STINGER replaces the REDEYE Weapon System in order to counter the threat of the 1980's and 1990's. It provides the active army and reserve components with a light air defense missile for defense of priority assets within the division.

~~CLASSIFIED BY: MULTIPLE SOURCES~~
~~DECLASSIFY ON: OADR~~

~~CONFIDENTIAL~~

OASD(PA) DFOISR 88-F-0801

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- The STINGER POST initial hardware was available in February 1987, with the quantity of 22,042 out of the 52,390 filled. The Army authorization objective for STINGER - Post is being reviewed due to the Pedestal Mounted STINGER and Air-to-Air-STINGER (ATAS) requirements. RMP STINGER R&D was completed in December 1987.

b. (U) Significant Developments Since Last Report -- Program funding and quantities reflect the FY 88-89 President's Budget except as adjusted for FY 88 Congressional Direction and FY 89 Amended Budget Decisions. The FY 88 authorized quantity cannot be procured within the FY 88 appropriated amount. The actual FY 88 negotiated quantity to be procured is 3942 missiles. Signed annual stand alone letter contract for 1987 hardware with plans to definitize as a multiyear contract; however, due to Congressional language differences, definitization has slipped to FY 88. The second year of the second source contract will be effected during the third year of the multi-year contract.A separate SAR for Pedestal Mounted Stinger (PMS) was established in FY 87. STINGER is expected to meet system requirements.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: None

9. (U) Schedule:

a. (U) Milestones--				Development Estimate/ Approved Program	Current Estimate
(1)	(U)	BASIC STINGER			
	(A)	(U)	Milestone (DSARC II)	May 72/May 72	May 72
	(B)	(U)	Development Contr Awarded	Jun 72/Jun 72	Jun 72
	(C)	(U)	Milestone III (ASARC/DSARC III)	Aug 75/Oct/Nov 77	Oct/Nov 77
	(D)	(U)	Milestone IIIa (ASARC/DSARC IIIa)	Aug 77/N/A	N/A
	(E)	(U)	Initial IOC Operational Capability (IOC)	Sep 77/Feb 81	Feb 81
(2)	(U)	STINGER-POST			
	(A)	(U)	Special ASARC (Development)	Apr 77/Apr 77	Apr 77
	(B)	(U)	Development	Jun 77/Jun 77	Jun 77
	(C)	(U)	Completion of Design Evaluation Testing	Apr 79/Jun 81	Jun 81
	(D)	(U)	Completion of Guided Test Vehicles	Apr 80/May 82	May 82
	(E)	(U)	Completion of PQT /OT	Jan 81/Oct 82	Oct 82

9. (U) Schedule: (Continued)

a. (U) Milestones--(Continued)			Development Estimate/ Approved Program	Current Estimate
(F)	(U)	Completion of R&D Program	Feb 81/Nov 82	Nov 82
(G)	(U)	Special ASARC (Post Production)	Mar 81/Jan 83	Jan 83
(H)	(U)	First Unit Equipped	Sep 82/Sep 87	Sep 87
(3)	(U)	STINGER-RMP		
(A)	(U)	Special ASARC (Development)	Jun 83/Jun 83	Jun 83
(B)	(U)	Development Contract Award	Sep 84/Sep 84	Sep 84
(C)	(U)	Completion of Design Evaluation Testing	Jul 86/Sep 86	Sep 86
(D)	(U)	Production Baseline Established	Nov 86/Sep 86	Sep 86
(E)	(U)	Completion of Guided Test Vehicles/Testing	Jul 87/Jul 87	Jul 87
(F)	(U)	Completion of R&D Program	Dec 87/Dec 87	Dec 87 (CH-1)
(G)	(U)	First Unit Equipped (FUE)	Nov 87/Apr 88 (CH-2)	Jun 88 (CH-2)

b. (U) Previous Change Explanation --None.

c. (U) Current Change Explanation -- (CH-1) Development estimated date of Dec 87 was met for completion of R&D Program. (CH-2) Revised FUE based on availability of equipment and trained personnel.

d. (U) References --

Development Estimate: DCP 114, dated Jul 72, for Basic/Revised DCP 114 dated 5 Jun 73 for STINGER-POST. ASARC III, Jun 83, for STINGER-RMP.

Approved Program: Amended FY 88-89 President's Budget
Secretary of the Army Memo, Jul 83, Subj: System Acquisition Decision
Memo - STINGER-POST/RMP ASARC III Executive Council Session, 6 Jun 83.

10. (U) Technical/Operational Characteristics:

a. (U) Technical (Basic/POST/RMP)--

	Dev. Estimate/ Approved Program	Demonstrated Performance	Current Estimate
Ready-to Fire Weapon Weight Including Onboard IFF Antenna lbs	32/35/35.5/36	35	35/35.5/36

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

			Dev. Estimate/ Approved Program	Demonstrated Performance	Current Estimate
b.	(U)	Operational (Basic STINGER/POST/RMP)--			
(1)	(U)	Basic STINGER			
(b)(1)					
(g)	(U)	Weapon Reliability	.82/.92	.92	.92
(h)	(U)	IFF Maximum Instantaneous Search Sector (Degrees)	±6/+5	±5	±5

(2) (U) STINGER (POST/RMP)

(b)(1)

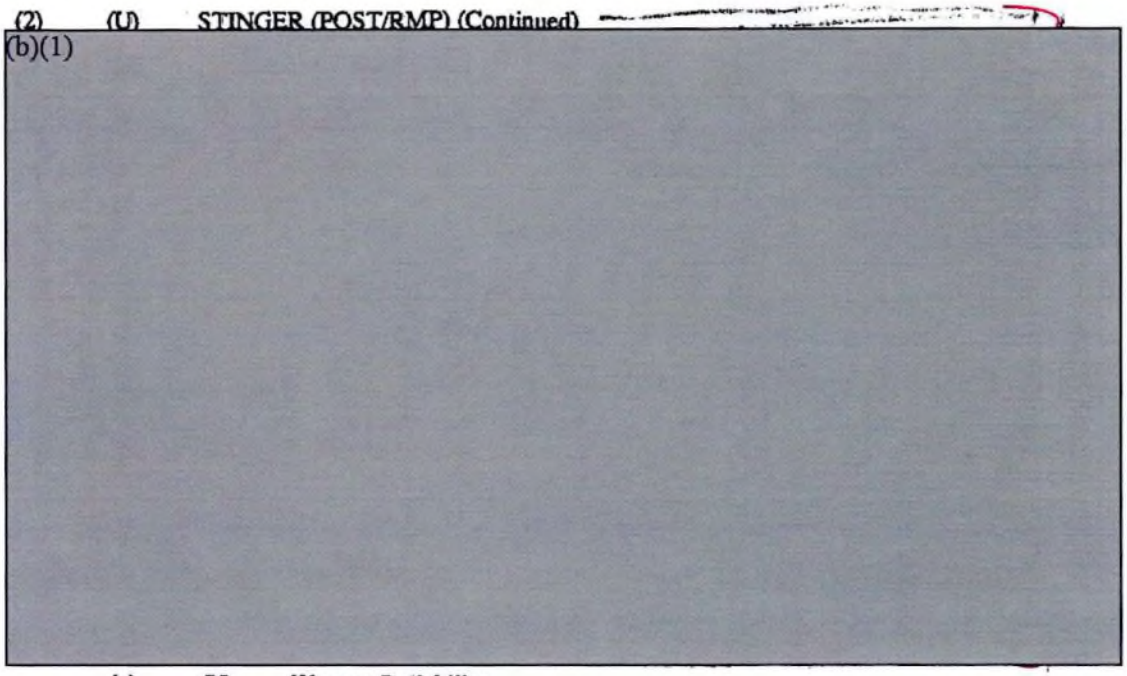
10. (U) Technical/Operational Characteristics: (Continued)

	Dev. Estimate/ Approved Program	Demonstrated Performance	Current Estimate

b. (U) Operational (Basic STINGER/POST/RMP)-- (Continued)

(2) (U) STINGER (POST/RMP) (Continued)

(b)(1)



(g)	(U)	Weapon Reliability		
		Post	.82/.89	.87	.87
		RMP	.82/.89	.82 (CH-1)	.82 (CH-1)

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

d. (U) Current Change Explanations -- (CH-1) RMP is unofficial demonstrated score. RAM Scoring Conference is scheduled for Mar 88 with AMC/MICOM OTEA, TRADOC, and AMSAA participation.

e. (U) References--

Development Estimate: DCP 114, dated Jul 72 for Basic STINGER
Revised DCP 114 dated 5 Jun 78 for STINGER-POST
Approved Program: Amended FY 89 President's Budget

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

	Development Estimate	Changes	Current Estimate
a. (U) Cost --			
Developement (RDT&E)	76.6	98.8	175.4
Basic	(76.6)	(34.8)	(111.4)
POST-RMP	(0.0)	(64.0)	(64.0)
Procurement	334.3	(579.6)	913.9
Weapon (FLYAWAY)	(307.8)	(504.6)	(812.4)
IFF			
Belt Pack	(13.1)	(10.7)	(23.8)
Programmer	(1.0)	(1.8)	(2.8)
Other	(11.1)	(63.4)	(74.5)
Initial Spares	(1.3)	-(0.9)	(0.4)
Total Constant FY72$	410.9	678.4	1089.3
Escalation	62.9	2127.0	2189.9
Development (RDT&E)	(4.2)	(87.3)	(91.5)
Procurement	(58.7)	(2039.7)	(2098.4)
Total Then-Year $	473.8	2805.4	3279.2
b. (U) Quantities --			
Development (RDT&E)	222	-8	214
Weapon -Basic	(222)	-(17)	(205)
-POST		(0)	(0)
-RMP		(9)	(9)
IFF			
Belt Pack	32	0	32
Programmer	6	0	6
Procurement			
Weapon	22,980	27,660	50,640
IFF			
Belt Pack	1,248	2,459	3,707
Programmer	250	392	642
Total Weapons	23,202	27,652	50,854
c. (U) Unit Cost --			
Procurement:			
FY 72 Base-Year $	0.014	0.004	0.018
Then-Year $	0.017	0.042	0.059
Program:			
FY 72 Base-Year $	0.018	0.003	0.021
Then-Year $	0.020	0.044	0.064

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

No DTC goal was established with Secretary of Defense in DCP 114 dated 5 Jan 78.

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

e. (U) Foreign Military Sales--Sales to date total $219.51 (M), Training/Training Support Equipment, and/or services. A breakdown of approximate dollar value by country is as follows:

	COUNTRY	TOTAL $
(U)	Pakistan	9.2
(U)	France	5.9
(U)	Germany	2.7
(U)	Italy	46.1
(U)	Japan	52.4
(U)	Netherlands	34.6
(U)	Saudi Arabia	39.2
(U)	Switzerland	1.2
(U)	Turkey	19.61
(U)	United Kingdom	6.3
(b)(1)		

f. (U) Nuclear Costs -- None

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

	Current Year		Budget Year
	Current EST Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baselin Dec 87 SAR
a. (U) Program Acquisition --			
(1) (U) Cost	$3,279.2	$3,276.5	$3,279.2
(2) (U) Quantity	50,854	50,584	50,854
(3) (U) Unit Cost	$0.064	$0.065	$0.064
b. (U) Current Procurement --	(FY 88)	(FY 88 APPN)	(FY 89)
(1) (U) Cost	$171.5	$171.5	$242.5
Less CY Adv Proc	33.9	33.9	0.0
Plus PY Adv Proc	22.1	22.1	38.8
Net Total	159.6	159.6	281.2
(2) (U) Quantity*	4200	4200	6750
(3) (U) Unit Cost	$0.0380	$0.0380	$0.0417

* The Army will procure the maximum number of supportable systems with the dollars appropriated.

13. (U) Cost Variance Analysis:

a. Summary --(Current [Then-Year] $ in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	80.8	393.0	0.0	473.8
Previous Changes:				
Economic	+4.8	+415.0		+419.8
Quantity	+11.0	+272.7		+283.7
Schedule	+27.4	+813.6		+841.0
Engineering	+114.3	+87.0		+201.3
Estimating	+14.9	+967.0		+981.9
Other	+7.3			+7.3
Support	+2.7	+65.0		+67.7
Subtotal	+182.4	+2620.3	0.0	+2802.7
Current Changes:				
Economic		+17.4		+17.4
Quantity				+0.0
Schedule				+0.0
Engineering	+3.8			+3.8
Estimating	-0.1	-18.4		-18.5
Other				+0.0
Support				+0.0
Subtotal	+3.7	-1.0	0.0	+2.7
Total Changes	+186.1	+2619.3	0.0	+2805.4
Current Estimate	266.9	3012.3	0.0	3279.2

(FY 72 Constant Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning 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	+64.1	+18.8		+82.9
Estimating	+5.1	+300.2		+305.3
Other	+6.0			+6.0
Support	+1.9	+23.6		+25.5
Subtotal	+97.4	+585.9	0.0	+683.3
Current Changes:				
Quantity				+0.0
Schedule				
Engineering	+1.4			+1.4
Estimating		-6.3		-6.3
Other				
Support				
Subtotal	+1.4	-6.3	0.0	-4.9
Total Changes	+98.8	+579.6	0.0	+678.4
Current Estimate	175.4	913.9	0.0	1089.3

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

b. (U) Previous Change Explanations--

RDT&E

Economic:	Revised escalation indices
Quantity:	Additional 6 POST and 3 RMP Missiles.
Schedule:	Revision to the POST program resulting in stretchout.
Engineering:	Development of RMP to counter future threat; addition and deletion of PMS.
Estimating:	Transfer of PEP effort from procurement; increased test costs; revision of PMS estimate.
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. Shift of 530 missiles to outyear.
Schedule:	Reduction of missiles in early years and rescheduling procurement in subsequent years as a result of budget cuts. Schedule stretch of 6 months.
Engineering:	Additional manufacturing and assembly cost for producing RMP added to the 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.

c. (U) Current change Explanations --

(Dollars in Millions)

			Base Year	Then Year
(1)	(U)	RDT&E		
		Safeguard Interlock System (Engineering)	+1.4	+3.8
		Estimating changes due to misc. cuts, i.e. Gramm-Rudman, etc. (Estimating)		-.1
(2)	(U)	Procurement		
		Revised economic escalation. (Economic)	N/A	+17.4
		Estimating changes due to misc. cuts, i.e. Gramm-Rudman, etc. (Estimating)	-13.5	-45.3
		MYP/2nd Source Savings (Estimating)	-27.4	-96.4
		Additional 1750 missiles added for MYP/2nd Source. (Estimating)	+17.3	+63.0
		Additional missiles shifted from FY 87 to outyear (639) and replacement of missiles (270) not included in Dec 86 SAR (Estimating)	+17.3	+60.3

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

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

PAUC (Plan Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.020	+.009	-.005	+.016	+.004	+.019	+.000	+.001	+.044	.064

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

a. (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
$228.2	$258.2	3218

Estimated Price at Completion

(b)(4)

	Cost Variances	Schedule Variances
Previous Cumulative Variances	$ +.84	$ -.43
Cumulative Variances To Date (Dec 87)	$ -14.8	$ -10.10
Net Change:	$ -15.64	$ -9.67

Explanation of Change: Thresholds were established in July 1987. Cost and schedule variances as of the 31 Dec 87 CPR, are attributed to a contract modification which rescheduled the budget baseline to incorporate a two month schedule of hardware deliveries. Adjustments have been made to the BCWS and BCWP to reflect this modification.

b. (U) Production

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
$232.1	$263.3	$4643

Estimated Price at Completion

Contractor Program Manager

(b)(4)

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$ 0.0	$ 0.0
Cum Variances to date (Oct 87)	$ +.3	$ +1.0
Net Change:	$ +.3	$ +1.0

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

b. (U) Production (Continued)

Explanation of Change: Schedule Variances resulted primarily from flight motor retest after a December 1987 failure. Early receipt of flight motors in prior months was primary cause for cost variance.

	Initial Contract Price		
	Target	Ceiling	Qty
General Dynamics Corp Pomona, CA DAAH01-87-C-0607 FFP/CPAF Award: Letter 26 Aug 87 (fixed) $120.0M Apr 87 (Award Fee) $8.5M Definitized 15 Mar 88	$128.5	$128.5	

Baseline SAR Values ($ in M)		Current Values	
Cost Variance	Schedule Variance	Cost Variance	Schedule Variance
N/A	N/A	N/A	N/A

Change to Current Base: N/A

16. (U) Program Funding Summary: (Current estimated $ in Millions)

a. (U) Program Status--

(1) (U) Percent program completed: 77.3% (17 years/22 years) (Year Funds Appropriated/Total Program Years)

(2) (U) Percent program cost appropriated: 54.6% ($179.1/$3279.2) (Funds Appropriated to Date in Millions/Total Program Funding in Millions)

b. (U) Appropriation Summary --

Appropriation	Current & Prior Yrs (FY 71-88)	Year (FY 89)	FYDP (FY 90-92)	Beyond FYDP	Total
RDT&E	266.9	0.0	0.0	0.0	266.9
Procurement	1524.2	242.5	887.7	357.9	3012.3
MILCON	0.0	0.0	0.0	0.0	0.0
Total	1791.1	242.5	887.7	357.9	3279.2

16. (U) Program Funding Summary: (Current estimated $ in Millions) (Continued)

c. (U) Annual Summary -- Program funding and quantities reflect the FY 88-89 President's Budget except as adjusted for FY 88 Congressional Direction and FY 89 Amended Budget Decisions. The FY 88 authorized quantity cannot be procured within the FY 88 appropriated amount. The actual FY 88 negotiated quantity to be procured is 3942 missiles.

FISCAL YEAR	QTY	FY 72 BASE-YEAR DOLLARS FLYAWAY NONREC	FLYAWAY REC	TOTAL	THEN-YEAR DOLLARS ADVANCE PROC DEBIT	ADVANCE PROC CREDIT	TOTAL	ESCL RATE %
APPROPRIATION: RDT&E								
1971	0			4.7			4.5	4.4
1972	179			7.5			7.5	2.6
1973	0			18.1			19.8	7.4
1974	0			21.8			25.4	9.4
1975	0			24.9			32.1	11.2
1976	0			16.4			22.4	8.7
1977T	0			1.1			1.7	1.9
1977	26			18.5			26.7	8.0
1978	0			7.7			11.9	8.6
1979	0			14.3			24.6	8.5
1980	0			9.9			18.7	9.4
1981	0			2.7			5.6	11.9
1982	0			7.5			16.6	7.6
1983	0			8.7			20.0	4.9
1984	0			0.0			0.0	3.8
1985	0			2.0			5.0	3.4
1986	3			7.1			17.9	2.8
1987	6			1.4			3.5	2.7
1988	0			1.1			3.0	2.3
SUBTOTAL	214			175.4			266.9	
APPROPRIATION: PROCUREMENT								
1978	258		19.5	21.1			36.9	6.8
1979	1651		34.4	51.5			100.8	8.7
1980	1482		31.1	40.2			81.0	9.7
1981	1144		23.3	31.5			70.2	11.9
1982	2544		42.7	59.6			166.7	14.3
1983	1006		34.1	40.8			122.7	9.0
1984	1205		43.2	43.4			136.5	8.0
1985	2360		56.1	58.7			198.9	3.4
1986	2909		53.4	64.4			212.2	2.8
1987	3541		62.5	66.7		27.0	226.8	2.7
1988	4200		47.2	48.7	-22.1	33.9	171.5	3.7
1989	6750		63.5	66.7	-38.8		242.5	3.8
1990	4492		63.5	72.3			270.4	3.6
1991	5994		76.2	80.3			308.2	3.3
1992	5784		72.3	78.7			309.1	2.8
1993	5320		89.1	89.1			357.9	2.3
SUBTOTAL	50640		812.4	913.9			3012.3	
TOTAL	50854		812.4	1089.3			3279.2	

SLP 50,370 Dec 26

16. (U) Program Funding Summary: (Current estimated $ in Millions) (Continued)

d. (U) Obligations and Expenditures –

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
APPROPRIATION: RDT&E			
1971	4.5	4.5	4.5
1972	7.5	7.5	7.5
1973	19.8	19.8	19.8
1974	25.4	25.4	25.4
1975	32.1	32.1	32.1
1976	22.4	22.4	22.4
197T	1.7	1.7	1.7
1977	26.7	26.7	25.3
1978	11.9	11.9	11.7
1979	24.6	24.6	24.4
1980	18.7	18.7	18.6
1981	5.6	5.6	5.6
1982	16.6	16.6	16.4
1983	20.0	20.0	17.2
1984	0.0	0.0	0.0
1985	5.0	5.0	3.0
1986	17.9	17.9	11.9
1987	3.5	2.8	0.0
1988	3.0	0.0	0.0
To Compl	0.0	0.0	0.0
TOTAL	266.9	263.2	247.4
APPROPRIATION: PROCUREMENT			
1978	36.9	36.9	36.2
1979	100.8	100.8	100.5
1980	81.0	80.2	79.2
1981	70.2	66.3	65.3
1982	166.7	163.3	162.5
1983	122.7	122.6	117.0
1984	136.5	120.9	120.5
1985	198.9	197.1	140.5
1986	212.2	174.4	18.6
1987	226.8	130.9	1.8
1988	171.5	0.0	0.0
To Compl	1488.0	0.0	0.0
TOTAL	3012.3	1193.4	842.1

17. (U) Production Rate Data:

a. (U) Annual Production Rates --

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum* Economic
1976/Prior	772		179	179
1977	3050		26	26
1978	3850	258	258	258
1979	4800	2250	1651	1651
1980	4800	2400	1482	1482
1981	4800	2400	1144	1144
1982	1130	2450	2544	2544
1983		4450	1006	1006
1984		4000	1205	1205
1985		5750	2360	2360
1986		6495	2912	2912
1987			3547	3547
1988			4200	4200
1989			6750	6750
1990			4492	9075
1991			5994	9600
1992			5784	2915
1993			5320	

* The Maximum Economic Production Rate for a 1-8-5 contained in the FY 88 President's Budget was estimated to be 960 per month for all customers under current facilities. The Army-only portion is reflected above.

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

ITEM	PRODUCTION ESTIMATE*	VARIANCE (CE LESS PDE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ECONOMIC
Prog Acq Cost (BY $)	N/A	N/A	1,089.3	+59.3	1,030.0
(TY $)	N/A	N/A	3,279.2	+249.4	3,029.8
PAUC (BY $)	N/A	N/A	21.4	+1.2	20.2
(TY $)	N/A	N/A	64.5	+4.9	59.6

17. (U) Production Rate Data: (Continued)

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

ITEM	PRODUCTION ESTIMATE*	VARIANCE (CE LESS PDE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ECONOMIC
Start Date (mo/Yr)	N/A	N/A	Jun-72	+0	Jun-72
Duration (in months)	N/A	N/A	284	+17	267
End Date (Mo/Yr)	N/A	N/A	Feb-96	+17	Sep-94

* Not applicable due to combination of Basic/POST & RMP programs.

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

	TO DATE
RDT&E	214/214
Procurement	9500/9500

18. (U) Operating and Support Costs: Not Applicable

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SAR-87-013

(5) ~~CONFIDENTIAL~~

AN/SQQ-89 31 DECEMBER 1987

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AN/SQQ-89 SURFACE SHIP ASW COMBAT SYSTEM (U)

N-4 AN/SQQ-89

AS OF DATE: 31 DECEMBER 1987

INDEX (U)

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1. (U) **Designation/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, VA 22202

CAPT W.C. Carlson
Assigned: 05 Jul 82
COMM: (202) 692-8018
AUTOVON: 222-8018

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

Basic AN/SQQ-89

RDT&E,N: 0205620N/S0896 (MK116)
0604713N/S0234 (AN/SQR-19)
0604212N/W1707 (AN/SRQ-4): Funding was shared in prior years
0604575N/S1451 (AN/SQS-53C)

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

No Security Objection to Open Publication (AS AMENDED)
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OASD(PA) DFOISR 88-T-0902

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

Basic AN/SQQ-89 (continued)

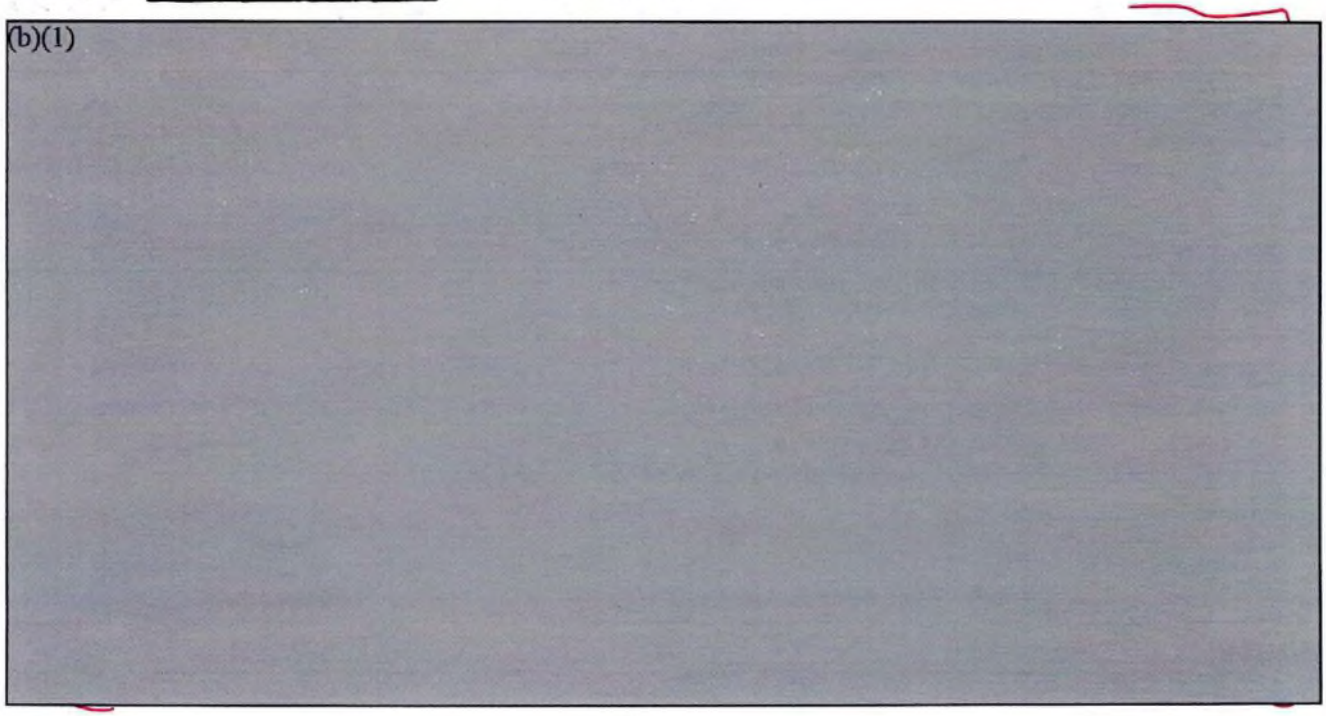
PROCUREMENT:	SCN 24292N/8219, 8224: Funding is shared.
	OPN 24223N/84VA
	OPN 24225N/82WF, 82JE, 82DB
	OPN 24228N/82WP
	OPN 24243N/43S1: Funding is shared.
O&M,N:	78017N/P4K3, RU7C: Funding is shared.
	78012N/Q7UM, RFXN: Funding is shared.

Improved AN/SQQ-89

RDT&E,N:	0604713N/S1916 (AN/SQQ-89I)
	0603553N/S1704 (AN/SQQ-89I):(FY87-89) Funding is shared
PROCUREMENT:	SCN 24292N/8219, 8224: Funding is shared.
	OPN 24225N/82DB
BLI/ICN:	OPN 2136(AN/SQQ-89), 2134(AN/SQS-53C), 2236(AN/SQR-19), 2133(AN/SQS-53B), 5452(MK 116), 4255(AN/SRQ-4)
	R&D 1915, 1916(AN/SQQ-89), 0896(MK 116) 1451(AN/SQS-53C)

5.(U) Related Programs. LAMPS MK III

(b)(1)



(b)(1)



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 have lost their separate identity. 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.

b.(U) Significant Developments Since Last Report. The AN/SQS-53C update to the Basic AN/SQQ-89 was installed in DD 978, and technical evaluation was conducted at sea from 2/87 to 5/87 and 10/87. OPEVAL began in January 1988.

Contracts for design definition of the Improved AN/SQQ-89 were awarded in 2/87 (Westinghouse) and 5/87 (General Electric); however, design definition did not begin until FY88 funds were made available.

The basic and improved AN/SQQ-89 is expected to satisfy all mission requirements.

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

8.(U) Decision Coordinating Paper (DCP) Threshold Breaches. There are no Decision Coordinating Paper (DCP) threshold breaches.

9. Schedule

a. Milestones

	Production Estimate/ Approved Program	Current Estimate
(U) Basic AN/SQQ-89:		
(U) AN/SRQ-4 Subsystem		
FSD Contract Award	Sep 77/Sep 77	Sep 77
DNSARC III	Jun 82/Jun 82	Jun 82
Approval for Prod.	Dec 82/Dec 82	Dec 82
(U) AN/SQR-19 Subsystem		
FSD Contract Award	Oct 76/Oct 76	Oct 79
DNSARC III	Nov 80/Nov 80	Mar 83
Approval for Prod.	Mar 83/Mar 83	Dec 84
(U) AN/SQQ-28 Subsystem		
FSD Contract Award	Feb 78/Feb 78	Feb 78
DNSARC IIIA (PASU)	Dec 81/Dec 81	Dec 81
DNSARC IIIB (ASU)	Aug 82/Aug 82	Aug 82
(U) AN/SQS-53B Subsystem		
FSD Contract Award	Jun 79/Jun 79	Jun 79
DNSARC III	Dec 82/Dec 82	Dec 82
Approval for Production	Jun 83/Jun 83	Jun 83
(U) AN/SQS-53C Subsystem		
FSD Contract Award	May 82/May 82	May 82
DNSARC IIIA (ALP)	Jan 86/Jan 86	Jan 86
DNSARC (NPDM) IIIB (ALP)	Sep 86/Sep 86	Sep 86
DNSARC (NPDM) IIIC (ALP)	Dec 87/Dec 87	Pending(CH-1)
Approval for Production (AFP)	Dec 87/Jul 88	Jul 88
(U) MK 116 Subsystem		
Approval for Production	Dec 82/Dec 82	Dec 82

9.(U) Schedule (continued)

a. Milestones (continued)

	Planning Estimate/ Approved Program	Current Estimate
(b)(1)		

b.(U) Previous Change Explanations

AN/SQS-53C(XN-1) TECHEVAL (Phase I) results indicated that system computer software should be modified to reflect insitu data. The modification was made and verified during TECHEVAL (Phase II) in October 1987. AN/SQS-53C DNSARC (NPDM) IIIC (Approval for Limited Production) was rescheduled for November 1987. OPEVAL and Approval for Production was delayed until July 1988.

Milestone MS II for Blocks 1 and 2 of the AN/SQQ-89 Improved Program, was scheduled to be completed by FY90. Block 3 was scheduled for Critical Design Review during this time. Block 3 Milestone MS II was scheduled to be completed in FY91.

Block I Milestone MS III (FFG) and MS III (BGE) were scheduled to occur in FY93 and for Block 2 they were scheduled to occur in FY94. Approval for Limited Production for Block 3 was scheduled to occur in FY96.

c.(U) Current Change Explanations

(CH-1). From November 1987 to pending. The AN/SQS-53C DNSARC (NPDM) IIIC meeting occurred in November 1987, but the decision memorandum is pending.

(CH-2). The Improved AN/SQQ-89 program was restructured to: (1) address the restrictive language in the Joint Conference Report on the FY87 Appropriation Bill; (2) account for deferment of all FY87 funds; (3) conform to the FY88/89 Presidential Budget.

9.(U) Schedule (continued)

d.(U) References: Approved Program - DAE Baseline, 17 Feb 1988.

Production Estimate

(1) DCP-92 dated August 16, 1976 (AN/SQR-19)
(2) DCP-85 dated March 5, 1979 (AN/SQR-4 and AN/SQQ-28)
(3) OR 062-03-86 dated 24 December 1985 (AN/SQQ-89)
(4) ASN (R&S) Milestone IIIC (NPDM held 19 November 1987; Decision Memorandum not issued to date.
(5) DoD FY 1989 Amended Biennial Budget

10.(C) AN/SQQ-89A(V)1 Technical/Operational Characteristics

a.(U) Basic AN/SQQ-89

(U) AN/SQR-19

	Production Estimate/ Appr. Program	Demonstrated Performance	Current Estimate
(U) Technical: N/A			
(b)(1)	[redacted]		

10. (C) AN/SQQ-89A(V)1 Technical/Operational Characteristics (continued)

(C) AN/SQR-19 (continued)

	Production Estimate/ Appr. Program	Demonstrated Performance	Current Estimate
(b)(1)			
(U) Technical	N/A		N/A
(C) Operational			
(b)(1)			

(U) AN/SQQ-28

(U) Technical/Operational

Processing Capability/Sonobuoy LOFAR (AN/SSQ-41) DIFAR DIRECTIONAL (AN/SSQ-53) DIFAR OMNI (AN/SSQ-53) DIFAR NULL STEER (AN/SSQ-53) VLAD DIRECTIONAL (AN/SSQ-77) VLAD OMNI (AN/SSQ-77) DEMON (AN/SSQ-41, AN/SSQ-53, or AN/SSQ-77) BT (AN/SSQ-36) ANM (AN/SSQ-57) RO (AN/SSQ-47) CASS (AN/SSQ-50) DICASS DIRECTIONAL (AN/SSQ-62) DICASS OMNI (AN/SSQ-62)	The AN/SQQ-28 is required to process the sonobuoys identified, and has demonstrated this capability.

10. AN/SQQ-89A(V)1 Technical/Operational Characteristics (continued)

(U) Technical	AN/SQS-53C Production Estimate/ Appr. Program	(3) Demonstrated Performance	(CH-1) Current Estimate
Space and Weight (electronics)	178 sq.ft./178 sq.ft. 16.5 tons/16.5 tons	178 sq.ft. 16.5 tons	178 sq. ft. 16.5 tons
Reliability			
Passive Subsystem (MTBF)(HW)	600 hr./600 hr.		
Active Subsystem (MTBF)(HW)	1,100 hr./1,100 hr.		
Total Subsystem (MTBF)(HW)	460 hr./460 hr.	1,290	1,290 hr.
(b)(1)			
(U) Operational			
Operational Availability	.8		.8

c. (U) Previous Change Explanations. Demonstrated Performance in AN/SQR-19 subsystem Figure of Merit and Array MTBF have been revised to accurately show performance demonstrated subsequent to TECHEVAL/OPEVAL. Current Estimate in Streaming and Recovery Time and Array MTTR have been revised to accurately show performance being achieved.

(3) (U) AN/SQS-53C TECHEVAL is complete. Demonstrated performance data has been provided.

10. (U) AN/SQQ-89A(V)1 Technical/Operational Characteristics (contd.)

d.(U) Current Change Explanations. (CH-1) AN/SQS-53C current estimate has been changed to agree with demonstrated performance.

e.(U) References: Same as Section 9.d.

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

a. Basic AN/SQQ-89

Costs	Production Estimate	Changes	Current Estimate
Development (RDT&E,N)	754.2	130.7	884.9
Procurement (OPN)	2961.0	-396.8	2564.2
Major System Equipment	1986.5	-446.9	1539.6
System Support	207.9	115.3	323.3
Flyaway Total	2194.4	-331.5	1862.9
Other Wpn Sys Cost	548.3	-76.3	472.0
Initial Spares (4)	218.3	10.9	229.2
O&M,N (Fleet Mod. Prog.)	183.8	3.6	187.4
TOTAL FY85 BASE-YEAR $	3899.0	-262.5	3636.5
Escalation			
Development (RDT&E,N)	-66.4	-39.3	-105.7
Procurement (OPN)	291.9	110.1	402.0
O&M,N (FMP)	23.1	9.4	32.5
Total Then-Year $	4147.6	-182.3	3965.3
(5)			
Quantities			
Development (RDT&E,N)	0	0	0
Procurement (OPN)	120	0	120
TOTAL	120	0	120
Unit Cost			
Procurement (OPN):			
FY 85 Base-Year $	24.7	-3.3	21.4
Then-Year $	27.1	-2.4	24.7
Program:			
FY 85 Base-Year $	32.5	-2.2	30.3
Then-Year $	34.6	-1.5	33.0

Approved Design to Cost Goal: Not available.

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 and 8 Towed Array Groups 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.

Nuclear Costs: None.

(4)(U) Only AN/SRQ-4 and AN/SQQ-28 O&MN (FMP) cost estimates are currently addressed.

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

b. Improved AN/SQQ-89

Costs	Planning Estimate	Changes	Current Estimate
Development (RDT&E,N)	764.8	-16.0	748.8
Procurement (OPN)	TBD	0	TBD
Major System Equipment	TBD	0	TBD
System Support	TBD	0	TBD
Flyaway Total	TBD	0	TBD
Other Wpn Sys Cost	TBD	0	TBD
Initial Spares	TBD	0	TBD
O&M,N (Fleet Mod. Prog.)	TBD	0	TBD
TOTAL FY85 BASE-YEAR $	764.8	-16.0	748.8
Escalation			
Development (RDT&E,N)	187.9	21.4	209.3
Procurement (OPN)	0	0	0
O&M,N (FMP)	0	0	0
Total Then-Year $	952.7	5.4	958.1
Quantities (6)			
Development (RDT&E,N)	0	0	0
Procurement (OPN)	TBD	0	TBD
TOTAL	TBD	0	TBD
Unit Cost			
Procurement (OPN):			
FY 85 Base-Year $	TBD	0	TBD
Then-Year $	TBD	0	TBD
Program:			
FY 85 Base-Year $	TBD	0	TBD
Then-Year $	TBD	0	TBD

(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

Approved Design to Cost Goal: None.

Foreign Military Sales: None.

Nuclear Costs: None.

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

a. Basic AN/SQQ-89

	Current Year (Dec 1987 SAR) Current Estimate	Current Year (Dec 1986 SAR) UCR Baseline(6) Estimate	Budget Year (Dec 1987 SAR) UCR Baseline Estimate
Program Acquisition:			
(1) Cost	3965.3	3966.4	3965.3
(2) Quantity	120	120	120
(3) Unit Cost	33.0	33.1	33.0

Current Procurement: Not applicable due to year to year changes in the mix of hardware components being purchased under this program.

b. Improved AN/SQQ-89

Program Acquisition:			
(1) Cost	TBD	TBD	TBD
(2) Quantity	TBD	TBD	TBD
(3) Unit Cost	TBD	TBD	TBD

Current Procurement: Not available.

(5) (U) (continued) AN/SQQ-89 systems to be acquired is considered to be Basic AN/SQQ-89 and Improved AN/SQQ-89 systems.

(6) (U) Current year UCR Baseline Estimate represents December 1986 SAR.

13. (U) Cost Variance Analysis.

a. Summary. Total AN/SQQ-89 Program (7)

Current Then-Year Dollars in Millions

	RDT&E,N	OPN	O&MN	TOTAL
Production/Planning Estimate	1640.5	3252.9	206.9	5100.3
Previous Changes:				
Economic	5.9	49.0		54.9
Quantity		-421.6		-421.6
Schedule	4.5	158.3		162.8
Engineering	6.6	251.0		257.6
Estimating	85.6	-311.9		-226.3
Other				
Support		-8.6		-8.6
Subtotal	102.6	-283.8	0	-181.2
Current Changes:				
Economic	25.4	17.4	3.7	46.5
Quantity				.0
Schedule				.0
Engineering				.0
Estimating	-31.2	-20.3	9.3	-42.2
Other				
Support				
Subtotal	-5.8	-2.9	13.0	4.3
Total Changes	96.8	-286.7	13.0	-176.9
Current Estimate	1737.3	2966.2	219.9	4923.4

FY 1985 (Base-Year) Constant Dollars in Millions

	RDT&E,N	OPN	O&MN	TOTAL
Production/Planning Estimate	1519.0	2961.0	183.8	4663.8
Previous Changes:				
Quantity		-386.8		-386.8
Schedule	4.7	.9		5.6
Engineering	9.0	211.4		220.4
Estimating	129.2	-94.4		34.8
Other				
Support		-14.3		-14.3
Subtotal	142.9	-283.2	0	-140.3
Current Changes:				
Quantity				.0
Schedule				.0
Engineering				.0
Estimating	-28.2	-113.6	3.6	-138.2
Other				
Support				
Subtotal	-28.2	-113.6	3.6	-138.2
Total Changes	114.7	-396.8	3.6	-278.5
Current Estimate	1633.7	2564.2	187.4	4385.3

(7)(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)

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13. (U) Cost Variance Analysis (continued)

a. Summary. Basic AN/SQQ-89

Current Then-Year Dollars in Millions

	RDT&E,N	OPN	O&MN	TOTAL
Production Estimate	687.8	3252.9	206.9	4147.6
Previous Changes:				
Economic	5.9	49.0		54.9
Quantity		-421.6		-421.6
Schedule	4.5	158.3	.0	162.8
Engineering	6.6	251.0		257.6
Estimating	85.6	-311.9		-226.3
Other				
Support		-8.6		-8.6
Subtotal	102.6	-283.8	0	-181.2
Current Changes:				
Economic	3.0	17.4	3.7	24.1
Quantity				.0
Schedule				.0
Engineering				.0
Estimating	-14.2	-20.3	9.3	-25.2
Other				
Support				
Subtotal	-11.2	-2.9	13.0	-1.2
Total Changes	91.4	-286.7	13.0	-182.4
Current Estimate	779.2	2966.2	219.9	3965.3

FY 1985 (Base-Year) Constant Dollars in Millions

	RDT&E,N	OPN	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	129.2	-94.4		34.8
Other				
Support		-14.3		-14.3
Subtotal	142.9	-283.2	0	-140.3
Current Changes:				
Quantity				.0
Schedule		.0		.0
Engineering				.0
Estimating	-12.2	-113.6	3.6	-122.2
Other				
Support				
Subtotal	-12.2	-113.6	3.6	-122.2
Total Changes	130.7	-396.8	3.6	-262.5
Current Estimate	884.9	2564.2	187.4	3636.5

13.(U) Cost Variance Analysis (continued)

(8)

c. Previous Change Explanations

RDT&E

Economic:	Revised escalation rates.
Schedule:	Program restructured due to funding deficiencies.
Engineering:	System redesigned to use new Navy standard hardware.
Estimating:	Increased contractor support costs and hardware development costs.

Procurement

Economic:	Revised escalation rates.
Quantity:	Decreased ship market.
Schedule:	Program restructured due to funding constraints.
Engineering:	System redesigned to use new Navy standard hardware and accomodate improvement program.
Estimating:	Changed GFM and CFE costs.
Support:	Changed procurement requirements.

(7) (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

(8)(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.

d. Current Change Explanation:

	(Dollars in Millions) FY85 (Base Year)$	Then-Year $
AN/SQQ-89(V) Basic		
RDT&E		
Revised escalation rates for the AN/SQQ-89(V) Basic (Economic).		3.0
Reduction in outyear funding for the AN/SQS-53C, due to planned completion of OPEVAL (Estimating).	-9.4	-13.3
Reduction in outyear funding for for ASWCSI (Estimating).	-2.8	- .9
PROCUREMENT		
Revised escalation indices for the AN/SQQ-89(V) (Economic).		17.4
Change due to administrative error in applying Then Year dollar factors only vice outlay factors (Estimating).		120.7
Reduction in FY87 thru FY92 funding for the AN/SQQ-89(V) program (Estimating).	-113.6	-141.0
O&MN		
Revised escalation rates for the AN/SRQ-4 and the AN/SQQ-28 (Economic).		3.7
Refinement of estimates to include 2 additional program years for shipboard portion of LAMPS MKIII (AN/SRQ-4 and AN/SQQ-28) program (Estimating).	3.6	9.3

13. (U) Cost Variance Analysis (continued)

e. Summary. Improved AN/SQS-89

Current Then-Year Dollars in Millions

	RDT&E,N	OPN	O&M,N	TOTAL
Planning Estimate	952.7	TBD	0	952.7
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0	0	0	0
Current Changes:				
Economic	22.4			22.4
Quantity				
Schedule				
Engineering				
Estimating	-17.0			-17.0
Other				
Support				
Subtotal	5.4	0	0	5.4
Total Changes	5.4	0	0	5.4
Current Estimate	958.1	TBD	0	958.1

FY 1985 (Base-Year) Constant Dollars in Millions

	RDT&E,N	OPN	O&MN	TOTAL
Planning Estimate	764.8	TBD	0	764.8
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	0	0	0	.0
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-16.0			-16.0
Other				
Support				
Subtotal	-16	0	0	-16
Total Changes	-16	0	0	-16
Current Estimate	748.8	TBD	0	748.8

e. Previous Change Explanations: None

13.(U) Cost Variance Analysis (continued)

d. Previous Change Explanations: None

e. Current Change Explanations:

	(Dollars in Millions) FY85 (Base Year)$	Then-Year $
AN/SQQ-89 Improved Program		
RDT&E		
Revised escalation rates for the AN/SQQ-89I (Economic).		22.4
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 Appropriation Bill; (2) account for deferment of all FY87 funds; (3) conform to the FY88/89 Presidential Budget (Estimating).	-16.0	-17.0

13.(U) Cost Variance Analysis (continued)

f. References. FY88/89 Amended Biennial Budget
DCP-92 dated August 16, 1982 (AN/SQR-19)
ASN (RE&S) Milestone IIIB Decision
Memorandum of December 17, 1986

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 (Development Estimate) to Current Estimate

PAUC (Initial SAR Est)	Changes								PAUC (Current Est)
	Econ	Qty	Schd	Engr	Est	Other	Spt	Total	
34.6	.658	-3.6	1.357	2.147	-2.096	.0	-.072	-1.6	33.0

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 Dollar in Millions)

a. AN/SQS-53C Subsystem RDT&E
General Electric Company, Syracuse, NY

N00024-82-C-6208/CPAF
Awarded: May 28, 1982
Definitized: May 28, 1982

Initial Contract Price		
Target	Ceiling	Qty
$114.9	$131.5	3

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$153.0	183.2	2	$169.3	$183.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-20.6	$-0.9
Cumulative Variance To Date (12/87)	$-22.4	$-0.8
Net Change	$- 1.8	$+0.1

Explanation of Change: The cost variance is caused by non-availability of operable AN/UYK-44s, and by technical problems with the transducer and beamformer. PM's estimated cost at completion provides for correction of TECHEVAL/OPEVAL deficiencies. Schedule variance is not significant.

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

b. AN/SQR-19 Subsystem Procurement
Gould Inc., Glen Burnie, MD

		Initial Contract Price		
N00024-83-C-6294/FPIF		Target	Ceiling	Qty
Awarded:	June 16, 1983	$102.5	$113.2	26 Arrays
Definitized:	August 13,1984			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$177.7	$194.3	67 Arrays 39 H&SGs	$154.1	$154.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+0.7	$-0.6
Cumulative Variances To Date (12/87)	$+0.8	$-0.3
Net Change	$+0.1	$+0.3

Explanation of Change: Variances have improved due to materiels arriving ahead of schedule. This allowed the lower level assemblies to be completed early.

c. AN/SQS-53B Subsystem Procurement
Hughes Aircraft Company, Fullerton, CA
(9)

			Initial Contract Price		
N00024-83-C-6316/FPI/FFP			Target	Ceiling	Qty
Awarded:	May 3, 1983	FPI	$66.0	$73.3	23
Definitized:	May 10, 1984	FFP	9.8	9.8	

	Current Contract Price			Estimated Price at Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
FPI	$82.4	$89.7	23	$77.5	$77.5
FFP	9.8	9.8		9.8	9.8

d. AN/SQS-53B Subsystem Procurement
General Electric Company, Syracuse, NY
(9)

			Initial Contract Price		
N00024-84-C-6232/FPI/FFP			Target	Ceiling	Qty
Awarded:	May 4, 1984	FPI	$127.7	$137.9	8 Subsystems
Definitized:	Dec. 3, 1984	FFP	6.7	6.7	16 Kits 24 Switches

	Current Contract Price			Estimated Price at Completion	
	Target	Ceiling	Qty	Contractor	Program Manager
FPI	$144.5	$154.7	8 sys.	$127.2	$127.2
FFP	6.7	6.7	16 kits/ 24 swts.	6.7	6.7

(9)(U) Cost Performance Report is not a CDRL requirement in a FFP contract.

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

e. AN/SQR-19 Subsystem Procurement
General Electric Company, Syracuse, NY

	Initial Contract Price		
N00024-83-C-6292/CPAF	Target	Ceiling	Qty
Awarded: June 7, 1983	$109.5	$109.5	26
Definitized: February 1, 1984			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$149.2	$149.2	26	$133.1	$133.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-1.4	$-2.5
Cumulative Variances To Date (12/87)	$-2.6	$-2.6
Net Change	$-1.2	$ -.1

Explanation of Change: Current target price includes add-on of FY85/86 production quantities. Lot II assembly and test are the major contributors to schedule variance because of late deliveries of GFM by supplier and missed intermediate assembly milestones. Delayed specification development caused by changes in program direction also contributed to schedule variance. Although systems are being delivered to testing behind the orginial plan, customer delivery schedules are still being met well in advance of shipyard need dates.

f. AN/SQS-53C Subsystem Procurement
General Electric Company, Syracuse, NY

	Initial Contract Price		
N00024-85-C-6116/FPI	Target	Ceiling	Qty
Awarded: April 30, 1985	$44.5	$47.4	1
Definitized: June 31, 1986			

Current Contract Price			Estimated Price at Completion (10)	
Target	Ceiling	Qty	Contractor	Program Manager
$126.0	$131.3	6	$129.0	$129.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-1.9	$-3.4
Cum Variance To Date (12/87)	$-5.6	$-3.0
Net Change	$-3.7	$+0.4

Explanation of Change: The contract was renegotiated to procure 5 more systems. This modification increased the Negotiated cost to $111.7 million dollars. The cost variance is occuring in the Systems Equipment, Test & Evaluation, and ARBF cost categories. These additional costs are being expended in order to regain the Schedule.

(10) This number includes effort authorized by two contract modifications that are not yet negotiated or definitized. One Mod is for PIO Spares the other Mod includes funding for repackaged Active Receive Beamformers and long lead material for DDG 52 and DDG 53.

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

a. Basic AN/SQQ-89

1. Program Status

(1) Percent Program Completed: 70.0%
(14 yrs./20 yrs.)

(2) Percent Program Cost Appropriated: 53.1%
($2,104.2 / $3,965.3)

2. Appropriation Summary (Then-Year Dollars)

Appropriation	Prior Years (FY75-88)	Budget Year (FY89)	Balance FYDP (FY90-93)	To Complete Beyond FYDP (FY94)	Total
RDT&E,N	692.5	17.3	69.4	.0	779.2
OPN	1333.2	243.5	1179.7	209.8	2966.2
O&M,N (FMP)	78.5	23.0	99.8	18.6	219.9
TOTAL	2104.2	283.8	1348.9	228.4	3965.3

b. Improved AN/SQQ-89

1. Program Status

(1) Percent Program Completed: N/A
(1 yr./TBD)

(2) Percent Program Cost Appropriated: N/A
($20.3 / TBD)

2. Appropriation Summary (Then-Year Dollars)

Appropriation	Prior Years (FY87-88)	Budget Year (FY89)	Balance FYDP (FY90-93)	To Complete Beyond FYDP (FY94-97)	Total
RDT&E,N	20.3	42.7	526.4	368.7	958.1
OPN	.0	.0	TBD	TBD	TBD
O&M,N (FMP)	.0	.0	.0	.0	.0
TOTAL	20.3	42.7	526.4	368.7	958.1

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

c. Annual Summary. Total AN/SQQ-89 Program

Fiscal Year	Qty	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		%
Appropriation: RDT&E,N								
1975		16.6		16.6			8.7	10.9%
1976		19.1		19.1			10.6	6.6%
197T		7.1		7.1			4.1	2.9%
1977		42.3		42.3			25.1	2.6%
1978		58.9		58.9			37.6	6.8%
1979		66.1		66.1			46.6	8.4%
1980		95.3		95.3			74.3	10.6%
1981		82.5		82.5			70.2	10.6%
1982		86.9		86.9			77.8	7.6%
1983		96.1		96.1			89.9	4.9%
1984		72.4		72.4			70.3	3.8%
1985		61.4		61.4			61.4	3.4%
1986		50.8		50.8			52.3	2.8%
1987		35.8		35.8			38.6	2.7%
1988		40.7		40.7			45.4	3.7%
1989		51.8		51.8			60.0	3.8%
1990		105.9		105.9			126.8	3.6%
1991		123.6		123.6			152.5	3.3%
1992		122.7		122.7			155.3	2.8%
1993		124.4		124.4			161.1	2.3%
1994		123.1		123.1			163.1	2.3%
1995		92.4		92.4			125.2	2.3%
1996		53.1		53.1			73.6	2.3%
1997		4.8		4.8			6.8	2.3%
1998		.0		.0			.0	
1999		.0		.0			.0	
2000		.0		.0			.0	
Subtotal		1633.7	.0	1633.7	.0	.0	1737.3	

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

c. Annual Summary. Total AN/SQQ-89 Program (continued)

Fiscal Year	Qty	FY 85 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate %
Appropriation: OPN								
1979		.0	.7	1.0			.7	8.7%
1980		.0	2.7	3.0			2.3	10.6%
1981		.0	4.1	4.3			3.6	10.6%
1982		.0	36.0	42.0			37.6	7.6%
1983		4.5	80.9	132.1			123.4	4.9%
1984		10.1	171.4	280.1			269.7	3.8%
1985		7.3	159.8	245.5			245.5	3.4%
1986		4.8	141.3	215.7			234.4	2.8%
1987		10.7	137.7	210.9			237.4	2.7%
1988		8.1	112.8	153.0			178.6	3.7%
1989		15.9	143.0	202.1			243.5	3.8%
1990		24.5	150.6	227.9			281.9	3.6%
1991		36.8	116.5	219.6			278.7	3.3%
1992		46.9	156.9	315.8			409.9	2.8%
1993		.2	137.3	157.1			209.2	2.3%
1994		.2	141.1	154.1			209.8	2.3%
1995		.0	0	0			.0	
To Complete		TBD	TBD	TBD			TBD	
Subtotal	TBD	170.1	1692.8	2564.2	.0	.0	2966.2	
Appropriation: O&M,N (FMP)								
1984				1.2			1.2	3.8%
1985				15.4			15.4	3.4%
1986				16.1			16.6	2.8%
1987				30.6			33.1	2.7%
1988				10.9			12.2	3.7%
1989				19.8			23.0	3.8%
1990				15.5			18.6	3.6%
1991				19.6			24.2	3.3%
1992				13.2			16.8	2.8%
1993				31.0			40.2	2.3%
1994				14.0			18.6	2.3%
Subtotal		.0	.0	187.4	.0	.0	219.9	
Total	TBD	1803.8	1692.8	4385.3	.0	.0	4923.4	

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

d. Annual Summary. Basic AN/SQQ-89

Fiscal Year	Qty	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		%
Appropriation: RDT&E,N								
1975		16.6		16.6			8.7	10.9%
1976		19.1		19.1			10.6	6.6%
197T		7.1		7.1			4.1	2.9%
1977		42.3		42.3			25.1	2.6%
1978		58.9		58.9			37.6	6.8%
1979		66.1		66.1			46.6	8.4%
1980		95.3		95.3			74.3	10.6%
1981		82.5		82.5			70.2	10.6%
1982		86.9		86.9			77.8	7.6%
1983		96.1		96.1			89.9	4.9%
1984		72.4		72.4			70.3	3.8%
1985		61.4		61.4			61.4	3.4%
1986		50.8		50.8			52.3	2.8%
1987		35.8		35.8			38.6	2.7%
1988		22.5		22.5			25.1	3.7%
1989		14.9		14.9			17.3	3.8%
1990		16.0		16.0			19.1	3.6%
1991		20.2		20.2			24.9	3.3%
1992		20.0		20.0			25.3	2.8%
1993		.0		.0			.0	
1994		.0		.0			.0	
1995		.0		.0			.0	
1996		.0		.0			.0	
1997		.0		.0			.0	
1998		.0		.0			.0	
Subtotal		884.9	.0	884.9	.0	.0	779.2	

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

d. Annual Summary. Basic AN/SQQ-89 (continued)

Fiscal Year	Qty	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		%
Appropriation: OPN (11)								
1979		.0	.7	1.0			.7	8.7%
1980		.0	2.7	3.0			2.3	10.6%
1981		.0	4.1	4.3			3.6	10.6%
1982		.0	36.0	42.0			37.6	7.6%
1983		4.5	80.9	132.1			123.4	4.9%
1984		10.1	171.4	280.1			269.7	3.8%
1985		7.3	159.8	245.5			245.5	3.4%
1986		4.8	141.3	215.7			234.4	2.8%
1987		10.7	137.7	210.9			237.4	2.7%
1988		8.1	112.8	153.0			178.6	3.7%
1989		15.9	143.0	202.1			243.5	3.8%
1990		24.5	150.6	227.9			281.9	3.6%
1991		36.8	116.5	219.6			278.7	3.3%
1992		46.9	156.9	315.8			409.9	2.8%
1993		.2	137.3	157.1			209.2	2.3%
1994		.2	141.1	154.1			209.8	2.3%
1995		.0	.0	.0			.0	
1996		.0	.0	.0			.0	
Subtotal	120	170.1	1692.8	2564.2	.0	.0	2966.2	
Appropriation: O&M,N (FMP)								
1984				1.2			1.2	3.8%
1985				15.4			15.4	3.4%
1986				16.1			16.6	2.8%
1987				30.6			33.1	2.7%
1988				10.9			12.2	3.7%
1989				19.8			23.0	3.8%
1990				15.5			18.6	3.6%
1991				19.6			24.2	3.3%
1992				13.2			16.8	2.8%
1993				31.0			40.2	2.3%
1994				14.0			18.6	2.3%
Subtotal		.0	.0	187.4	.0	.0	219.9	
Total	120	1055.1	1692.8	3636.5	.0	.0	3965.3	

(11)(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	FY 85 Base-Year Dollars Flyaway Nonrec	FY 85 Base-Year Dollars Flyaway Rec	FY 85 Base-Year Dollars Total	Then-Year Dollars Advance Proc Debit	Then-Year Dollars Advance Proc Credit	Then-Year Dollars Total	Escl Rate %
Appropriation: RDT&E,N								
1987		.0		.0			.0	2.7%
1988		18.2		18.2			20.3	3.7%
1989		36.9		36.9			42.7	3.8%
1990		89.9		89.9			107.7	3.6%
1991		103.4		103.4			127.6	3.3%
1992		102.7		102.7			130.0	2.8%
1993		124.4		124.4			161.1	2.3%
1994		123.1		123.1			163.1	2.3%
1995		92.4		92.4			125.2	2.3%
1996		53.1		53.1			73.6	2.3%
1997		4.8		4.8			6.8	2.3%
1998		.0		.0			.0	
1999		.0		.0			.0	
2000		.0		.0			.0	
Subtotal	0	748.8	.0	748.8	.0	.0	958.1	
Appropriation: OPN								
Subtotal	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Appropriation: O&M,N								
Subtotal		.0	.0	.0	.0	.0	.0	
Total	TBD	748.8	.0	748.8	.0	958.1	958.1	

(11) (U) (continued)
receive assuming the Improved AN/SQQ-89 is introduced starting in FY93. 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 considerd to be the sum of the Basic AN/SQQ-89 and Improved AN/SQQ-89 systems.

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

f. Obligations and Expenditures. Basic AN/SQQ-89

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation: RDT&E,N		
1975	8.7	8.7	8.7
1976	10.6	10.6	10.6
197T	4.1	4.1	4.1
1977	25.1	25.1	25.1
1978	37.6	36.8	36.8
1979	46.6	46.1	46.1
1980	74.3	74.3	74.3
1981	70.2	70.2	69.9
1982	77.8	77.8	77.6
1983	89.9	89.8	84.2
1984	70.3	68.8	68.0
1985	61.4	61.2	59.8
1986	52.3	52.1	49.9
1987	38.6	38.1	28.3
1988	25.1	8.6	.6
To Complete	86.7	N/A	N/A
Subtotal	779.2	672.3	643.8
	Appropriation: OPN		
1979	.7	.7	.7
1980	2.3	2.3	2.3
1981	3.6	3.6	3.6
1982	37.6	37.5	36.8
1983	123.4	123.4	120.4
1984	269.7	261.8	245.8
1985	245.5	238.7	190.5
1986	234.4	222.7	115.3
1987	237.4	219.9	36.5
1988	178.6	5.6	.0
To Complete	1633.0	N/A	N/A
Subtotal	2966.2	1116.2	751.9
	Appropriation: O&M,N (FMP)		
1984	1.2	1.2	1.2
1985	15.4	15.4	15.4
1986	16.6	16.6	16.6
1987	33.1	33.1	33.1
1988	12.2	.0	.0
To Complete	141.4	N/A	N/A
Subtotal	219.9	66.3	66.3
Total	3965.3	1854.8	1462.0

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

g. Obligations and Expenditures. Improved AN/SQQ-89

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation: RDT&E,N		
1987	.0	.0	.0
To Complete	958.1	N/A	N/A
Subtotal	958.1	.0	.0
	Appropriation: OPN		
To Complete	TBD	N/A	N/A
Subtotal	TBD	N/A	N/A
Total	958.1	.0	.0

17.(U) Production Rate Data

a. Annual Production Rates. The year to year changes in the mix of hardware components being purchased under this program preclude the identification of quantities by fiscal year.

b. Deliveries. Basic AN/SQQ-89 (Partial System(12) and Final Configuration(13))

	PARTIAL PLANNED/DELIVERED	FINAL PLANNED/DELIVERED
RDT&E,N	0/0	0/0
OPN	11/11	3/3

(12) System includes the functional equivalent of any two of the subsystems previously known as the AN/SQR-19, AN/SQS-53B, AN/SQQ-28, and the AN/SQS-53C.

(13) Final Basic AN/SQQ-89 configuration the ship is scheduled to receive assuming the Improved AN/SQQ-89 is introduced starting in fiscal year 1993.

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 103 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/SQS-89 Avg Annual Cost (per System)	Antecedent
O&M,N	1.13	N/A
MPN	.69	N/A
OPN	.35	N/A
Total	2.17	N/A

SAR-87-063

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: TOMAHAWK SEA LAUNCHED CRUISE MISSILE, R/UGM-109 (U)

1-39 TOMAHAWK

AS OF DATE: December 31, 1987

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AS AMENDED APR 13 1988 AS AMENDED
DIRECTORATE FOR SECURITY REVIEW
DEPARTMENT OF DEFENSE

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: 1 November 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.

CLASSIFIED BY: OPNAVINST S5513.2B, Encl (71)

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No Security Objection to Open Publication (AS AMENDED)
APR 12 1988
Office of the Chief of Naval Operations
Dept. of the Navy

OASD(PA) DFOISR 88-T-0933

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 survivable, world-wide theater nuclear capability.

7. (U) Program Highlights:

a. (U) 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.

b. Significant Developments since Last Report:

(b)(1) [redacted]

(2) (U) Approval for full production of TLAM/N, TLAM/C and TASM missiles was granted on 1 September 1987 by the Assistant Secretary of the Navy (Shipbuilding and Logistics). Approval was also granted for limited production for one additional year for the AN/SWG-3 Weapon Control System.

(3) (U) The first live warhead demonstration of TOMAHAWK land attack missile with submunitions dispenser was conducted on San Clemente Island on 3 November 1987. Three targets were attacked with live Combined Effects Bomblets (CEBs). The then depleted missile went into a planned terminal dive and impacted a fourth simulated target on the island.

(4) (U) FY 88 competitive contracts were awarded in November, 1987 at a savings of $91.0M. These savings were realized even after several items of previously government furnished equipment and engineering support were incorporated, or "broken back", into the prime competitors contracts. In the FY89 competition, the program office expects to eliminate all government furnished equipment except for fuel and the warhead.

(5) (U) The operational evaluation and the IOC for the Tomahawk Conventional Block IIB (dispenser) variant are on schedule with IOC scheduled for the early Fall of 1988. The Tomahawk variants are expected to satisfy mission requirements.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are no NDCP threshold breaches.

9. (U) Schedule:

	Development Estimate/ Approved Program	Actual
a. (U) Milestones		
1. (U) DSARC I - Land Attack (SUBMARINE)	2/74	2/74
Anti-Ship	2/74	2/74
2. (U) First Flight	5/76	3/76
3. (U) First Guided Flight - Land Attack	10/76	12/76
Anti-Ship	12/76	12/76
4. (U) DSARC II - Land Attack	1/77	1/77
Anti-Ship	1/77	1/77
5. (U) First Full Scale Development (FSD) Flight -		
Land Attack	3/77	1/77
Anti-Ship	2/77	2/77
Land Attack/ Conventional	N/A	7/81
Conventional (Blk IIA)	N/A	6/84
Conventional (Blk IIB)	N/A	11/85

(b)(1)



7. (U) NPDM

Conventional Land Attack (Block I)	N/A	N/A	N/A	N/A
Conventional Land Attack (Block IIA)	N/A	N/A	12/85	12/85
Conventional Dispenser Variant (Block IIB) (DNS ARC III)	12/87	12/87	8/88	8/88
Anti-Ship	9/80	5/81	12/84	12/84
Land Attack Nuclear	9/80	5/81	12/84	12/84
Vertical Launch TOMAHAWK	N/A	N/A	N/A	10/86

8. (U) IOC

Conventional Land Attack (Block I)	N/A	N/A	N/A	4/83
Conventional Land Attack (Block IIA)	N/A	N/A	3/86	3/86
Conventional Land Attack (Block IIB)	9/87	9/87	9/88	9/88
Anti-Ship	6/81	6/82	11/83	6/84
Land Attack Nuclear	1/82	6/82	6/84	6/84

~~SECRET~~

b. (U) Previous Change Explanation:

Conventional Dispenser Variant OPEVAL completion was delayed from 7/87 to 2/88 and DNSARC III (NPDM) from 12/87 to 8/88, and IOC from 9/87 to 9/88 due to a flight test failure in 1986. This time was needed to identify and fix the problem and verify the solution. Additional flight tests were also added to the program.

(b)(1)

d. (U) 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 W0545 dated 31 August 1987 (TOMAHAWK Weapons System) approved by OPNAV.

Approved Program: FY88/89 Budget Amended
DAE Baseline, 17 Feb 1988.

10. (U) Operational/Technical Characteristics:

	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. (U) Operational (Land Attack):	(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)		

~~SECRET~~

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

	Development Estimate/ Approved Program(CH-1)	Demonstrated Performance	Current Estimate
5. (S) Mission Reliability			
(b)(1)			
6. (SRD) Warhead Yield			
(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)			
b. (U) Operational (Anti-Ship)			
(b)(1)			
5. (U) Mission Success			
(1) Sub/Ship (FOC)	.72/.72	.73/.83	≥.72
(2) Sub/Ship (IOC)	.57/.50	.67/.89	≥.50

* c. (U) Operational Characteristics
(S) Previous Change Explanations --

10.a.1 (U) Range - Reflects 29 January 1986 NDCP; propulsion range shown as demonstrated is that experienced in flight tests which are limited for safety reasons.
10.a.2 (U) Cruise Speed - Based on current flight data.
10.a.3 (U) Penetration Altitude - Demonstrated performance betters estimate.
10.a.4 (U) Terminal Accuracy - Performance betters estimate.
10.a.5 (U) Mission Reliability - Reflected all SLCM flights to January 1986.
(b)(1)
10.c.5 (U) Reflects all SLCM post IOC flights (24 TLAM/16 TASM), January 1983 t 31 December 1986

d. (U) Current Change Explanations --
(CH-1) (U) Approved program based on NDCP W0545 dated 31 Aug 1987.
(CH-2) (U) Probability of Hit - Demonstrated Performance based on flights from 1 Jan 83 to 1 Feb 88.

e. (U) 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 W0545 dated 31 August 1987 (TOMAHAWK Weapon System) approved by OPNAV.

Approved Program: FY88/89 Budget Amended
DAE Baseline dtd 17 Mar 1988

* c. (U) Operational Characteristics:	Develop Est/ Approved Prog	Demonstrated Performance	Current Estimate
(b)(1)			
4. (U) Wave Height (Sea State) (13 ft)	-/5	/	>5
5. (b)(1)			

NOTES:

New Page

(b)(1)

1. (U) PROGRAM ACQUISITION COSTS (Current Estimate in Millions of Dollars)

	Development Estimate (FY74-86)	Changes	Current Estimate (FY74-93)
a. (U) Program Acquisition Cost			
Development (RDT&E)	782.8	519.5	1302.3
Procurement	1023.6	3108.1	4131.7
Air Vehicle (Flyaway)	(786.0)	(2513.0)	(3299.0)
Other Launch/Fire Control Costs	(90.2)	(343.7)	(433.9)
Peculiar Support	(81.1)	(147.1)	(228.2)
Initial Spares	(66.3)	(104.3)	(170.6)
Construction (MILCON)	0	0.3	0.3
Total FY 77 Base-Year $	1806.4	3627.9	5434.3
Escalation	616.5	5250.0	5866.5
Development (RDT&E)	(83.3)	(423.6)	~~(507.5)~~ 506.9
Procurement	(533.2)	(4826.2)	~~(5357.3)~~ 5359.4
Construction (MILCON)	(0.0)	(0.2)	(0.2)
Total Then-Year Prog Cost 1/	$2,422.9	8877.9	11300.8
b. (U) Quantities--			
Development (RDT&E)	81	-7	74
Procurement	1,082	+2,912	3,994
Total	1,163	+2,905	4,068
c. (U) Unit Cost --			
Procurement:			
FY 77 Base-Year $	0.946	+0.088	1.034
Then-Year $	1.439	+0.937	2.376
Program:			
FY 77 Base-Year $	1.553	-0.217	1.336
Then-Year $	2.083	+0.695	2.778

d. (U) Approved Design to Cost Goal -- (Average Unit Flyaway Cost)	Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty: 3994			
@ Peak Rate: 50/mo			
FY 77 Base-Year $	.707/ .999	.989	1.225
Then-Year $	1.075/2.484	2.316	2.870

e. (U) Foreign Military Sales (FMS): N/A

(b)(1) [redacted]

1/ (U) Excludes SCN for new construction ships and shipboard Vertical launching system costs.

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

		Current Year		Budget Year
		SAR Current Estimate	UCR Baseline Estimate	UCR Baseline Estimate
a. (U) Program Acquisition —		Dec 87 SAR	Dec 86 SAR	Dec 87 SAR
(1)	Cost	11,300.8	11,814.6	11,300.8
(2)	Quantity	4,068	4,068	4,068
(3)	Unit Cost	2.778	2.904	2.778
b. (U) Current Procurement —		(FY 1988)	(FY 1988)	(FY 1989)
		-- Appropriation Act --		
(1)	Cost	928.1	928.1	776.6
	Less CY Adv Proc	(71.4)	(71.4)	(75.6)
	Plus PY Adv Proc	66.5	66.5	71.4
	Net Total	923.2	923.2	772.4
(2)	Quantity	475	475	510
(3)	Unit Cost	1.944	1.944	1.515

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	866.1	1,556.8	-	2,422.9
Previous Changes:				
Economic	-18.4	-1,888.5	+0.1	-1,906.8
Quantity	-22.6	+7,649.2	-	+7,626.6
Schedule	+213.4	+132.4	-	+345.8
Engineering	+760.1	+999.6	-	+1,759.7
Estimating	+6.8	-210.1	-0.1	-203.4
Other	-	-	-	-
Support	+2.9	+1,766.4	+0.5	+1,769.8
Subtotal	+942.2	+8,449.0	+0.5	+9,391.7
Current Changes:				
Economic	+1.3	+45.5	-	+46.8
	-	-	-	-
	-	-	-	-
Engineering	-0.4	-	-	-0.4
Estimating	-	-551.3	-	-551.3
	-	-	-	-
Support	-	-8.9	-	-8.9
Subtotal	+0.9	-514.7	-	-513.8
Total Changes	+943.1	+7,934.3	+0.5	+8,877.9
Current Estimate	1,809.2	9,491.1	0.5	11,300.8

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

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

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate(DE)	782.8	1,023.6	-	1,806.4
Previous Changes:				
Quantity	-17.5	+2,641.0	-	+2,623.5
Schedule	+148.5	-275.7	-	-127.2
Engineering	+395.8	+422.1	-	+817.9
Estimating	-9.3	-158.2	-0.1	-167.6
Other	-	-	-	-
Support	+2.1	+714.3	+0.4	+716.8
Subtotal	+519.6	+3,343.5	+0.3	+3,863.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-0.1	-	-	-0.1
Estimating	-	-230.1	-	-230.1
Other	-	-	-	-
Support	-	-5.3	-	-5.3
Subtotal	-0.1	-235.4	-	-235.5
Total Changes	+519.5	+3,108.1	+0.3	+3,627.9
Current Estimate	$1,302.3	$4,131.7	0.3	$5,434.3

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.

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.

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

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. Reestimate 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.

MILCON

Military construction requirement not estimated in DE. (Estimating)

c. (U) Current Change Explanations

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Revised Escalation Rates (Economic)	-	+1.3
Block IIB Overrun - (Engineering)	-0.1	-0.4
TOTAL	-0.1	+0.9
(2) Procurement		
Revised Escalation Rates (Economic)	-	+45.5
WPN:		
Expected competition savings (Estimating)	-230.1	-551.3
OPN: Deletion of one AN/SWG-3 (Support)	-5.3	-8.9
TOTAL	-235.4	-514.7

c. (U) References
- Development Estimate: RDT&E -- FY 1981 RDT&E Descriptive Summary Program Element 64367N; Procurement -- FY 79 President's Budget
- Approved Program: FY 88/89 Budget Amended

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

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

PAUC(DE) Baseline Estimate)	Changes (Then Year Dollars in Millions)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
2.083	-0.377	+0.387	+0.085	+0.433	-0.247	+0.414	0.0	+0.695	2.778

15. (U) Contract Information: (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:

General Dynamics (FY86 AUR)
San Diego, CA
N00019-85-C-4484, FFP
Award: February 1986
Definitized: February 1986

Initial Contract Price		
Target	Ceiling	Qty
$201.9M	N/A	206

Current Contract Price		
Target	Ceiling	Qty
$201.9M	N/A	206

Estimated Price At Completion	
Contractor	Program Manager
$291.9M	$201.9M

Previous Cumulative Varinances N/A N/A
Cumulative Variances To Date
Net Change
Explanation of Change: Not reported for FFP contracts

2. AUR Missile

McDonnell Douglas (FY86 AUR Option)
San Diego, CA
N00019-84-C-4485, FFP
Award: December 1985
Definitized: December 1985

Initial Contract Price		
Target	Ceiling	Qty
$192.0M	N/A	139

Current Contract Price		
Target	Ceiling	Qty
$199.0M	N/A	139

Estimate Price At Completion	
Contractor	Program Manager
$199.0M	$199.0M

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

2. AUR Missile (Cont'd):

3. 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		
Target	Ceiling	Qty
$172.5M	N/A	160

Estimated Price at Completion	
Contractor	Program Manager
$172.5M	$172.5M

Previous Cumulative Variances
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.

4. 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		
Target	Ceiling	Qty
$187.9M	N/A	240

Estimate Price At Completion	
Contractor	Program Manager
$187.9M	$187.9M

Cost Variance	Schedule Variance
N/A	N/A

Previous Cumulative Variances
Cumulative Variances To Date
Net Change
Explanation of Change: Not reported for FFP contracts.

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

5. 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

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 (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

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)

a. (U) Program Status --

(1) Percent Program Completed: 70.0% (14 yrs/20 yrs)

(2) Percent Program Cost Appropriated: 54.3%
($6,135.4/$11,299.0)

b. (U) Appropriation Summary --

Appropriation	Current & Prior Yrs (FY74-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93)	Total
RDT&E	1,596.1	60.3	152.8	-	1,809.2
Procurement	4,541.0	776.6	3,470.3	703.2	9,491.1
Weapon	(3,881.1)	(733.4)	(3,369.2)	(703.2)	(8,686.9)
Other	(659.9)	(43.2)	(101.1)	(.0)	(804.2)
MILCON	0.5	-	-	-	0.5
Total	6,137.6	836.9	3,623.1	703.2	11,300.8

16. (U) PROGRAM FUNDING SUMMARY (Cont'd) (Current Estimate in Millions of Dollars)

c. (U) Annual Summary —

FISCAL YEAR	QUANTITY	FY 77 BASE-YEAR DOLLARS			THEN YEAR DOLLARS			ESCL
		FLYAWAY (NON-ADD)			Advance Procurement			
		NON-REC	REC	TOTAL	Debit	Credit	TOTAL	RATE (%)
APPROPRIATION, RDT&E,N								
1974				8.4			6.6	—
1975				43.1			37.3	—
1976				140.6			130.6	—
1977				115.3			119.2	—
1978				188.1			209.5	6.8
1979				125.3			154.1	8.4
1980				77.6			105.5	10.6
1981				90.3			133.9	10.6
1982				92.5			144.3	7.6
1983				72.5			118.2	4.9
1984				79.9			135.0	3.8
1985				46.2			80.5	3.4
1986				41.3			73.9	2.8
1987				41.7			77.1	2.7
1988				36.9			70.5	3.7
1989				30.3			60.3	3.8
1990				26.7			54.9	3.6
1991				22.7			48.1	3.3
1992				22.9			49.8	2.8
SUBTOTAL	74			1,302.3			1,809.2	
APPROPRIATION: WPN								
1980	6	0.0	13.1	19.6	10.7	0.0	30.1	10.6
1981	50	3.5	91.4	113.7	14.0	-10.7	195.0	10.8
1982	61	6.5	100.9	124.8	14.0	-14.0	232.4	7.6
1983	51	13.1	79.0	112.1	6.7	-14.0	220.8	4.9
1984	124	15.8	29.9	168.1	15.3	-6.7	345.4	3.8
1985	180	31.2	191.5	266.2	27.7	-15.3	563.1	3.4
1986	249	33.9	216.8	315.9	51.8	-27.7	690.3	2.8
1987	324	34.4	242.3	324.6	66.5	-51.8	735.1	2.7
1988	475	28.9	298.8	370.3	71.4	-66.5	868.9	3.7
1989	510	19.4	299.7	302.5	75.6	-71.4	733.4	3.8
1990	515	20.7	388.1	449.0	99.3	-75.6	1,121.1	3.6
1991	515	15.2	414.3	462.5	103.4	-99.3	1,184.1	3.3
1992	515	10.7	380.0	406.1	71.3	-103.4	1,064.0	2.8
1993	419	8.3	270.7	262.4	0	-71.3	703.2	2.3
SUBTOTAL	3,994	241.6	3,016.5	3,697.8	627.7	-627.7	8,686.9	
APPROPRIATION: OPN								
1981				23.2			36.6	10.8
1982				45.7			75.1	7.6
1983				75.6			129.0	4.9
1984				36.4			64.0	3.8
1985				44.7			81.0	3.4
1986				53.6			105.0	2.8
1987				58.0			110.0	2.7
1988				29.2			59.2	3.7
1989				21.0			43.2	3.8
1990				20.0			42.8	3.6
1991				19.5			42.7	3.3
1992				7.0			15.6	2.8
SUBTOTAL				434.0			804.2	
APPROPRIATION: MILCON								
1982	—	—	—	0.3			0.5	7.6
SUBTOTAL				0.3			0.5	
TOTAL	4,068			5,434.3			11,300.8	

16. (U) PROGRAM FUNDING SUMMARY (Cont'd)

d. (U) Obligations and Expenditures

FISCAL YEAR	THEN YEAR DOLLARS(Current Estimate in Millions) TOTAL	OBLIGATED	EXPENDED
APPROPRIATION: RDT&E,N			
1974	6.6	6.6	6.6
1975	37.3	37.3	37.3
1976	130.6	130.6	130.6
1977	119.2	119.0	119.0
1978	209.5	209.5	209.5
1979	154.1	154.1	154.1
1980	105.5	105.5	105.5
1981	133.9	133.9	133.9
1982	144.3	144.4	143.3
1983	118.2	118.3	116.8
1984	135.0	135.0	130.0
1985	80.5	80.5	76.6
1986	73.9	73.2	71.6
1987	77.1	76.9	63.2
1988	70.5	13.2	1.7
To Complete	213.0	N/A	N/A
TOTAL	1,809.2	1,538.0	1,499.7
APPROPRIATION: WPN			
1980	30.1	30.1	30.1
1981	195.0	195.0	187.3
1982	232.4	232.4	227.5
1983	220.8	220.8	205.8
1984	345.4	345.4	334.6
1985	563.1	562.7	528.9
1986	690.3	679.3	548.1
1987	735.1	716.8	272.3
1988	868.9	515.5	9.9
To Complete	4,805.8	N/A	N/A
TOTAL	8,686.9	3,498.0	2,344.5
APPROPRIATION: OPN			
1981	36.6	36.6	36.6
1982	75.1	75.0	59.3
1983	129.0	128.2	123.0
1984	64.0	63.0	44.2
1985	81.0	81.0	69.0
1986	105.0	99.8	63.9
1987	110.0	117.1	31.2
1988	59.2	2.5	0.1
To Complete	144.3	N/A	N/A
TOTAL	804.2	603.2	427.3
APPROPRIATION: MILCON			
1982	0.5	0.5	0.5
TOTAL	0.5	0.5	0.5

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 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. Also, the attainment of the Sea Launched Cruise Missile maximum production rate may be limited by Ground Launched Cruise Missile (GLCM) missile delivery requirements until the completion of the FY 1988 funding delivery period when the GLCM program is completed.

	Production Rates (Quantity/Year)			
Fiscal Year	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	480
1987	198	330	324	540
1988	94	450	475	600
1989	-	617	510	600
1990	-	614	515	600
1991	-	631	515	600
1992	-	631	515	600
1993	-	-	419	600
1994	-	-	-	600*
1995	-	-	-	600
TOTAL	1082	3994	3994	N/A

* March 1994 would be the earliest theoretical date for total program (3994) 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 $)	6,240.0	-805.7	5,434.3	1,527.9	3,906.4
(TY $)	13,791.4	-2,490.6	11,300.8	2,228.7	9,072.1
PAUC (BY $)	1.534	-0.198	1.336	0.376	0.960
(TY $)	3.390	-0.613	2.778	0.547	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 1982	N/A	July 1982	N/A	July 1982
Duration (in Months)	152	0	152	35	117
End Date (Mo/Yr)	Mar 1995	N/A	Mar 1995	N/A	Mar 1994

(U) DELIVERIES (Plan/Actual)

		R&D To Date			Procurement To Date
R&D:	Land Attack	47/37	Procurement:	Land Attack	92/90
	Anti-Ship	27/37		Anti-Ship	281/282
	Total	74/74		Land Attack/Nuclear	252/259
				Total	625/631

18. (U) Operating and Support Costs: N/A

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

PROGRAM: UH-60A BLACK HAWK

87-020

A-26 UH-60A

AS OF DATE: December 31, 1987

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[redacted]

1. Designation and Nomenclature (Popular Name): UH-60A BLACK HAWK

[redacted]

2. DOD Component: Department of the Army

[redacted]

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

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.

6. Mission and Description: The BLACK HAWK is a twin engine helicopter that is used in the performance of the air assault, air cavalry and aeromedical evacuation mission. This aircraft is 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, air cavalry, and aeromedical evacuation units.

[redacted]

CASD(PA) DFOIS 88-0732

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 FY 80 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 System (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.

b. Significant Developments Since Last Report -- The Multiyear III Airframe Contract for FY 88-91 to procure the remaining 252 UH-60As to complete the approved 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. The intent was to continue to procure the UH-60A at the minimum economic rate of 6 per month.

Congressional direction and funding was also provided to initiate the efforts necessary to develop a Composite Helicopter Rotor System and upgrade of the UH-60A.

DT II for the UH-60A HELLFIRE Missile System was completed in November 1987. A Draft RFP will be released to industry May 1988 and Contract Award for 135 shipsets is expected January 1989 - (45 shipsets per year/3 years). Procurement of Long Lead GFE for UH-60A HELLFIRE kits will be initiated FY 88.

Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 Amended Budget Decisions.

The BLACK HAWK system currently meets most essential mission requirements (see paragraph 8).

7. PROGRAM HIGHLIGHTS (Cont.)

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

8. Decision Coordinating Paper (DCP) Threshold Breaches:

a. 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 $2,046.3M (FY 71 C $).

b. 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 327 and cruise speed in knots from 145 to 137 in the current production configuration of the UH-60A. These performance threshold values will be regained in Oct 89 with the incorporation of the H-60 Series uprated engine which has a minimum of 9% additional shaft horsepower.

c. The system meantime between failure in hours exceeds the development estimate of 4.0 but has fallen below the approved program estimate of 6.6 to an estimated value of 4.3. The mission reliability has been estimated at .980 versus the .987 threshold. These current estimated values are based on sample data collected on Lot 8 (FY 84) UH-60A aircraft during the period Jul-Dec 86. A mission reliability test to obtain actual data for better estimation of these values is scheduled for FY 88 using the current Lot 12 aircraft. It is anticipated that the more accurate method of data collection will reconfirm a MTBF and mission reliability that meets the threshold.

9. Schedule:

a. Milestones --	Development Estimate/ Approved Program	Current Estimate
First Year of Funding	Jul 67/NA	Jul 67
Engine Development Contract Award	Dec 71/NA	Mar 72
Prototype Development Contracts Awarded	Sep 72/NA	Aug 72
First Flight	Sep 74/NA	Nov 74
Engine Military Qualification Test (150 Hrs)	Dec 75/NA	Mar 76
Development Test II		
Started	Feb 76/NA	Mar 76
Completed	Dec 77/NA	Dec 76
Operational Test II		
Started	Not Shown/NA	Jun 76
Completed	Not Shown/NA	Sep 76
Milestone III (DSARC)	Sep 76/ NA	Nov 76
Type Classification (Standard)	Not Shown/NA	Nov 76
Prototype Evaluation Completed	Not Shown/NA	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 Operational Capability (IOC) 1/	Jun 79 /Nov 79	Nov 79
Department of the Army Program Review (DAPR)	NA/NA	NA (Ch-1)

9. SCHEDULE (Cont.)

b. Previous Change Explanations --
Changes in the current estimate of milestone accomplishments have been caused by (a) conformance with the new Army Acquisition Guidelines; (b) reduction in prototype aircraft from 6 to 3; (c) time required to repair the prototype which was damaged in November 1975; (d) scheduling problems and additional time required by other Government agencies for testing; (e) decision by DSARC III on initial production go ahead in December 1976; (f) the January 22, 1979 temporary grounding of the BLACK HAWK fleet because of the observance of a failure mode in a primary servo; (g) the June 11, 1979 official beginning of FDTE at Ft. Campbell, KY; and (h) the October 15, 1979 completion of FDTE at Ft. Campbell, KY.

c. Current Change Explanations --
(CH-1) The requirement for a DAPR has been rescinded. The revised procurement objective for the BLACK HAWK will be documented by a memorandum by the Under Secretary of the Army.

d. References --

Development Estimate: DCP #13, June 13, 1971 and DCP #13 Update, November 1, 1977.

Approved Program: FY 88-89 President's Budget (Amended); Program Baseline, 26 Feb 88.

Footnote:

1/ IOC of the BLACK HAWK means that during 1st Quarter of FY 80, 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 --	Dev Estimate/ Appr Program(CH-4)	Demonstrated Performance	Current Estimate
Payload (Pounds)	2640/2640	2640	2640
Flight Performance with Payload 1/			
(1) Vertical Climb in Feet Per Minute (FPM) 2/	500/327	450	327 3/ (CH-1)
(2) Cruise Speed in Knots 4/	150/137	145	137 (CH-2)
(3) Endurance in Hours 5/	2.3/2.3	2.3	2.3
System Meantime Between Failure (MTBF) in Hours	4.0/4.3	6.6	4.3 (CH-3)
Maintenance Man-hours Per Flight Hour (MMH/FH) 6/	3.8/3.0	3.1	3.0
b. Operational --			
Payload (Troop) 1/	11/11	11	11
Air Transportability			
(1) C-130 (Quantity) 7/	1/NA		
(2) C-141 (Quantity)	2/2	2	2
(3) C-5 (Quantity)	6/6	6	6
Mission Reliability (Probability of Success)	.986/NA	.980	.980(CH-3)
(MTBF in Hours)	70.9/49.5	49.5	49.5 8/

10. TECHNICAL/OPERATIONAL CHARACTERISTICS (Cont'd)

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 IX (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 of maintenance man-hours per flight hour the 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 has reduced the vertical rate of climb from 664 to 327 feet per minute.

(CH-2) Weight growth due design revisions and added mission capabilities has reduced the cruise speed from 145 knots to 137 knots.

(CH-3) System meantime between failures has been revised from 6.6 to 4.3 and mission reliability has been revised from .987 to .980, based on sample data collected on Lot 8 (FY 84) UH-60A aircraft during the period July thru December 1986.

(CH-4) Updated to reflect baseline values.

e. References --

Development Estimate: DCP #13, June 13, 1971 and DCP #13 Update, November 1, 1977.

Approved Program: FY 88-89 President's Budget (Amended): Program Baseline, 26 Feb 1988.

Footnotes:

1/ At 4,000 ft. altitude and 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 MTBF in hours. The value shown is equivalent to the value for probability of success.

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

a. Cost --	Development 1/ Estimate	Changes	Current Estimate
Development (RDT&E)	$ 357.6	$ +42.9	$ 400.5
Procurement	1,584.4	+461.9	2,046.3
Airframe			(1,178.7)
Engine			(350.9)
Avionics			(66.0)
Other Flyaway			(222.1)
Total Flyaway			(1,817.7)
Other Weapon System Cost			(69.5)
Initial Spares			(159.1)
Construction (MILCON)			0
Total FY 71 Base-Year	$1,942.0	+504.8	2,446.8
Escalation	365.3	+3,735.1	4,100.4
Development (RDT&E)	(52.3)	(+138.0)	(190.3)
Procurement	(313.0)	(+3,597.1)	(3,910.1)
Construction (MILCON)	(0)	(0)	(0)
Total Then-Year $	$2,307.3	$+4,239.9	$6,547.2

1/ Adjusted from the December 31, 1985 SAR to reflect the current then-year dollars in the Development Estimate.

b. Quantities --			
Development (RDT&E)	16	-6	10
Procurement	1,107	+4	1,111
Total	1,123	-2	1,121

c. Unit Cost --			
Procurement:			
FY 71 Base-Year $	1.43	+.41	1.84
Then Year $	1.71	+3.65	5.36
Program:			
FY 71 Base-Year $	1.73	+.45	2.18
Then Year $	2.05	+3.79	5.84

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

d. Approved Design to Cost Goal --

	(Average Unit Flyaway Cost) 1/		
	Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
Constant FY 72 $	.951/ .951	1.632	-
Then-Year $	1.089/1.089	4.640	-

Quantity: 1107
Peak Airframe Rate: 14 per month
Peak Engine Rate: 60-80 per month within 45 months, for a total of 4,700

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

Footnote:

1/ System Project Management, System Test and Evaluation, and Warranty are excluded.

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

	Current Year		Budget Year
a. Program Acquisition --	Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
(1) Cost	6,547.2	6,400.3	6,547.2
(2) Quantity	1,121	1,121	1,121
(3) Unit Cost	5.84	5.71	5.84
b. Current Procurement --	(FY 1988)	(FY 1988 APPN)	(FY 1989)
(1) Cost	515.1	515.1	494.9
Less CY Adv Proc	208.4	208.4	205.5
Plus PY Adv Proc	155.7	155.7	176.8
Net Total	462.4	462.4	466.2
(2) Quantity	72	72	72
(3) Unit Cost	6.42	6.42	6.48

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	+1,155.6	-	+1,207.9
Quantity	-22.0	+10.5	-	-11.5
Schedule	+3.0	-42.3	-	-39.3
Engineering	+40.3	+111.5	-	+151.8
Estimating	+25.5	+2,724.6	-	+2,750.1
Other	+18.5	+1.4	-	+19.9
Support	+8.2	+5.9	-	+14.1
Subtotal	+125.8	+3,967.2	-	+4,093.0
Current Changes:				
Economic	-	+13.0	-	+13.0
Quantity	-	-	-	-
Schedule	-	-3.7	-	-3.7
Engineering	+55.9	+45.0	-	+100.9
Estimating	-1.9	-61.5	-	-63.4
Other	-	-	-	-
Support	+1.1	+99.0		+100.1
Subtotal	+55.1	+91.8	-	-146.9
Total Changes	+180.9	+4,059.0	-	+4,239.9
Current Estimate	590.8	5,956.4	-	6,547.2

(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	+16.3	+12.3	-	+28.6
Estimating	+7.6	+568.7	-	+576.3
Other	+12.6	+.8	-	+13.4
Support	+6.2	-99.8		-93.6
Subtotal	+23.9	+384.7	-	+408.6
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	+19.2	+12.7	-	+31.9
Estimating	-.6	+30.2	-	+29.6
Other	-	-	-	-
Support	+.4	+34.3	-	+34.7
Subtotal	+19.0	+77.2	-	+96.2
Total Changes	+42.9	+461.9	-	+504.8
Current Estimate	400.5	2,046.3	-	2,446.8

13. Cost Variance Analysis (Cont'd)

b. Previous Change Explanations --

RDT&E

Economic: Due to the application of January 1987 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 an OSD reduction in FY 78 and increases 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 1975 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 1987 and prior DA/OSD inflation guidance.

Quantity: Due to procurement of 4 additional aircraft for the U.S. Customs Service in FY 87.

Schedule: Due to the 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.

13. Cost Variance Analysis (Cont'd):

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

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 the net of decreases resulting from transferring stock fund spares requirements from the project manager's budget to the respective major subordinate command's budget, revised initial spares requirements because of completion of initial spares in FY 82, peculiar ground support equipment, and production delivery acceleration; and increases resulting from increased quantity and unit price of engines for initial spares, increased funding requirements for initial spares in the subsequent years to accommodate an increased number of deployment sites and the 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		
Addition of funds by Congress in FY 88 and Headquarters DA in FY 89 to develop Block Modification for the BLACK HAWK (Engineering)	+19.2	+55.9
Reduction of funding requirements to complete qualification of HELLFIRE Missile System on the UH-60A BLACK HAWK (Estimating)	-.6	-1.9
Addition of funding to develop a Cockpit Emergency Procedures Trainer (CEPT) (Support)	+.4	+1.1
(2) Procurement		
Application of February 1988 DA/OSD Inflation Factors (Economic)	0	+13.0
Increase of aircraft procured in FY 88 by 11 each (at Congressional direction) and corresponding decrease at Program completion in FY 91 (Schedule)	0	-3.7
Addition of requirement to provide increased protection from Electromagnetic Pulse/Interference (Engineering)	+9.6	+35.1
Addition of requirements for Special Mission Aircraft (EUSA) (Engineering)	+3.1	+9.9
Application of approved DA/OSD Unique Historical Deflators (Estimating)	+48.9	0
Reduced airframe and mission kit estimates resulting from definitization of MYP III (Estimating)	-18.7	-61.5
Application of approved DA/OSD Unique Historical Deflators (Support)	+3.2	0
HQDA policy change to include funding of Flight Simulators in the Procurement Line in FY 87 and beyond (Support)	+23.3	+73.5
Increase in spares requirements for FY 89 (Support)	+7.4	+24.6
Increased requirements for Other Support items (PGSE/Data) (Support)	+.4	+.9

13. Cost Variances Analysis (Cont'd):

(3) MILCON None

d. References --

Development Estimate: DCP #13, June 13, 1971 and DCP #13 Update, November 1, 1977.

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	+1.089	-.007	-.038	+.225	+2.396	+.102	+.018	+3.785	5.840

Footnote: Initial SAR dated December 31, 1971.

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

a. RDT&E: None.

b. Procurement 1/

1/ Contracts are not under C/SCSC reporting. Cost and Schedule variance not applicable.

United Technologies Corp.,
Sikorsky Aircraft Division, 2/
Stratford, CT, DAAJ09-85-C-A006, FFP,
Award: October 31, 1984
Definitized: October 31, 1984

Initial Contract Price		
Target	Ceiling	Qty
832.4	N/A	296

Current Contract Price		
Target	Ceiling	Qty
1,128.5	N/A	311

Estimated Price at Completion	
Contractor	Program Manager
$1128.5	$1128.5

2/ UH-60A BLACK HAWK deliveries on this contract are complete, therefore, it will no longer be reported.

General Electric Co., Lynn MA
DAAJ09-85-C-A481, FFP,
Award: February 11, 1986
Definitized: February 11, 1986

Initial Contract Price		
Target	Ceiling	Qty
716.2	N/A	1,724

Current Contract Price		
Target	Ceiling	Qty
847.5	N/A	1,997

Estimated Price at Completion	
Contractor	Program Manager
$847.5	$847.5

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

a. Program Status --

(1) Percent Program Completed: 88.0% (22/25 yrs)

(2) Percent Program Cost Appropriated: 83.8% ($5,485.0/$6,547.2)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY68-88)	Budget Year (FY89)	Balance To Complete FYDP (FY 90-92)	Beyond FYDP	Total
RDT&E	549.9	40.9	0	0	590.8
Procurement	4,935.1	494.9	526.4	0	5,956.4
MILCON	0	0	0	0	0
TOTAL	5,485.0	535.8	526.4	0	6,547.2

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

c. Annual Summary --

Fiscal Year	Qty	FY 71 Base-Year Dollars			Then-Year Dollars			Escl Rate 1/ (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1968				0.6			0.5	3.6
1969				2.4			1.8	4.7
1970				1.2			1.2	5.5
1971				7.7			7.9	5.1
1972				21.1			22.7	4.6
1973				44.1			50.3	4.4
1974				83.3			102.6	8.0
1975				39.4			52.7	10.9
1976				65.8			93.6	6.6
TT				12.7			18.6	2.9
1977				49.8			76.0	2.6
1978				23.9			39.2	6.8
1979				6.3			11.4	8.4
1980				1.8			3.6	10.6
1981				3.2			7.0	10.6
1982				2.9			6.7	7.6
1983				3.8			9.1	4.9
1984				6.0			15.0	3.8
1985				0.0			0.0	3.4
1986				5.7			15.0	2.8
1987				0			0	2.7
1988				5.3			15.0	3.7
1989				13.9			40.9	3.8
Subtotal	10			400.5			590.8	

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	Qty	FY 71 Base-Year Dollars			Then-Year Dollars			Escl Rate 1/ (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: Procurement								
1977	15	18.7	39.7	71.9	7.2	0.0	140.6	3.7
1978	56	11.8	82.1	111.4	10.6	5.8	245.7	6.0
1979	92	5.5	131.7	157.7	13.1	11.2	395.6	12.0
1980	94	3.2	124.5	138.0	15.1	13.4	380.2	9.8
1981	80	2.3	123.3	164.9	24.7	15.4	478.0	13.5
1982	96	2.6	180.6	211.8	130.0	24.9	618.8	8.1
1983	96	8.7	165.4	184.4	144.2	102.9	540.6	-.3
1984	84	1.1	125.9	132.5	136.8	152.1	389.4	1.7
1985	86	.9	136.8	146.7	164.8	144.1	432.2	-.3
1986	78	1.4	128.3	138.3	187.1	138.8	412.9	-.1
1987	82	1.8	104.8	125.1	161.2	208.3	386.0	.2
1988	72	4.5	133.4	160.8	208.4	155.7	515.1	3.7
1989	72	5.5	130.6	149.5	205.6	176.8	494.9	3.8
1990	72	5.3	98.5	109.8	96.1	202.6	374.4	3.6
1991	36	1.7	37.1	42.7	0.0	152.9	149.3	3.3
1992	0	0.0	0.0	.8	0.0	0.0	2.7	2.8
Subtotal	1,111	75.0	1,742.7	2,046.3	1,504.9	1,504.9	5,956.4	

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)

Appropriation: MILCON

Subtotal	0			0			0	
Total	1,121			2,446.8	1,504.9	1,504.9	6,547.2	

Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 Amended Budget decisions.

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1968	0.5	0.5	0.5
1969	1.8	1.8	1.8
1970	1.2	1.2	1.2
1971	7.9	7.9	7.9
1972	22.7	22.7	22.7
1973	50.3	50.3	50.3
1974	102.6	102.6	102.6
1975	52.7	52.7	52.7
1976	93.6	93.6	93.6
TQ	18.6	18.6	18.6
1977	76.0	76.0	76.0
1978	39.2	39.2	39.2
1979	11.4	11.4	11.4
1980	3.6	3.6	3.6
1981	7.0	7.0	7.0
1982	6.7	6.4	6.4
1983	9.1	9.1	8.1
1984	15.0	15.0	12.2
1985	0.0	0.0	0.0
1986	15.0	8.2	1.0
1987	0.0	0	0
1988	15.0	0	0
To Complete	40.9	0	0
Subtotal	590.8	527.8	516.8

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

d. Annual Summary -- (Cont'd)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: Procurement			
1977	140.6	139.6	139.5
1978	245.7	245.7	245.7
1979	395.6	392.8	387.8
1980	380.2	378.7	377.2
1981	478.0	473.5	458.6
1982	618.8	613.4	610.9
1983	540.6	539.1	527.7
1984	389.4	389.4	373.4
1985	432.2	428.5	383.9
1986	412.9	411.4	401.6
1987	386.0	351.1	267.5
1988	515.1	210.5	0
To Complete	1,021.3	0	0
Subtotal	5,956.4	4,573.7	4,173.8
Appropriation: MILCON			
Subtotal	0	0	
Total	6,547.2	5,101.5	4,690.6

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.

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	136	144
1984	165	180	113	144
1985	165	180	109	144
1986			80	144
1987			84	144
1988			72	144
1989			72	
1990			72	
1991			72	

17. Production Rate Data: (Cont'd)

b. Cost Variances -- Dollars in Millions

Item		Production Estimate	Variance (CE Less Pde)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Prog Acq Cost	(BY$)	1755.6	+ 691.2	2,446.8	+ 87.7	2,359.1
	(TY$)	3402.4	+3144.8	6,547.2	+ 387.6	6,159.6
PAUC	(BY$)	1.572	.611	2.183	+ .079	2.104
	(TY$)	3.046	2.794	5.840	+ .345	5.495

c. Schedule Variance --

Item	Production Estimate	Variance (CE Less Pde)	Current Estimate	Variance (CE vs Max)	Maximum Ecomomic
Start Date (Mo/Yr)	Oct 78		Oct 78		Oct 78
Duration (in months)	93	+60	153	+32	121
End Date (Mo/Yr)	Jun 86		Jun 91		Aug 88

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	10/10
Procurement	859/859

18. Operating and Support Costs: N/A

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: TANK, COMBAT, FT. M1/M1A1

87-034

A-15 M1/M1A1

AS OF DATE: December 31, 1987

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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

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)

[redacted]

5. (U) Related Programs:
Tank Main Armament Systems (TMAS); Combat Vehicle Improvement Program.

[redacted]

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[redacted]

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6. (U) Mission and Description: The Abrams tank provides a significant improvement to the Army's offensive and defensive ground combat power. The Abrams tank mounts a large caliber main gun and complementary armament systems with improved day/night fire control and shoot-on-the-move capabilities, thus assuring increased first round kill capability. The tank's significant improvement in survivability is achieved by incorporation of special armor, compartmentation, improved nuclear, biological, and chemical protection, and enhanced mobility. Higher cross country speeds and faster acceleration make the Abrams tank a more difficult target for opposing ground and air forces. The goal of reduced maintenance requirements over earlier tanks has been realized in the Abrams tank through increased emphasis on reliability, availability, maintainability, and durability (RAM-D) during engineering and test programs. 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 Abrams Tanks was accepted by the government on May 30, 1986. The M1A1 fielding milestone for First Unit Equipped (FUE) was accomplished in December 86.

b. (U) Significant Developments Since Last Report-- To date, 1482 M1A1 120mm tanks have been produced. The M1A1 Initial Production Test (IPT), begun June 12, 1986, was completed in September 87. Scored data indicates that, except for Power Train Durability, where corrective actions are in progress, RAM performance is exceeding requirements. Forward fielding of the M1A1 in USAREUR began in January 87. The 3rd Infantry Division, four of six battalions of the 1st Armored Division, and one battalion of the 2nd Armored Division (Fwd) have been completed. POMCUS units were also fielded on schedule. In CONUS, the 3rd Armored Cavalry Regiment (M1A1) at FT. Bliss completed fielding and New Equipment Training (NET). As part of M1 redistribution, the 24th Infantry Division, Ft. Stewart, and three battalions of the 1st Infantry Division, FT. Riley, completed fielding and NET. The FY88 RDT&E Authorization and Appropriation levels are now adequate for Block II program execution. Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions. M1/M1A1 Tanks are expected to satisfy the mission requirement.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches:

The combat loaded weight of the M1A1 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 original requirement has been raised to 67.5 tons as part of the M1A1 Block II Product Improvement Program. This new threshold will be included in the next DCP revision. It is planned to retrofit all M1A1s to this new configuration. This 67.5 ton weight will be met when Block II modifications are made to the current M1A1 tank.

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 Prod Dec)	Feb 81/NA	Sep 81
Full Production Contract Awarded	Feb 81/NA	Oct 81
European Operational Capability	NA/NA	CY 82

(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
Initial Production Test Started	NA/Jun 86	Jun 86
First Unit Equipped (CONUS)	NA/Dec 86	Dec 86
First Unit Equipped (Europe)	NA/Jan 87	Jan 87
Follow-on Evaluation Started	NA/Jan 87	Jan 87
Award MY Tank Contract (FY86-FY90)	NA/May 87	May 87
Follow-on Evaluation Completed	NA/Jul 87	Jul 87
Survivability Test Started	NA/Aug 87	Aug 87
IPT Completed	NA/Nov 87	Nov 87
Survivability Test Completed	NA/Jul 88	May 88

9. (U) Schedule: Milestones - - M1A1 (Cont'd)

b. (U) References - -

Development Estimate: DCP #117A, May 24, 1978.

Approved Program: FY89 Amended President's Budget, USDA memo, dated February 26, 1988 Approved Baseline.

10. (U) Technical/Operational Characteristics: M1

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. (U) Technical - -			
Weight, Combat Loaded	58.0/61.5	61.5	61.5 (Ch-1)
Width (Inches)	120-144/144.125	144.125	144.125
Height (Inches) (Top of Turret Roof)	90-95/93.5	93.5	93.5
Armament			
Main Armament (Cannon)(mm)	105-120/105	105	105
Coaxial MG(mm)	7.62/7.62	7.62	7.62
Commander's MG(Cal)	.50/.50	.50	.50
Loader's MG(mm)	7.62/7.62	7.62	7.62
Engine Horsepower (HP)	1500/1500	1500	1500

b. (U) Operational - -

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(U) Acceleration (Seconds) Hard Surface 0% Slope 0-20 MPH (Tactical Idle)	6.0/7.0	5.8	7.0
(U) Speed:			
(U) Level Terrain X-Country (MPH) Sustained	30/30	31.6	30
(U) Cruising Range (Miles)	275-325/310	310	310
(U) Hit probability, KE RD, 1500 Meters, DT III Test conditions (%)			
(b)(1)			
(U) Combat Mission Reliability (MMBF)	360/385	372	385
(U) System Maintainability (MR)	1.00/1.18	1.22	1.18
(U) Power Train Durability (Probability of 4,000 miles)	.67/.66	.66	.66

10. (U) Technical/Operational Characteristics: M1 (Cont'd)

c. (U) Previous Change Explanations - -

Engineering changes to the basic M1 increased the weight estimate from 60.28 to 60.8 short tons. Increased weight also increased the time of acceleration from 6-7 to 7 seconds. Height measured during M1 DT/OT increased from 93.125 to 93.5 inches. DT III demonstrated a speed change from 25-32 to 30 mph and no change in cruising range of 310 miles obtained from Comparison Production Tests. Improved production experience has increased Reliability from 320-360 to 385 MMBF. Maturation of the tank system has improved the maintenance ratio from 1.25 to 1.18. System Availability, which is not a DCP requirement, has been deleted. Power Train Durability is now expressed as the probability of achieving 4000 miles without major incident. Hit probability current estimates were changed to reflect demonstrated performance (DT III).

d. (U) Current Change Explanations - - M1

(Ch-1) The estimated weight changed from 60.8 to 61.5 short tons, based on the latest combat load study by TRADOC, Ft. Knox. Each item in the combat load was weighed. The General Dynamics Land Systems (GDLS) combat load data base has been adjusted.

e. (U) References - - M1

Development Estimate: DCP #117A, May 24, 1978.

Approved Program: SDDM Decision, May 8, 1979 and March 12, 1980.

Acceleration: 6.6 nominal - 7 maximum per M1 Tank System Specification # 5AX-00004A, dated April 16, 1984.

FY89 Amended President's Budget.

Demonstrated Performance: M1 Tank System Development Test (DT)/Operational Test (OT) 1979 - 1985. Power Train Durability Test, July 1983 - March 1984.

Current Estimate: M1 Tank System Specification Number 5AX-001G dated April 16, 1984.

(U) Technical/Operational Characteristics: M1A1

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. (U) Technical - -			
Weight (Cbt Loaded) (Short Tons)	63/67.5	65	67.5(Ch-1)

10. (U) Technical/Operational Characteristics: M1A1 (Cont'd)

		Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a.	(U) Technical (cont'd)			
	Width (inches)	NA/144±1.5	144±1.5	144±1.5
	Height (inches)(Top of Turret Roof)	NA/96±0.5	96±0.5	96±0.5
b.	(U) Operational - -			
	Range (Miles-Min)			
	Paved Roads (Minimum - Nominal)	257-279 w NBC/ 257 w NBC 270-289 w/o NBC/ 270 w/o NBC	265 w NBC 302 w/o NBC (PQT-G)	265 w NBC 302 w/o NBC
	Max Speed (MPH)			
	(Cross Country)	30/30	30	30
	(Paved Roads)	41.5/41.5	41.5	41.5
	Acceleration (max seconds)			
	Hard surface 0% slope			
	0-20 mph w/NBC	NA/7.5	7.1 (IPT)	7.5
	w/o NBC	NA/7.2	6.8 (IPT)	7.2

(b)(1)

Combat Mission Reliability (MMBF)	DT/OT II 298/ 320	403 (IPT)	403 (Ch-2)
System Maintainability (MR)	DT II 1.40/1.25	1.04 (IPT)	1.02 (Ch-3)
Power Train Durability (Probability of Achieving/ Miles)	.50/4000/NA	.39/4000 (IPT)	.50/4000 (Ch-4)
Vehicle Life (Miles prior to Hull & Turret Structure being reparable at Depot)	6000/NA	6000	6000
Track Life (Miles)	670/670	739 (IPT)	739 (Ch-5)

10. (U) Technical/Operational Characteristics: M1A1 (Cont'd)

Weapon Tube Life (Rounds)	500/NA	500/500	500/500
Sprocket Life (Miles)	1500/NA	2078 (IPT)	2078 (Ch-6)
Road/Idler Wheel Durability (Percent Replacement in 3000 Miles)	19%-3000/NA	3.2%-3000 (IPT)	3.2%-3000 (Ch-7)
Air Transportability	C5A	C5A	C5A

(b)(1)

c. (U) Previous Change Explanations - -

Engineering Changes to the basic M1/M1A1 increased the weight from 63.0 to 63.99 tons. High Reliability of 390 MMBF is based on positive production experience. The low Maintenance Ratio of 1.1 is based on maturation of the tank system.

(U) Current Change Explanations - -

(Ch-1) The estimated weight changed from 63.99 to 67.5 because of engineering improvements to the production vehicle. The additional change from 64.3 to 65 short tons is based on the latest combat load study by TRADOC, Ft. Knox. Each item in the combat load was weighed. The GDLS combat load data base was revised. With the addition of Block II and improved durability track, the weight of the M1A1 is expected to increase to 67.5 tons by 1992. Additional requirements for survivability enhancement may increase the Abrams weight to the Army mandated threshold of 70.0 tons.

(U) Technical/Operational Characteristics: M1A1 (Cont'd)

(Ch-2) The improved Reliability from 390 to 403 MMBF is based on IPT, December 31, 1987

(Ch-3) The maintenance ratio improvement from 1.10 to 1.02 is based on production changes implemented as a result of IPT data analysis.

(Ch-4) The Power Train Durability probability decreased from .50 to .39 based on IPT. Engine recuperator was the prime contributor. Recuperator fixes have been identified, incorporated, and are under test. It is estimated that with corrective actions in place, the requirement of .50/4000 will be met.

(Ch-5) Track life has decreased from 756 to 739 miles based on IPT. However, demonstrated performance exceeds criteria of 95% M1 = 95% of 705 miles = 670 miles, by achieving 739 miles.

(Ch-6) Sprocket life increased from 1500 to 2078 miles based on IPT.

(Ch-7) Road/Idler Wheel Durability has improved from 4% replacement in 3000 miles to 3.2% based on IPT. Demonstrated performance significantly improved on criteria of 95% of M1 (95% of 20% = 19%) by achieving 3.2%.

e. (U) References - -

Development Estimate: M1E1/DCP Annex B, September 28, 1984.

Approved Program: FY89 Amended President's Budget and Approved Program Baseline, 26 Feb 1988.

Demonstrated Performance/Current Estimate: Completion of M1A1 Initial Production Test, June 1986-September 1987, and evaluation of results as of December 31, 1987.

f. (U) Footnotes - - M1A1

1/ Condition, Tank-Target (stationary or moving).
2/ AMSAA Independent Evaluation Report for the Initial Production Testing is not complete at this time.
3/ Crew and Ammunition Compartments.

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

	Development Estimate	Changes	Current Estimate
a. (U) Cost - -			
Development (RDTE)	422.6	257.7	680.3
Primary Veh/105mm Gun	(422.6)	(18.5)	(441.1)
Primary Veh/120mm Gun	(0.0)	(239.2)	(239.2)
Procurement	1970.2	4187.1	6157.3
Primary Veh/105mm Gun	(1900.4)	(180.3)	(2080.7)
Primary Veh/120mm Gun	(0.0)	(3644.3)	(3644.3)
Initial Spares	(69.8)	(238.9)	(308.7)
Training Devices	(0.0)	(123.6)	(123.6)
Construction (MILCON)	0.0	9.0	9.0
Total FY72 Base-Year $	2392.8	4453.8	6846.6

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

Escalation	2386.6	12766.3	15152.9
Development (RDTE)	(162.0)	(437.8)	(599.8)
Procurement	(2224.6)	(12315.1)	(14539.7)
Construction (MILCON)	(0.0)	(13.4)	(13.4)
Total Then-Year $	4779.4	17220.1	21999.5

	Development Estimate	Changes	Current Estimate
b. (U) Quantities - -			
Development (RDTE)			
105mm Gun	13	0	13
120mm Gun	0	0	0
Procurement			
105mm Gun	3312	-44	3268
120mm Gun	0	4576	4576
Total	3325	4532	7857
c. (U) Unit Cost - -			
Procurement			
FY72 Base-Year $	0.6	0.2	0.8
Then-Year $	1.3	1.3	2.6
Program			
FY72 Base-Year $	0.7	0.2	0.9
Then-Year $	1.4	1.4	2.8

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

	(Average Unit Rollaway Cost) Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty 3312			
@ Prod Rate: 60/Month			
FY72 Base-Year $	.6/.6	.6	.6
Then-Year $	1.2/1.2	1.9	1.2

e. (U) Foreign Military Sales - - In response to an Egyptian request to coproduce 555 M1A1 tanks in Egypt from 1991-98, the Army has submitted a 36(b) Congressional notification to USD for submission to Congress. The Army is currently drafting a Memorandum of Understanding to be negotiated upon Congressional approval of the U.S./Egyptian M1A1 Coproduction Program.

Egypt is expected to finance coproduction partially out of U.S. FMS credit and partially with Egyptian funds. The 36(b) notification estimates the cost of the Coproduction Program to be $1,719.62 million. Throughout the Coproduction program, The U.S. will produce at least 60% of the content of the tanks, thus assuring U.S. employment over and above the work attributed to the tank production for the Army, as well as economies of scale aiding in the reduced cost of tanks produced for the Army.

f. (U) Nuclear Costs - - None

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

		Current Year		Budget Year
		Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a. (U)	Program Acquisition - -			
(1)	Cost	21999.5	21860.0	21999.5
(2)	Quantity	7857	7857	7857
(3)	Unit Cost	2.8	2.8	2.8
b. (U)	Current Procurement - -	(FY 1988)	(FY 1988 Appn) *	(FY 1989)
(1)	Cost	1696.1	1696.1	1424.4
	Less CY Adv Proc	166.0	166.0	212.1
	Plus PY Adv Proc	173.1	173.1	235.1
	Net Total	1703.2	1703.2	1447.4
	* Adjusted to reflect FY 1988 Appropriations.			
(2)	Quantity	645	645	545
(3)	Unit Cost	2.6	2.6	2.7

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	6.2	217.7	-	223.9
Quantity	-	8326.1	-	8326.1
Schedule	-	1175.8	-	1175.8
Engineering	338.0	1170.5	-	1508.5
Estimating	233.8	4978.9	22.4	5235.1
Other	-	-	-	-
Support	98.5	512.7	-	611.2
Subtotal	676.5	16381.7	22.4	17080.6
Current Changes:				
Economic	0.2	36.9	-	37.1
Quantity	-	-	-	-
Schedule	-	-105.8	-	-105.8
Engineering	-	150.0	-	150.0
Estimating	18.8	146.5	-	165.3
Other	-	-	-	-
Support	-	-107.1	-	-107.1
Subtotal	19.0	120.5	-	139.5
Total Changes	695.5	16502.2	22.4	17220.1
Current Estimate	1280.1	20697.0	22.4	21999.5

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

(FY72 Constant (Base-Year) Dollars in Millions)

Development Estimate	422.6	1970.2	-	2392.8
Previous Changes:				
Economic	-	-	-	-
Quantity	-	2409.3	-	2409.3
Schedule	-	123.1	-	123.1
Engineering	145.7	277.2	-	422.9
Estimating	58.7	1264.9	9.0	1332.6
Other	-	-	-	-
Support	46.2	74.9	-	121.1
Subtotal	250.6	4149.4	9.0	4409.0
Current Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-20.8	-	-20.8
Engineering	-	37.6	-	37.6
Estimating	7.1	46.9	-	54.0
Other	-	-	-	-
Support	-	-26.0	-	-26.0
Subtotal	7.1	37.7	0.0	44.8
Total Changes	257.7	4187.1	9.0	4453.8
Current Estimate	680.3	6157.3	9.0	6846.6

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. Revised estimates of development cost for Block II improvements and increased funding of previously unfunded Block II requirements.

(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 schedule.
Engineering: Incorporated 120mm gun and revised Block II improvements, Chemical Agent Resistant Coating (CARC), Reliability, Availability, Maintainability - Durability (RAM-D) investments, and optical improvements. Increased provision for eng'g changes and reduced scope and slip of Block II.

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

Estimating: Increased cost for initial production facilities. Revised estimates from contract awards for transmission and final drive. Negotiations that resulted in revised proposals on multi-year procurement data for basic vehicle, engine, and fire control subsystems. Additional requirements for first article test, government engineering and test, special projects, and contractor survivability test.

Support: Revised estimates for peculiar support equipment (TMDE, Special Tools), initial spares (engine and modules), special tools, training devices, test sets, and system technical support.

(U) MILCON

Estimating: Revised estimate to include MILCON in December 31, 1982 SAR. Added 0.5M base-year dollar error correction.

c. (U) Current Change Explanations - -

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDTE		
Revised January 1988 economic escalation rates. (Economic)	N/A	0.2
Congressional increase for Block II unfunded requirements. (Estimating)	7.1	18.8
(2) (U) Procurement		
Revised January 1988 economic escalation rates. (Economic)	N/A	36.9
Program revisions.	37.7	83.6
* A total of 90 tanks from FY92 were rescheduled to the FY85-89 period. (Schedule)	(-20.8)	(-105.8)
* Revised estimates for Block II. (Engineering)	(37.6)	(150.0)
* Revised estimates for vehicle (103.2), auxiliary services (39.9), system technical support (86.3), RAM-D (-28.0), government engineering/test/quality assurance (-38.3), and misc (-16.6). (Estimating)	(46.9)	(146.5)
* Revised requirements for initial spares (-64.3), training devices (-13.1), and special tools/special test equipment (-29.7). (Support)	(-26.0)	(-107.1)

Tank, Combat, FT. M1/M1A1, December 31, 1987

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

d. (U) References - -

Development Estimate: DCP #117A, 24 May 1978.

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	
.9	.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	.03	.23	.14	.21	.69	-	.06	1.36	2.80

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

a. (U) RDT&E - - NA

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

b. (U) Procurement - -

Servo Torque Drive Assembly (STDA)
7th-9th Year Production (MYP)
Kearfott Div, Singer Co.
Little Falls, NJ
DAAA09-84-G-0002/0002
FFP
Award: June 29, 1984
Definitized: November 12, 1985

Initial Contract Price		
Target	Ceiling	Quantity
51.2	N/A	2520

Current Contract Price		
Target	Ceiling	Quantity
44.1	NA	2520

Estimated Price at Completion	
Contractor	Program Manager
44.1	44.1

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

Laser Range Finder, 8th-10th Year, and Thermal Imaging System, 8th-12th Year, Production (MYP)
Hughes Aircraft Co
El Segundo, CA
DAAA09-85-G-0029/0026
FFP
Award: May 31, 1986
Definitized: September 26, 1987

Initial Contract Price		
Target	Ceiling	Quantity
$370.0	N/A	3299

Current Contract Price		
Target	Ceiling	Quantity
370.0	NA	3299

Estimated Price at Completion	
Contractor	Program Manager
370.0	370.0

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

Transmission 9th Year Production
Allison Transmission Div, Gen Mtrs
Indianapolis, IN
DAAE07-87-C-A010
FFP
Award: February 27, 1987
Definitized: February 27, 1987

Initial Contract Price		
Target	Ceiling	Quantity
104.6	NA	762

Current Contract Price		
Target	Ceiling	Quantity
104.6	NA	762

Estimated Price at Completion	
Contractor	Program Manager
104.6	104.6

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
Award: November 12, 1987
Definitized: November 12, 1987

Initial Contract Price		
Target	Ceiling	Quantity
89.3	NA	669

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
Award: June 13, 1986
Definitized: March 31, 1987

Initial Contract Price		
Target	Ceiling	Quantity
301.6	N/A	840

Current Contract Price		
Target	Ceiling	Quantity
1050.6	NA	3299

Estimated Price at Completion	
Contractor	Program Manager
1050.6	1050.6

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

Tank, 8th-12th Year Production, MYP
General Dynamics Land Systems Div
Warren, MI
DAAE07-85-C-A043
FFP
Award: April 1, 1985
Definitized: May 29, 1987

Initial Contract Price		
Target	Ceiling	Quantity
3569.8	N/A	840

Current Contract Price		
Target	Ceiling	Quantity
3569.8	NA	3000

Estimated Price at Completion	
Contractor	Program Manager
3569.8	3569.8

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: 81.0% (17 yrs/21 yrs)

(2) Percent Program Cost Appropriated: 75.1% ($16520.8/$21999.5).

b. (U) Appropriation Summary - -

(Then-Year Dollars in Millions)

Appropriation	Current and Prior Years (FY72-88)	Budget Year (FY89)	Balance FYDP (FY90-93)	To Complete Beyond FYDP (FY94)	Total
RDT&E	1189.6	45.7	44.8	0	1280.1
Procurement	15308.8	1424.4	3963.8	0	20697.0
MILCON	22.4				22.4
Total	16520.8	1470.1	4008.6	0	21999.5

c. (U) Annual Summary - - Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.

Fiscal Year	QTY	FY72 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Rollaway		Total	Advance Proc		Total	
		Non-Rec	Rec		Debit	Credit		
Appropriation: RDT&E								
1972				19.3			20.0	
1973				19.4			21.5	4.6
1974				46.1			53.8	7.6
1975				51.9			65.0	8.2
1976				38.8			52.8	7.5
197T				27.0			39.3	4.7
1977				63.8			98.6	9.8
1978				74.9			125.8	7.0
1979				50.2			92.3	8.4
1980				34.0			68.7	9.4
1981				43.4			96.4	11.9
1982				48.3			114.2	7.6
1983				28.1			69.3	4.9
1984				34.1			87.4	3.8
1985				24.2			64.1	3.4

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

Fiscal Year	QTY	FY72 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Rollaway			Advance Proc		Total	
		Non-Rec	Rec	Total	Debit	Credit		
1986				9.0			22.8	2.8
1987				9.4			24.5	2.7
1988				27.0			73.1	3.7
1989				16.3			45.7	3.8
1990				5.1			14.9	3.6
1991				6.7			19.9	3.3
1992				3.3			10.0	2.8
Subtotal	13			680.3			1280.1	
Appropriation: Procurement								
1977		12.9		12.9			21.2	.57
1978		57.9		87.4	37.0		164.8	3.61
1979	90	69.2	81.6	190.8	67.5	37.0	402.7	10.67
1980	309	53.9	194.0	301.0	70.5	67.5	729.1	11.37
1981	569	62.5	351.1	511.2	133.9	70.5	1416.8	18.31
1982	665	17.3	374.1	521.6	212.0	133.9	1557.4	20.22
1983	855	32.8	427.8	620.8	368.4	212.0	1976.6	9.00
1984	840	16.9	416.0	507.3	290.8	368.4	1696.6	8.00
1985	854	13.5	471.7	566.1	301.3	289.0	1912.8	3.40
1986	800	5.5	448.6	532.7	281.4	247.6	1863.8	2.80
1987	810	3.4	445.8	515.8	233.0	265.6	1870.9	2.70
1988	645	13.5	369.3	451.5	166.0	173.1	1696.1	3.70
1989	545	1.2	307.9	367.1	212.1	235.1	1424.4	3.80
1990	304	21.5	233.1	335.6	379.5	274.2	1339.9	3.60
1991	331	4.2	329.4	403.0	292.9	379.5	1650.0	3.30
1992	227	0.5	170.3	232.5		292.9	973.9	2.80
Subtotal	7844	386.7	4620.7	6157.3	3046.3	3046.3	20697.0	
Appropriation: MILCON								
1980				2.6			5.8	
1981								10.6
1982								7.6
1983				3.7			9.4	4.9
1984				1.6			4.3	3.8
1985				1.1			2.9	3.4
Subtotal				9.0			22.4	
Total	7857	386.7	4620.7	6846.6	3046.3	3046.3	21999.5	

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

d. (U) Obligations and Expenditures - -

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1972	20.0	20.0	20.0
1973	21.5	21.5	21.5
1974	53.8	53.8	53.8
1975	65.0	65.0	65.0
1976	52.8	52.8	52.8
197T	39.3	39.3	39.3
1977	98.6	98.6	98.6
1978	125.8	125.8	125.8
1979	92.3	92.3	92.3
1980	68.7	68.7	68.7
1981	96.4	96.4	96.4
1982	114.2	113.7	113.7
1983	69.3	69.0	69.0
1984	87.4	87.4	87.4
1985	64.1	49.0	42.4
1986	22.8	22.7	14.2
1987	24.5	6.5	4.2
1988	73.1	6.5	.4
1989	45.7		
1990	14.9		
1991	19.9		
1992	10.0		
Total	1280.1	1089.0	1065.5
	Appropriation: Procurement		
1977	21.2	21.2	21.2
1978	164.8	162.9	162.1
1979	402.7	402.6	396.8
1980	729.1	724.6	695.3
1981	1416.8	1350.0	1308.1
1982	1557.4	1495.5	1430.9
1983	1976.6	1975.4	1856.6
1984	1696.6	1526.8	1494.8
1985	1912.8	1864.3	1718.9
1986	1863.8	1663.7	1358.7
1987	1870.9	1576.1	119.4
1988	1696.1	861.8	
1989	1424.4		
1990	1339.9		
1991	1650.0		
1992	973.9		
Total	20697.0	13624.9	10562.8

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

Fiscal Year	Then-Year (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: MILCON			
1980	5.8	5.8	5.8
1981			
1982			
1983	9.4	9.4	4.0
1984	4.3		
1985	2.9		
Total	22.4	15.2	9.8

17. (U) Production Rate Data:

a. (U) Annual Production Rates. (NOTE: The annual production rates shown differ from the annual funded quantities because the funded delivery periods (in months) are:

FY	Current Est	Max Economic
85	12.200	12.200
86	11.429	11.429
87	13.500	12.0
88	10.750	12.0
89	9.083	7.8
90	10.133	0

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1979	110	110	90	90
1980	352	352	309	309
1981	360	506	569	569
1982	360	665	665	665
1983	360	855	855	855
1984	360	840	840	840
1985	360	840	854	854
1986	360	840	800	800
1987	360	720	810	1080
1988	330	720	645	1080
1989		610	545	702
1990			304	
1991			331	
1992			227	

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

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

Item	Production Estimate	Variance	Current Estimate	Variance	Maximum Economic
Prog Acq Cost (BY $)	5747.9	1098.7	6846.6	430.3	6416.3
(TY $)	19574.2	2425.3	21999.5	1753.0	2246.5
PAUC (BY $)	0.7	0.2	0.9	0.1	0.8
(TY $)	2.6	0.2	2.8	0.2	2.6

c. (U) Schedule Variance - -

Item	Development Estimate	Variance	Current Estimate	Variance	Maximum Economic
Start Data (Mo/Yr)	2/80		2/80		2/80
Duration (in Months)	118	49	167	37	130
End Date (Mo/Yr)	12/89		1/94		12/90

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

	To Date
RDT&E	13/13
Procurement	4746/4750

18. (U) Operating and Support Costs: NA

87-023

AH-64A, December 31, 1987

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AH-64 (APACHE)

A-2 AH-64

AS OF DATE: December 31, 1987

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1. (U) Designation and Nomenclature (Popular Name): AH-64A/Advanced Attack Helicopter (APACHE)

(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 644810 Project DB54 (Shared)
PROCUREMENT: APPN 2031 SSN A06605/AA0951/AA0968

MILCON: Project 1304/2131

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

OASD(PA) DFOISR 88-T-0837

ludes the HELLFIRE anti-tank missile system, 30MM automatic gun and 2.75" rockets. This aircraft is the platform for the Target Acquisition Designation Sight/Pilot Night Vision Sensor (TADS/PNVS) which will provide day and night acquisition and designation of targets and hand-off capabilities in support of HELLFIRE and other guided munitions. 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 the APACHE was approved, was held on 26 March 1982. Production contracts for first production quantity of 11 aircraft and associated equipment were rded to Hughes, MMOA and General Electric in April 1982. The FY 84 President's Budget increased the procurement objective from 446 to 515 helicopters. 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) installed at Fts. Rucker and Hood.

b. (U) Significant Developments Since Last Report -- Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions. A total of 309 production APACHEs was delivered through 31 December 1987. This completed the fourth Production Lot of Air Vehicles on schedule. The option for P7 (FY88) requirements of 67 APACHEs was exercised on 1 November 1987. Settlement with MMOA for TADS/PNVS Lot 7 Hardware and FY88 Program Support was reached 1 December 1987. Congress increased program to buy 10 additional aircraft in FY88. Currently, five Attack Helicopter Battalions (AHBs) have been fielded and are combat ready, four at Ft. Hood and one in USAREUR. Two APACHE AHBs, 1-6 AHB and 2-6 AHB, participated in REFORGER 1987. The 2-6 Aircraft were ferried to Illesheim, Germany, upon completion of REFORGER to become USAREUR's Initial APACHE AHB. During REFORGER, the APACHEs flew 841 hours with a 90% Operational Readiness Rate. The first Army National Guard unit to receive the APACHEs, the 1-130 AHB North Carolina National Guard, began CADRE training in [redacted]y 1987, with actual unit training beginning in November 1987, at Raleigh, NC. The entire unit will return to Ft. Hood in July 1988 to complete the evaluation phase of its training program. A total of three van mounted Electronic Equipment Test Facilities (EETFs) and one floor mounted EETF were fielded during 1987. The first of three CMSs for USAREUR was fielded in November 1987. As of 31 December 1987, fielded APACHE's had flown approximately 75,000 hours.

On [redacted] August 1987, COL Curtis J. Herrick, Jr., was designated as the APACHE PM succeeding BG Forster who is Program Executive Officer, Combat Aviation. The AH-64 system is expected to satisfy the mission requirement.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (dated 1 March 1982); SDDM (dated 15 April 1982)1/; or CSA Program Decision ltr (dated 21 September 1984) threshold breaches.

1/ Changed to reflect correct date of SDDM.

9. (U) Schedule:

a. (U) Milestones 1/ --

	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 Engineering 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 Operation	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 Engineering Dev)	Dec 76/ N/A	Dec 76
Engineering Design Test 3 Completed	Jul 79/ N/A	N/A
Competitive TADS Fly-Off Completed	Dec 79/ N/A	Mar 80
Engineering Design Test 4 Completed	N/A/ N/A	Nov 80
Milestone III (DSARC III)	May 80/Mar 82	Mar 82
Contract Award (LLTI)	Jun 80/Feb 81	Feb 81
Contract Award (Production)	Oct 80/Apr 82	Apr 82
Engineering Design Test 5 Completed	N/A/ N/A	Jan 81
OT II Completed	Feb 81/ N/A	Aug 81
First Production Delivery (AC)	Jun 82/Jan 84	Jan 84
Initial Operational Capability (IOC)	May 83/Jul 86	Jul 86

1/ OT IIa Completed was deleted to agree with 30 Jun 80 SAR as no longer a measurable stub item.

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 -- None.

d. (U) References --

(U) Development Estimate: Dep Sec Def Memo, January 5, 1977, subject: "Advanced Attack Helicopter (AAH) DSARC II."

(U) Approved Program: FY 88/89 Amended President's Budget; and "Advanced Attack Helicopter (AAH) System Production Baseline," 26 February 1988.

AH-64A, December 31, 1987

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Dev Estimate/ Appr Program 1/	Demonstrated Performance	Current Estimate
(b)(1)			
b. (U) Operational --			
(U) Primary Mission Gross Weight (PMGW) lbs. w/8 HF Msls, 320 Rds, 30MM	13,910/NA	14,694	14,765
(U) Cruise Airspeed @ PMGW - KTAS	145-175/145	145	145
(U) Vertical Rate of Climb @ PMGW-FPM	450-500/450	900	800
(U) Mission Reliability (MTBF)	19.5/19.5	18.7	19.5
(U) AVUM/AVIM Direct Maintenance MMH per FH	8-13/13	3.6	13
(b)(1)			
(U) Endurance (hrs) -Primary Mission	1.83/1.83	1.83	1.83
-Alternate Mission	2.5-2.8/2.5	2.5	2.5
(U) System Reliability (MTBF)	N/A/2.8	5.5	2.8
(U) Operational Availability	N/A/.62	.73	.72
(U) TADS System Reliability (MTBF)	N/A/63	126	126(Ch-1)
(U) PNVS System Reliability (MTBF)	N/A/160	253	253(Ch-2)

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 Demonstarted and Survey, and Airworthiness and Flight Characteristics Test.

d. (U) Current Change Explanations --

(U) (Ch-1) TADS System Reliability (MTBF) changed (Demonstrated Performance and Current Estimate) from 78 to 126 based on latest RAM/Log data collected through August 1987.

(U) (Ch-2) PNVS System Reliability (MTBF) changed (Demonstrated Performance and Current Estimate) from 237 to 253 based on latest RAM/Log data collected through August 1987.

1/ The following values have been updated to reflect the 26 February 1988 APACHE System Production baseline:

(b)(1)

(U) Vertical Rate of Climb @PMGW-FPM changed from 800 to 450.

(b)(1)

(U) Operational Availability changed from .72 to .62.

(U) TADS System Reliability (MTBF) changed from 78 to 63.

(U) PNVS System Reliability (MTBF) changed from 237 to 160.

e. (U) References --

(U) Development Estimate: Dep Sec Def Memo, 5 January 1977, subject, "Advanced Attack Helicopter (AAH) DSARC II."

(U) Approved Program:

FY 88/89 Amended President's Budget.

"Advanced Attack Helicopter (AAH) System Production Baseline," 26 February 1988.

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

a. (U) Cost --	Development Estimate	Changes	Current Estimate
Development	$609.4	$+239.9	$849.3
Procurement	1283.0	+1365.6	2648.6
Acft Flyaway	(998.0)	(+1040.4)	(2038.4)
HF Launcher (APA)	(-0-)	(+17.7)	(17.7)
HF Launcher (Other)	(15.4)	(-9.9)	(5.5)
Total Flyaway	(1013.4)	(+1048.2)	(2061.6)
Initial Spares (Acft)	(136.0)	(+134.5)	(270.5)
Initial Spares (HF)	(1.3)	(+2.5)	(3.8)
Other Wpn Sys Cost	(132.3)	(+180.4)	(312.7)
Construction	-0-	+23.0	23.0
Total FY 72 Base Year	1892.4	+1628.5	3520.9
Escalation	1897.4	+4445.1	6342.5
Development (RDT&E)	(326.3)	(+279.9)	(606.2)
Procurement	(1571.1)	(+4275.5)	(5846.6)
Acft	((1556.1))	((+4232.9))	((5789.0))
HF Launcher (APA)	((-0-))	((+47.9))	((47.9))
HF Launcher (Other)	((15.0))	((-5.3))	((9.7))
Construction (MILCON)	(-0-)	(+41.7)	(41.7)
Total Then-Year $	$ 3789.8	$+6225.6	$10015.4
b. (U) Quantities --			
Development(RDT&E)	9	--	9
Procurement	536	+139	675
Total	545	+139	684
c. (U) Unit Cost --			
Procurement:			
FY 72 Base Year $	$2.4	$+1.5	$3.9
Then-Year $	5.3	+7.3	12.6
Program:			
FY 72 Base Year $	3.5	+1.6	5.1
Then-Year $	$7.0	$+7.6	$14.6

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

	Dev Estimate/ Appr Program	(Average Unit Flyaway Cost) Current Estimate	Latest Approved Threshold
@ Qty: 515		675	
@ Peak Rate: 12/mo		12/mo	
FY 72 Base Year $	1.804/3.314	3.05	3.314
Then-Year $	4.511/10.660	9.80	10.660

e. (U) Foreign Military Sales --

Country	Quantity	Estimated Cost
Federal Republic of Germany	1/	$25.3M

(U) 1/ One primary FMS case 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 $25.3M.

f. (U) Nuclear Costs -- None

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

	Current Year		Budget Year
	Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a. (U) Program Acquisition --			
(1) (U) Cost	10015.4	8843.6	10015.4
(2) (U) Quantity	684	602	684
(3) (U) Unit Cost	14.64	14.69	14.64
b. (U) Current Procurement --	(FY 1988)	(FY 1988 Appn)	(FY 1989)
(1) (U) Cost	939.8	939.8	893.1
Less CY Adv Proc	36.0	36.0	36.0
Plus PY Adv Proc	41.2	41.2	36.0
Net Total	945.0	945.0	893.1
(2) (U) Quantity	77	77	72
(3) (U) Unit Cost	12.27	12.27	12.40

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	+615.0	-10.0	+629.5
Quantity	--	+173.3	--	+173.3
Schedule	+200.4	+338.5	--	+538.9
Engineering	+61.9	+155.8	--	+217.7
Estimating	-35.5	2425.9	+84.0	+2474.4
Other	--	--	--	--
Support	+32.4	+ 987.6	--	+1020.0
Subtotal	+283.7	+4696.1	+74.0	+5053.8
Current Changes:				
Economic	--	+24.9	-.2	+24.7
Quantity	--	+482.6	--	+482.6
Schedule	--	+68.7	--	+68.7
Engineering	--	+38.4	--	+38.4
Estimating	+236.1	140.4	-9.1	+367.4
Other	--	--	--	--
Support	--	+190.0	--	+190.0
Subtotal	+236.1	+945.0	- 9.3	+1171.8
Total Changes	+519.8	+5641.1	+64.7	+6225.6
Current Estimate	1455.5	8495.2	64.7	10015.4

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	--	+72.8	--	+72.8
Schedule	+94.6	+11.2	--	+105.8
Engineering	+27.6	+49.3	--	+76.9
Estimating	+17.0	+678.0	+26.1	+721.1
Other	--	--	--	--
Support	+17.4	+221.9	--	+239.3
Subtotal	+156.6	+1033.2	+26.1	+1215.9
Current Changes:				
Quantity	--	+134.1	--	+134.1
Schedule	--	+35.0	--	+35.0
Engineering	--	+13.1	--	+13.1
Estimating	+83.3	+81.1	-3.1	+161.3
Other	--	--	--	--
Support	--	+69.1	--	+69.1
Subtotal	+83.3	+332.4	-3.1	+412.6
Total Changes	+239.9	+1365.6	+23.0	+1628.5
Current Estimate	849.3	2648.6	+23.0	3520.9

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.
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).
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.

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 support costs; support of 160 additional aircraft; HF missile launcher funds increase due to acft qty increase. Revised spares definition.

(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		
Estimating Changes	+83.3	+236.1
o Reflects reprogrammed funding for Optical Improvement Program	(+.6)	(+1.4)
o Multi Stage Improvement Program	(+82.7)	(+234.7)
(2) (U) Procurement		
Revised Feb 88 economic escalation rates. (Economic)	N/A	+24.9
Increase of fleet from 593 to 675.	+332.4	+920.1
o Addition of 82 aircraft. (Quantity)	(+134.1)	(+482.6)
o Changes applicable to additional 82 aircraft and period of performance. (Estimating)	(+116.1)	(+208.8)
o Increase of Special Mission Kits, ASE suites Ground Spt Equipment, and Spares as the result of larger fleet size (675 vs 593). (Support)	(+82.2)	(+228.7)

o Correction of category shown in 31 Dec 85 SAR ("movement of 6 aircraft from FY 1985 to FY 1988") (Schedule)	+35.0	+68.7
o Correction of category shown in 31 Dec 85 SAR ("additional effort, Airborne Target Handover Systems") (Engineering)	+13.1	+38.4
o Correction of category shown in 31 Dec 85 SAR ("movement of 6 aircraft from FY1985 to FY1988") (Estimating)	-35.0	-68.7
o Correction of category shown in 31 Dec 85 SAR ("additional effort, Airborne Target Handover System") (Support)	-13.1	-38.4
o Correction of Typographical error in Previous Changes, 31 Dec 86 SAR (Escalated dollars only) (Support)	N/A	-.3

(3) (U) MILCON

Revised Feb 88 economic escalation rates (Economic)	N/A	-.2
Decrease due to addition/deletion of FY85, 88 and 89 system specific construction projects for APACHE (Estimating)	-3.1	-9.1

d. (U) References --

(U) Development Estimate: Dep Sec Def Memo, January 5, 1977, subject: "Advanced Attack Helicopter (AAH) DSARC II."

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	+ .956	-.454	+.888	+.374	+4.154	--	+1.770	+7.688	14.642

1 (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-A002, FFP, Award: November 1, 1984 Definitized: March 29, 1985	$665.6	N/A	138

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$666.2	N/A	138	$666.2	666.2

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

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Helicopter Co. Mesa, AZ DAAJ09-85-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
$ 80.5	N/A	N/A	$ 80.5	$ 80.5

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

TADS/PNVS	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	Estimated Price at Completion Contractor	Program Manager
$321.7	N/A	261	$321.7	$321.7

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

1[redacted] (U) Contract Information (Cont'd): (Then-Year Dollars in Millions)

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
$278.0	N/A	632	$278.0	$278.0

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

1/ Quantity reduced from 791 to 632 due to reduced aircraft buy.

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
$ 89.2	N/A	N/A	$ 89.2	$ 89.2

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

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Helicopter Co. 1/ 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
$1557.8	N/A	284	$1557.8	$1557.8

1/ P7 requirements originally awarded November 1986 on contract DAAJ09-86-C-A011; later transferred to DAAJ09-87-C-A009.

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

---

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

a. (U) Program Status --

(1) (U) Percent Program Completed: 80.0% (16 yrs/20 yrs)

(2) (U) Percent Program Cost Appropriated: 88.5% (8859.9/10015.4)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY73-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-94)	Beyond FYDP	Total
RDT&E	1245.5	90.0	120.0	--	1455.5
Procurement	7573.5	893.1	28.6	--	8495.2
MILCON	40.9	23.8	0	--	64.7
Total	8859.9	1006.9	148.6	--	10015.4

c. (U) Annual Summary -- Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions.

Fiscal Year	Qty	FY 72 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E								
1973				19.5			20.0	4.4
1974	2			44.3			49.1	7.9
1975				49.5			60.7	10.9
1976				56.4			73.9	6.6
197T				13.3			17.8	2.9
1977	7			94.5			130.8	2.6
1978				112.5			166.4	6.8
1979				112.0			179.4	8.4
1980				99.3			176.0	10.6
1981				88.2			172.8	10.6
1982				43.6			91.7	7.6
1983				9.0			22.1	4.9
1984				9.2			22.0	3.8
1985				10.1			24.9	3.4
1986				5.2			13.2	2.8
1987				0.0			0.0	2.7
1988				9.8			24.7	3.7
1989				32.1			90.0	3.8
1990				24.1			70.0	3.6
1991				13.4			40.0	3.3
1992				3.3			10.0	2.8
Subtotal	9			849.3			1455.5	

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

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

Fiscal Year	Qty	FY 72 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: Procurement (APA, APACHE)								
1981	LLT	14.0	6.1	23.4	53.2		61.2	11.6
1982	11	89.7	66.0	196.5	62.9	53.2	545.7	14.3
1983	48	71.2	150.0	308.7	113.1	62.9	909.8	9.0
1984	112	73.1	276.5	442.0	61.6	113.1	1356.8	8.0
1985	138	51.5	305.2	452.1	95.0	61.6	1429.0	3.4
1986	116	47.5	247.8	373.0	55.4	95.0	1220.9	2.8
1987	101	46.4	206.6	328.9	41.2	55.4	1110.3	2.7
1988	77	48.9	158.4	268.9	36.0	41.2	939.8	3.7
1989	72	52.5	144.9	247.4	36.0	36.0	893.1	3.8
1990	0	5.3	0.0	7.7		36.0	28.6	3.6
Subtotal	675	500.1	1561.5	2648.6	554.4	554.4	8495.2	
Appropriation: Procurement (APA, HELLFIRE)								
1981			(0.9)	(0.9)			(2.4)	11.6
1982			(4.6)	(4.6)			(12.8)	14.3
1983			(4.7)	(4.7)			(13.7)	9.0
1984			(3.7)	(3.7)			(11.6)	8.0
1985			(4.1)	(4.1)			(12.9)	3.4
1986			(3.8)	(3.8)			(12.5)	2.8
1987			(1.6)	(1.6)			(5.3)	2.7
1988			(1.5)	(1.5)			(5.5)	3.7
1989			(2.0)	(2.0)			(7.5	3.8
1990			(0.1)	(0.1)			(0.4)	3.6
Subtotal			(27.0)	(27.0)			(84.6)	
Appropriation: MILCON								
1983				3.4			8.7	4.9
1984				1.2			3.1	3.8
1985				5.8			15.6	3.4
1986				3.5			9.8	2.8
1987				1.3			3.7	2.7
1988				0.0			0.0	3.7
1989				7.8			23.8	3.8
Subtotal				23.0			64.7	
Total				3520.9			10015.4	

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

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
Appropriation: RDTE			
1973	20.0	20.0	20.0
1974	49.1	49.1	49.1
1975	60.7	60.7	60.7
1976	73.9	73.9	73.9
197T	17.8	17.8	17.8
1977	130.8	130.8	130.8
1978	166.4	166.4	166.4
1979	179.4	179.4	179.4
1980	176.0	176.0	176.0
1981	172.8	172.8	172.8
1982	91.7	91.7	91.7
1983	22.1	22.1	22.1
1984	22.0	22.0	22.0
1985	24.9	24.3	18.1
1986	13.2	13.2	4.1
1987	0.0	0.0	0.0
1988	24.7	0.0	0.0
To Complete	210.0	N/A	N/A
Total	1455.5	1220.2	1204.9
Appropriation: Procurement (APA, APACHE)			
1981	61.2	61.2	61.2
1982	545.7	545.7	544.3
1983	909.8	909.8	881.9
1984	1356.8	1351.9	1315.4
1985	1429.0	1372.2	1191.6
1986	1220.9	1170.0	435.3
1987	1110.3	1039.3	594.1
1988	939.8	537.1	0.0
To Complete	921.7	N/A	N/A
Total	8495.2	6987.2	5023.8
Appropriation: Procurement (APA, HELLFIRE)			
1981	(2.4)	(2.4)	(2.4)
1982	(12.8)	(12.8)	(12.8)
1983	(13.7)	(13.7)	(13.7)
1984	(11.6)	(11.6)	(9.2)
1985	(12.9)	(12.0)	(7.6)
1986	(12.5)	(9.7)	(3.1)
1987	(5.3)	(3.7)	(.2)
1988	(5.5)	(3.6)	(0.0)
To Complete	(7.9)	(N/A)	(N/A)
Total	(84.6)	(69.5)	(49.0)

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

d. (U) Obligations and Expenditures (Cont'd) --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation: MILCON		
1983	8.7	6.9	6.9
1984	3.1	1.7	1.5
1985	15.6	12.5	12.1
1986	9.8	3.1	2.9
1987	3.7	3.4	0.0
1988	0.0	0.0	0.0
To Complete	23.8	0.0	0.0
Total	64.7	27.6	23.4

17. (U) Production Rate Data:

a. (U) Annual Production Rates --

Fiscal Year	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	144
1986	96	144	116	144
1987	96	56	101	144
1988	60	--	77	72
1989	--	--	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	+808.7	3520.9	+124.8	3396.1
(TY $)	7402.4	+2613.0	10015.4	+461.0	9554.4
PAUC (BY $)	5.18	-.03	5.15	+.18	4.97
(TY $)	14.13	+.51	14.64	+.67	13.97

c. (U) Schedule Variance --

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo/Yr)	1/84		1/84		1/84
[redacted]uration (in Months)	64	+25	89	+12	77
[redacted]nd Date (Mo/Yr)	4/89		6/91		5/90

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(U) Deliveries (Plan/Actual) --

	To Date
RDT&E	9/9
Procurement	306/309

18. (U) Operating and Support Costs: N/A.

③

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

PROGRAM: CG 47 Class Guided Missile Cruiser

N-9 CG-47 AEGIS

AS OF DATE: December 31, 1987

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[redacted]

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 Shipbuilding 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~~

~~AS AMENDED~~

~~APR 11 1988~~

4. Program Elements/Procurement Line Items:

RDT&E: PE 0604567N/1319N

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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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 prior to FY 1982 ships), 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 September 1983. CG 47 has satisfied all mission requirements. In November 1986, BIW requested and Navy negotiated revised delivery dates for the BIW ships under construction.

b. Significant Developments Since Last Report -- The contract for the FY87 ships was awarded in April of 1987. The CG 66 and CG 68 will be constructed by Ingalls Shipbuilding Division (ISD), Pascagoula, Mississippi. Bath Iron Works (BIW), Bath, Maine, will build the CG 67. Both contracts are fixed price incentive. During 1987, the keel was laid on the CG 60 in April, the CG 61 in August, and the CG 63 in December at BIW. In June the keel was laid on the CG 62 at ISD. Four ships were commissioned in 1987 - USS MOBILE BAY (CG 53) in February, USS ANTIETAM (CG 54) in June, USS THOMAS S. GATES (CG 51) in August and USS LEYTE GULF (CG 53) in September. With the commissioning of the CG 55 there now are nine AEGIS Cruisers in active service.

In December 1987, BIW submitted a request for further changes to contract schedules and delivery dates for construction of six CG 47 Class ships. The following table shows the proposed changes to the delivery dates:

	From	To	Months
CG 58	01/30/89	01/29/89	-
CG 60	09/18/89	10/15/89	1
CG 61	12/11/89	03/04/90	3
CG 63	04/02/90	07/29/90	4
CG 64	11/26/90	11/25/90	-
CG 67	01/12/92	12/01/91	-1

The Navy is negotiating contract provisions to incorporate the revised delivery dates, recognizing that the delays are caused by factors solely attributable to BIW.

The greatest shortfall in the Navy force structure is AEGIS Combatants. The buy out of the CG 47 Class in FY88 insures quicker delivery of these highly capable ships to the fleet. The five ship cruiser buy in FY88 will save over $500 million, compared to buying out the class in FY88, 89 and 90. In addition, the substitution of three cruisers for the three Destroyers originally budgeted in FY88 allows the DDG 51 program additional time to mature.

7. Program Highlights (Cont'd):

c. Changes since "As of Date" -- The USS SAN JACINTO (CG 56) was commissioned on 23 January 1988. With the commissioning of the CG 56, there are now ten AEGIS Cruisers in active service.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP threshold breaches (AEGIS DCP #16 Revision #2 and CG 47 Class Guided Missile Cruiser #134 approved 2 March 1978).

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/Mar 81	Apr 81
Ship Commissioning, TICONDEROGA (CG 47)	Apr 83/Jan 83	Jan 83
Complete Post Shakedown Availability (CG 47)	Mar 83/Dec 83	Sep 83
TICONDEROGA Deployed	N/A	Oct 83
Launch VINCENNES (CG 49)	N/A	Jan 84
Lay Keel, BUNKER HILL (CG 52)	N/A	Jan 84
Ship Commissioning, VINCENNES (CG 49)	N/A	Jul 85
Launch MOBILE BAY (CG 53)	N/A	Aug 85
Ship Christening, THOMAS S. GATES (CG 51)	N/A	Dec 85
Ship Commissioning, VALLEY FORGE (CG 50)	N/A	Jan 86
Ship Commissioning, BUNKER HILL (CG 52)	N/A	Sep 86
Ship Commissioning, MOBILE BAY (CG 53)	N/A	Feb 87
Ship Commissioning, ANTIETAM (CG 54)	N/A	Jun 87
Ship Commissioning, THOMAS S. GATES (CG 51)	N/A	Aug 87
Ship Commissioning, LEYTE GULF (CG 55)	N/A	Sep 87
Ship Commissioning, SAN JACINTO (CG 56)	N/A	Jan 88 (CH-1)
Ship Commissioning, LAKE CHAMPLAIN (CG 57)	N/A	Aug 88 (CH-1)

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. The christening date for CG 51 changed from August 1985 to December 1985 because of the strike at Bath Iron Works, during 1985. The ship delivery date was moved from January 1987 to May 1987.

c. Current Change Explanations --

(CH-1) These milestones are reported for the first time with this SAR.

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: CG 47 Program Planning Schedule.
DAE Baseline, dtd February 1988.
FY88/89 Ammended Biennial Budget.

10. Technical/Operational Characteristics:

	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical --			
(1)(U) Ship:			
(a)(U) Length (overall, in feet)	563/563	567	567
(b)(U) Beam (feet)	55/55	55	55
(c)(U) Draft Navigational (feet)	31.7/31.7	31.7	31.7
(d)(U) Displacement (LT)	9100/10200	10200	9500 (CH-1
(e)(U) Propulsion			
1. Type	Gas Turbine/ Gas Turbine		Gas Turbine
2. Horsepower (2 Shafts)	80000/80000		80000
(f)(U) Accommodations			(CH-2)
1. Officers	33/33		37
2. CPO's and Enlisted	327/327		372
b. Operational --			
(1)(U) Ship:			
(a)(U) Speed, sustained (@ 80% power, in knots)	30/30	30+	30+
(b)(1)			
(c)(U) Armament			
1(U) Anti-Submarine Warfare			
a Under Water Fire Control System	MK-116 Mod 4/ MK-116 Mod 4		MK-116 Mod 6
b Sonar System	AN/SQS-53A/ AN/SQS-53A		AN/SQS-53C (CH-1)
c Towed-Array Sonar System	AN/SQR-19/ AN/SQR-19		AN/SQR-19
d Helo System	Seahawk/Seahawk		Seahawk
e MK-46 Torpedoes	MK-46/MK-46		MK-46
f Anti-Submarine Rocket	ASROC/ASROC		VLA
2(U) Anti-Air Warfare			
a AEGIS Weapon System	MK-7 Mod 3/ MK-7 Mod 3		MK-7 Mod 5
b Guided Missile Launching System	MK-26 Mod 1/ MK-26 Mod 1		MK-41 VLS

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

b. Operational --	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
2(U) Anti-Air Warfare (Cont'd)			
c Long Range Air Search Radar System	AN/SPS-49/ AN/SPS-49		AN/SPS-49
d PHALANX	MK-15 Mod 0/ MK-15 Mod 0		MK-15 Mod 2 Block I
e Electronic Warfare	SLQ-32/SLQ-32		SLQ-32
f STANDARD Missile	SM-2/SM-2		SM-2
3(U) Anti-Surface Warfare			
a Surface Search Radar	AN/SPS-55/ AN/SPS-55		AN/SPS-55
b HARPOON Weapon System/Launchers	4 Pod/4 Pod		4 Pod
c 5"/54 Rapid Fire Guns	MK-45/MK-45		MK-45
d Cruise Missile Control System			TOMAHAWK
(2)(U) AEGIS Weapon System	N/A		N/A

c. Previous Change Explanations --

The overall length of the TICONDEROGA (CG 47) is 563 feet. Beginning with CG 52 the overall length is 567 feet. The additional four feet is for the bulwark on the bow. 10,200 LT represents limiting displacement. Accommodations were increased beginning with CG 49 to support an increase in the Combat Systems. The Underwater Fire Control System, starting with CG 56, changed MK-116 to Mod 6 and AN/SQS-53A to AN/SQS-53B. Incorporation of the AN/SQR-19 was in CG 54 and beyond during construction. Incorporation of Seahawk was in CG 49 and beyond during construction. CG 47 and CG 48 are armed with Sea Sprites. ASROC is on CG 47 through CG 51. VLA replaces ASROC beginning with CG 52. Vertical Launch System MK 41 replaces MK 26 Mod 1 starting with CG 52. Block I was approved for limited production in November 1985 with installation beginning on the FY 86 ships. TOMAHAWK begins on CG 52. The AEGIS Weapon System, starting with CG 59, changed from SPY-1A to SPY-1B (MK-7/Mod 5).

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

d. Current Change Explanations -- (CH-1) 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. (CH-2) Accommodations were increased to meet operating requirements.

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: Same as Section 9d.

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

	Production Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	$ 55.5	+12.7	$ 68.2
Procurement (SCN)	3958.2	+5324.0	14282.2
Basic Ship Costs	(3440.3)	(+1536.4)	(4976.7)
AEGIS Weapon System	(2598.8)	(+1295.9)	(3894.7)
Other GFE	(1874.6)	(+2780.8)	(4655.4)
Other Costs	(832.9)	(-498.2)	(334.7)
OF/PD	(211.6)	(+209.1)	(420.7)
Construction (MILCON)	0.0	+14.4	14.4
Total FY 78 Base-Year $	$ 9013.7	+5351.1	$ 14364.3
Escalation	5069.8	+4792.4	9862.2
Development (RDT&E)	(1.8)	(+6.1)	(7.9)
Procurement (SCN)	(5068.0)	(+4777.0)	(9845.0)
MILCON	(0.0)	(+9.3)	(9.3)
Total Then-Year $	$ 14083.5	+10143.5	$ 24227.0
b. Quantities --			
Development (RDT&E)	0	-	0
Procurement (SCN)	16	+11	27
Total	16	+11	27
c. Unit Cost --			
Procurement (SCN):			
FY 78 Base-Year $	$ 559.9	$ -30.9	$ 529.0
Then-Year $	876.6	+17.0	893.6
Program:			
FY 78 Base-Year $	563.4	-31.4	532.0
Then-Year $	$ 880.2	$ +17.1	$ 897.3

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

d. 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/ Appr Program	Current Estimate	Latest Approved Threshold
FY 78 Base-Year $	540.0/540.0	537.6	N/A
Then-Year $	864.8/864.8	875.0	N/A

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

		Current Year		Budget Year
		Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a.	Program Acquisition --			
	(1) Cost	24227.0	24369.2	24227.0
	(2) Quantity	27	27	27
	(3) Unit Cost	897.3	921.1	897.3
			(FY 88 Budget)	
b.	Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
	(1) Cost	4198.2	2007.3	72.9
	Less CY Adv Proc	-	-11.0	-
	Plus PY Adv Proc	+18.9	+17.5	-
	Less OF/PD	-71.2	-70.3	-72.9
	Net Total	4145.9	1944.0	-
	(2) Quantity	5	2	-
	(3) Unit Cost	829.2	972.0	N/A

3. 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	+1.7	-680.1	-0.9	-679.3
Quantity	-	+11739.0	-	+11739.0
Schedule	-	+541.4	-	+541.4
Engineering	+9.7	+970.9	-	+980.6
Estimating	+7.7	-2274.5	-	-2266.8
Other	-	-	-	-
Support	-	+445.9	+24.9	+470.8
Subtotal	+19.1	+10742.6	+24.0	+10785.7
Current Changes:				
Economic	+0.1	-97.2	-	-97.1
Quantity	-	-	-	-
Schedule	-	-106.0	-	-106.0
Engineering	-	-	-	-
Estimating	-0.4	-440.6	-	-441.0
Other	-	-	-	-
Support	-	+2.2	-0.3	+1.9
Subtotal	-0.3	-641.6	-0.3	-642.2
Total Changes	+18.8	+10101.0	+23.7	+10143.5
Current Estimate	76.1	24127.2	23.7	24227.0

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	+5.3	-691.5	-	-686.2
Other	-	-	-	-
Support	-	+208.4	+14.5	+222.9
Subtotal	+12.9	+5591.7	+14.5	+5619.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-0.2	-268.5	-	-268.7
Other	-	-	-	-
Support	-	+0.8	-0.1	+0.7
Subtotal	-0.2	-267.7	-0.1	-268.0
Total Changes	+12.7	+5324.0	+14.4	+5351.1
Current Estimate	68.2	14282.2	14.4	14364.8

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: Stretchout of ship acquisition schedule.
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.
Support: Adjustment of outfitting and post delivery costs corresponding to program changes.

MILCON

Economic: Revised escalation indices.
Support: Funds for training and support sites.

3. Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
(Economic) Revised Jan 88 economic escalation rates	N/A	+0.1
(Estimating) Revised program funding requirements	-0.2	-0.4
(2) SCN		
(Economic) Revised Jan 88 economic escalation rates	N/A	-97.2
(Schedule) Procurement profile change from 2-2-1 (FY 88-90) to 5-0-0 (FY 88-90)	N/A	-106.0
(Estimating) Impact of program buy out in FY 88, revised estimates for all ship systems and adjustments to projected ship construction contract requirements	-268.5	-440.6
(Support) Impact to outfitting and post delivery requirements for the revised procurement schedule	+0.8	+2.2
(3) MILCON		
(Support) Change in MILCON requirements	-0.1	-0.3

d. References --

Production Estimate: - AEGIS DCP #16, Revisions #1 and #2; CG 47 DCP #134

Current Estimate: - FY 1988/89 Amended Biennial Budget Estimate, CG 47 Ship Data Sheet includes the following Program Elements:
RDT&E,N: 0604567N
SCN: 24292N
DAE Baseline, dtd February 1988

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

a. Initial SAR Estimate to Current Baseline Estimate -- Not Applicable.

b. Production Estimate to Current Estimate --

PAUC (Prod Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
880.219	-28.756	+75.170	+16.126	+36.319	-100.289	--	+17.507	+17.077	897.296

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 Division Pascagoula, Mississippi N00024-84-C-2035, FPI	$ 238.6	$ 267.5	1
(Mod)	$ 480.1	$ 537.1	2

Awarded: November 26, 1984 for CG 62 and modified January 8, 1986 for CG 65

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 Contractor	Program Manager
$ 499.9	$ 544.1	2	$ 491.7	$ 491.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date (12/31/87)	$ +23.4	$ - 6.6
Net Change	$ +23.4	$ - 6.6

Explanation of Change: Cost variance results from the contractor's favorable performance. Unfavorable schedule performance is temporary due to the early stage of construction and will not impact ship delivery dates. The program manager's assessment at completion is under target price.

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

Ship Construction (CG 54, 55, 56)	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding Division Pascagoula, Mississippi N00024-83-C-2013, FPI Awarded: June 20, 1983 Definitized: June 20, 1983	$ 939.7	$1084.0	3

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$ 973.2	$1135.7	3	$ 891.3	$ 884.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +38.3	$ -10.1
Cumulative Variances To Date (12/31/87)	$ +61.4	$ -28.7
Net Change	$ +23.1	$ -18.6

Explanation of Change: Cost variance results from the contractor's favorable performance. The unfavorable schedule performance reported is in material which is not a true schedule indicator. These ships delivered ahead of schedule. The program manager's assessment at completion remains well below the target contract price resulting in a significant cost underrun.

Ship Construction (CG 57, 59)	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding Division Pascagoula, Mississippi N00024-84-C-2004, FPI Awarded: December 16, 1983 Definitized: December 16, 1983	$ 325.5	$ 367.0	2

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$ 342.5	$ 378.9	2	$ 335.6	$ 335.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +24.1	$ - 3.2
Cumulative Variances To Date (12/31/87)	$ +35.3	$ -23.0
Net Change	$ +11.2	$ -19.8

Explanation of Change: Cost variance results from the contrator's favorable performance. The deterioration in schedule performance is not representative of the shipbuilder's true performance as mentioned above on the 54/55/56 contract; this unfavorable schedule performance reported is in material; labor is 1.5% ahead of schedule. The program manager's assessment, at completion, remains under the target price.

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

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: November 26, 1984 for CG 60/61 and modified January 8, 1986 for CG 63/64
Definitized: November 26, 1984 for CG 60/61 and January 8, 1986 for CG 63/64

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$ 795.9	$904.5	4	$ 844.4	$ 875.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ - 2.6	$ +19.4
Cumulative Variances To Date (11/31/87)	$ -17.6	$ + 7.5
Net Change	$ -15.0	$ -11.9

Explanation of Change: BIW has informed the Navy of ongoing schedule and productivity problems. Shipyard productivity has not returned to pre-strike levels and some cruiser assemblies are backlogged due to construction choke points. BIW has initiated significant efforts aimed at alleviating these problems including expanded production capabilities, a management reorganization, an increased work force, and numerous employee incentives. Recent results indicate their initiatives are having their intended effect. The program manager's assessment at completion remains above the target price but below the ceiling price.

AEGIS Weapon System (CG 63, 64, 65)	Initial Contract Price Target	Ceiling	Qty
RCA Government Systems Moorestown, New Jersey N00024-86-C-5102, FPI	$ 255.3	$ 282.6	3

Awarded: March 31, 1987
Definitized: March 31, 1987

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$ 254.7	$ 287.1	3	$ 257.7	$ 257.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date (12/31/87)	$ + 3.5	$ - 2.4
Net Change	$ + 3.5	$ - 2.4

Explanation of Change: Current variances are not significant. Contractor is expected to complete this contract within target.

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

AEGIS Weapon System (CG 60, 61, 62 and DDG 51) 1/	Initial Contract Price Target	Ceiling	Qty
RCA Government Systems Moorestown, New Jersey N00024-85-C-5100, FPI Awarded: Letter contract March 26, 1985 Definitized: December 23, 1985	$ 372.4	$ 414.0	4

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$ 414.8	$ 441.2	4	$ 414.8	$ 414.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ - 0.7	$ - 8.5
Cumulative Variances To Date (12/31/87)	$ + 2.8	$ - 6.2
Net Change	$ + 3.5	$ + 2.3

Explanation of Change: Contractor's cost report indicates improvement in cost and schedule performance. Performance improvement should continue and contract should be completed within target price.

c. MILCON -- Not Applicable.

1/ This is a combined procurement contract for the CG 60, 61, 62 and the DDG 51. It is reported in the SARs of each program.

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

a. Program Status --
(1) Percent Program Completed: 68.8% (11 yrs/16 yrs)

(2) Percent Program Cost Appropriated: 98.3% ($23821.7/$24227.0)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY78-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93)	Total
RDT&E	76.1	-	-	-	76.1
SCN	23721.9	72.9	251.3	81.1	24127.2
MILCON	23.7	-	-	-	23.7
Total	23821.7	72.9	251.3	81.1	24227.0

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

c. Annual Summary --

Fiscal Year	Qty	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%) 1/
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1978				39.4			39.4	-
1979				10.0			10.8	8.4
1980				5.4			6.5	10.6
1981				3.4			4.5	10.6
1982				5.0			7.2	7.6
1983				2.1			3.1	4.9
1984				1.0			1.5	3.8
1985				1.0			1.6	3.4
1986				0.6			1.0	2.8
1987				0.2			0.3	2.7
1988				0.1			0.2	3.7
Subtotal				68.2			76.1	

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	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%) 1/
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: SCN								
1978	1		667.5	667.5	31.7		925.3	-
1979	-		0.0	0.0		1.7	1.7	9.6
1980	1		499.0	499.0			798.2	9.9
1981	2		1012.8	1013.9		156.8	1787.0	9.6
1982	3		1804.0	1806.3	129.0	24.3	2759.0	7.5
1983	3		1558.7	1569.7	20.7	19.6	2512.4	3.8
1984	3		1668.1	1685.4		30.0	2779.6	3.6
1985	3		1521.1	1547.3	1.2	139.0	2707.3	2.1
1986	3		1419.8	1457.7	45.7	74.4	2510.8	1.2
1987	3		1493.6	1554.6	69.5	116.6	2742.4	1.6
1988	5		2216.9	2259.7	18.9	71.2	4198.2	3.7
1989				42.3		72.9	72.9	3.8
1990				58.3		104.1	104.1	3.6
1991				41.1		76.0	76.0	3.3
1992				37.6		71.2	71.2	2.8
1993				41.8		81.1	81.1	2.3
Subtotal	27		13861.5	14282.2	316.7	1038.9	24127.2	
Appropriation: MILCON								
1982				1.2			1.9	7.6
1983				6.8			10.8	4.9
1984				2.6			4.2	3.8
1987				3.8			6.8	2.7
Subtotal				14.4			23.7	
Total	27		13861.5	14364.8	316.7	1038.9	24227.0	

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)

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1978	39.4	39.4	39.4
1979	10.8	10.8	10.8
1980	6.5	6.5	6.5
1981	4.5	4.5	4.5
1982	7.2	7.2	7.2
1983	3.1	3.1	3.1
1984	1.5	1.5	1.5
1985	1.6	1.6	1.6
1986	1.0	0.8	0.8
1987	0.3	0.1	0.1
1988	0.2	-	-
To Complete	-	-	-
Subtotal	76.1	75.5	75.5
Appropriation: SCN			
1978	925.3	925.3	917.4
1979	1.7	1.7	1.7
1980	798.2	798.2	775.6
1981	1787.0	1785.3	1708.5
1982	2759.0	2710.5	2492.4
1983	2512.4	2394.3	2019.7
1984	2779.6	2480.0	1812.7
1985	2707.3	2016.3	1286.2
1986	2510.8	1923.8	783.4
1987	2742.4	1696.5	212.4
1988	4198.2	742.7	-
To Complete	405.3	-	-
Subtotal	24127.2	17474.6	12010.0

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: MILCON		
1982	1.9	1.9	1.9
1983	10.8	10.8	10.8
1984	4.2	4.2	4.2
1987	6.8	6.3	2.4
Subtotal	23.7	23.2	19.3
Total	24227.0	17573.3	12104.8

17. Production Rate Data: Not Applicable (Exempt: Less than six ships per year).

18. Operating and Support Costs: Not Applicable.

(9)

SAR-87-003

~~(CONFIDENTIAL)~~

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

Program: CVN 68 CLASS (CVN 72, 73/ CVN 74, 75)
As Of Date: December 31, 1987

N-11 CVN-72/73/74/75

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AS AMENDED

APR 7 1988

1.(U) 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 Ship Acquisition Program
Naval Sea Systems Command (PMS 312)
Washington D.C.

PM: Capt F. C. Holmes, USN
Assigned: August 23, 1985
Phone number: (202) 692-7280
Autovon number: 8-222-7280

4.(U) Program Elements:
RDT&E: 0605567N
PROCUREMENT: 24112N

5.(U) Related Programs: SSN new construction, submarine and carrier overhauls

~~Classified by DASN DOD Classification Guide OC-DN-1 Dated January 1977 Declassify on: OADR This document shall not be used as a basis for derivative classification guidance~~

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~~(CONFIDENTIAL)~~

OASD(PA) DFOISR 88-F-0870

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.

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 Nimitz (CVN 68), Dwight D. Eisenhower (CVN 69) and Carl Vinson (CVN 70) were delivered in 1975, 1977 and 1982 respectively. The Theodore Roosevelt (CVN 71) was delivered on 17 October 1986. Shock Trials were successfully completed during September 1987. There are two ships under construction at Newport News Shipbuilding, the Abraham Lincoln (CVN 72) and George Washington (CVN 73). Construction of both ships began in February 1983 with contract delivery dates of December 1989 and 1991. Due to heavy workload in the shipyard, the ships are behind schedule. Delivery of CVN 72 by the contract date is possible, although a best-ever performance between Launch and Delivery will be required. The CVN 73 is about six months behind schedule with nearly four years to go before the contract delivery date. It is too early to tell whether the contract delivery date for the CVN 73 will be met.

b. Significant Developments Since Last Report -- NONE

c. This SAR includes the approved funding for CVN 74/75 as reflected in the FY 1988/1989 Amended Biennial Budget.

d. Changes Since "As Of" Date -- Abraham Lincoln (CVN 72) Launched 13 Feb 1988.

8.(U) Decision Coordinating Paper (DCP) Threshold Breaches: NONE

9.(U) Schedule:	Development Estimate/ Approved Program 1)	Current Estimate
a. Milestones (CVN 72)		
(1) Establish Final Characteristics CVN 68 Class	10/66	10/66*
(2) Definitization of Contract	1/83	12/82*
(3) Start Production	2/83	2/83*
(4) Lay Keel	11/84	11/84*
(5) Launch	9/87	2/88
(6) Complete Acceptance Trials	9/89	9/89
(7) Delivery	12/89	12/89
(8) Complete Final Contract Trials	6/90	6/90
(9) War Ready	2/91	1/91
Milestones (CVN 73)		
(1) Definitization of Contract	1/83	12/82*
(2) Start Production	2/83	2/83*
(3) Lay Keel	8/86	8/86*
(4) Launch	9/89	9/89
(5) Complete Acceptance Trials	9/91	9/91
(6) Delivery	12/91	12/91
(7) War Ready	2/93	2/93
Milestones (CVN 74)		
(1) Definitization of Contract	8/88	8/88 (CH-2)
(2) Start Production	1/89	1/89 "
(3) Lay Keel	10/91	10/91 "
(4) Launch	1/94	1/94 "
(5) Delivery	FY96	FY96 "
Milestones (CVN 75)		
(1) Definitization of Contract	8/88	8/88 "
(2) Start production	1/89	1/89 "
(3) Lay Keel	4/93	4/93 "
(4) Launch	7/96	7/96 "
(5) Delivery	FY97	FY97 "

* Actuals
1) Dates represents both Development Estimate and Approved Program

9. Schedule: (cont)

b. Previous change explanations: NONE

c. Current change explanations:

(CH-2) The prior estimates were based upon the CVN 74 and CVN 75 being FY90 and FY93 ships respectively. The estimates contained herein reflect the CVN 74 and CVN 75 as FY1988 ships.

d. References:

Development Estimate:	Defense Appropriations Act of 1979
Approved Program:	DASD(MS) Memo of 21 May 1980
	FY 1983 Continuing Resolution
	FY 1988/89 Amended Biennial Budget
	DAE Baseline, dated 17 February 1988

10. (U) Technical/Operational Characteristics:

a. Technical	Development/Est Approved Program1/	Demonstrated Performance	Current Estimate
(1) Length overall	1,092	1,092	1,092
(2) Beam	134	134	134
(3) Maximum width	252	252	252
(4) Draft (Combat load) (feet)	38.4	38.4	38.4
(5) Displacement (tons)	96,300	93,405 2/	96,300
(6) Propulsion	Nuclear	Nuclear	Nuclear
(b)(1)			
(8) Core life (yrs)	13	4/	15
(9) Num of reactors	2	2	2
(10) Crew including air wing	6,280	6,040 3/	6,280 3/
(11) Troop	N/A	N/A	N/A
b. Operational			
(b)(1)			
(3) Stores (days)	75	75	75
(4) Close In Weapon Sys	4	4 *	4
(5) NATO Sea Sparrow Missile Systems	3	3 *	3
(6) Aviation Strike Ordnance (long tons)	2400	2,451 5/	2,451 5/
(b)(1)			
(8) Operational number of aircraft (deck multiple in A4 equivalents) 6/	151	151	151

c. Previous change explanations: NONE
d. Current change explanations: NONE
e. References ---
Development Estimate: Defense Appropriations Act of 1979

Approved Program: DASD(MS) Memo of 21 May 1980
FY 1988/89 Amended Biennial Budget
DAE Baseline dated 17 February 1988

1/ Values represent both Development Estimate and Approved Program
2/ Actual based on CVN 68 standardization trials
3/ Accomodations converted to training spaces; reconversion feasible if required
4/ Requires extensive operational data and is dependent on actual core life
5/ CVN 72 actual capability at delivery
6/ The operational number of aircraft (deck multiple) in A7 equivalents is 156
* CVN 71 actuals at delivery

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

	Development Estimate/ Approved Program	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	--	1.5	1.5
Procurement	5265.5	-112.0	5153.5
Basic Ship Costs	(3261.4)	(98.6)	(3360.0)
Government furn. equip costs	(1900.7)	(-260.8)	(1639.9)
Other Costs	(14.3)	(19.9)	(34.2)
Total production costs	(5176.4)	(-142.3)	(5034.1)
Ship Design	(0.9)	(-0.9)	( )
Outfitting & Post Delivery	(88.2)	(29.8)	(118.0)
Construction(MILCON)	(--)	(--)	(--)
Total FY 82 Base-Year $	5265.5	-111.9	5153.6
Escalation			
Development	(--)	(0.1)	(0.1)
Procurement	(2153.4)	(-1187.0)	(966.4)
Construction	(--)	(--)	(--)
Total Then-Year $	7418.9	-1298.9	6120.0
b. Quantities			
Development (RDT&E)	-	-	-
Procurement	2	-	2
Total	2	-	2
c. Unit Cost --			
Procurement:			
FY 82 Base Year $	2632.8	-56.0	2576.8
Then-year $	3709.5	-649.5	3060.0
Program:			
FY 82 Base Year $	2632.8	-56.0	2576.8
Then-year $	3709.5	-649.5	3060.0

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- NONE

f. Nuclear Costs -- CVN-68 Class ships draw upon general reactor plant research and developement work performed by the Department of Energy but this contribution cannot be quantified.

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

	Development Estimate/ Approved Program	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	--	--	--
Procurement	5911.0	-124.1	-5786.9
Basic Ship Costs	(3744.9)	(-82.1)	(3662.8)
Government furn. equip costs	(1998.1)	(-43.9)	(1954.2)
Other Costs	(28.4)	(-0.7)	(27.7)
Total production costs	(5771.1)	(-126.4)	(5644.7)
Ship Design	(0.0)	(0.0)	(0.0)
Outfitting & Post Delivery	(139.9)	(2.3)	(142.2)
Construction(MILCON)	(--)	(--)	(--)
Total FY 88 Base-Year $	5911.0	-124.1	5786.9
Escalation			
Development	(--)	(--)	(--)
Procurement	(1055.0)	(516.9)	(538.1)
Construction	(--)	(--)	(--)
Total Then-Year $	6966.0	-641.0	6325.0
b. Quantities			
Developement (RDT&E)	-	-	-
Procurement	2	-	2
Total	2	-	2
c. Unit Cost --			
Procurement:			
FY 88 Base Year $	2955.5	-62.1	-2893.5
Then-year $	3483.0	-320.5	3162.5
Program:			
FY 88 Base Year $	2955.5	-62.1	2893.5
Then-year $	3483.0	-320.5	3162.5

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- NONE

f. Nuclear Costs -- CVN-68 Class ships draw upon general reactor plant research and developement work performed by the Department of Energy but this contribution cannot be quantified.

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

	Current Year		Budget Year
	Current Est (DEC 87 SAR)	UCR Baseline (DEC 86 SAR)	UCR Baseline (DEC 87 SAR)
a. Program Acquisition --			
(1) Cost	6120.0	6150.0	6120.0
(2) Quantity	2	2	2
(3) Unit Cost	3060.0	3075.0	3060.0
b. Current Procurement --	(1988)	(1988)	(1989)
(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	13.3	25.0
Net Total	15.1	13.3	25.0
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

. Cost Variance Analysis:

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

	RDT&E	PROC	TOTAL
Development Estimate	-	7418.9	7418.9
Previous Changes	-		
Economic	-	-805.0	-805.0
Estimating	1.6	-470.6	-469.0
Support	-	5.1	5.1
Subtotal	1.6	-1270.5	-1268.9
Current Changes	-	-	-
Economic	-	-31.0	-31.0
Estimating	-	6.3	6.3
Support	-	-5.3	-5.3
Subtotal	-	-30.0	-30.0
Total Changes	1.6	-1300.5	-1298.9
Current Estimate	1.6	6118.4	6120.0

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

	Current Year		Budget Year
	Current Est (DEC 87 SAR)	UCR Baseline (DEC 86 SAR)	UCR Baseline (DEC 87 SAR)
a. Program Acquisition --			
(1) Cost	6325.0	6966.0	6325.0
(2) Quantity	2	2	2
(3) Unit Cost	3162.5	3483.0	3162.5
b. Current Procurement --	(1988)	(1988)	(1989)
(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

Cost Variance Analysis:

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

	RDT&E	PROC	TOTAL
Development Estimate	-	6966.0	6966.0
Previous Changes	-	-	
Economic	-	-	0.0
Quantity	-	-	0.0
Support	-	-	0.0
Subtotal	0.0	0.0	0.0
Current Changes	-	-	-
Economic	-	3.4	3.4
Schedule	-	-644.4	-644.4
Support	-	-	-
Subtotal	0.0	-641.0	-641.0
Total Changes	0.0	-641.0	-641.0
Current Estimate	0.0	6325.0	6325.0

d. Cost Variance Analysis (Cont'd):

(FY 1982 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	-	5265.5	5265.5
Previous Changes	-		
Estimating	1.5	-145.8	-144.3
Support	-	9.0	9.0
Subtotal	1.5	-136.8	-135.3
Current Changes	-	-	-
Estimating	-	28.0	28.0
Support	-	-4.6	-4.6
Subtotal	-	23.4	23.4
Total Changes	1.5	-113.4	-111.9
Current Estimate	1.5	5152.1	5153.6

b. Previous Change Explanations --

RDT&E

Estimating: Revised Requirement.

Procurement

Economic: Revised economic rates.

Estimating: Congressional reduction of funds for management reserves, contractor support services, and Independent Research and Developement/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.

Support: Revised estimates for outfitting.

13. Cost Variance Analysis (Cont'd):

(FY 1988 Constant Dollars (Base Year) in Millions)

	BASE	PROP	TOTAL
Development Estimate	-	5911.0	5911.0
Previous Changes	-	-	-
Estimating	-	-	-
Support	-	-	-
Subtotal	0.0	0.0	0.0
Current Changes	-	-	-
Schedule	-	-124.1	-124.1
Support	-	-	-
Subtotal	-	-124.1	-124.1
Total Changes	0.0	-124.1	-124.1
Current Estimate	0.0	5786.9	5786.9

b. Previous Change Explanations -- none

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanation --

	(Dollars in Millions) Base-Year	Then-Year
(1) Procurement		
Revised Jan 88 economic escalation rates. (Economic)	N/A	-31.0
Increase in Change Order estimates.	6.3	6.3
An increase to offset new economic indicies. (Estimating)	21.7	0
Revised estimates for Outfitting and Post Delivery.(Support)	-4.6	-5.3

d. References -- FY 1983 Continuing Resolution (Defense Appropriation Act)

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 (DE)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC (Current Estimate)
3709.5	-417.8	-	-	-	-231.3	-0.1	-	-649.3	3060.1

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanation --

(1) Procurement -- N\A	(Dollars in Millions) Base-Year	Then-Year
Revised economic indices. (Economic)	N/A	3.4
Funding of two ships in FY 88 vice one in FY 1990 and one in FY 1993. (Schedule)	-124.1	-644.4

d. References -- FY 1988 Continuing Resolution (Defense Appropriation Act)

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 (DE)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC (Current Estimate)
3483.0	1.7	-	-322.2	-	-	-	-	-320.5	3162.5

1 Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- N/A

b. Procurement

Shipbuilding Contract	Initial Contract Price Target	Ceiling	Qty
Newport News Shipbuilding and Dry Dock Co. Newport News,Va. N00024-83-C-2033,FPIF Award: December 27.1982	3143.0	3454.0	2

Current Target Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
3269.9	3590.5	2	3319.9	3269.9

Explanation of Change: Variances are not provided for this contrsct because reporting under DOD Instruction 7000.2 is not required.

Nuclear Components Contracts	Initial Contract Price Target	Ceiling	Qty
General Electric Co. Schenectady, New York N00024-82-C-4004, CPFF Award: December 29, 1982	--	399.8	--

Current Target Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
N/A	369.8	N/A	369.8	369.8

	Initial Contract Price Target	Ceiling	Qty
Department of Energy N00024-67-F-5110 Economy Act Order Award: December 30,1982	--	460.1	--

Current Target Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
N/A	345.1	N/A	345.1	345.1

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

a. RDT&E -- N/A
b. Procurement -- N\A
c. Milcon -- N/A

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

a. Program Status

(1) Percent Program Completed: 100.0% (1 yrs/1yrs)

(2) Percent Program Cost Appropriated: 100.0% ($6325.0\$6325.0)

b. Appropriation Summary --

(Then-year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Beyond FYDP	TOTAL
RDT&E	-	-	-	-	0.0
Procurement	6325.0	-	-	-	6325.0
Total	6325.0	0	0	0	6325.0

Annual Summary --

Fiscal Year	QTY	FY 88 Base-Year Dollars: Sailaway Nonrec	Sailaway Rec	Total	Then-Year Dollars: Advance Debit	Proc Credit	Total	ESCALATION RATE(%)
APPROPRIATION: SCN								
1988	2	-	5786.9	5786.9	6325.0	-	6325.0	3.7
To Comp	-	-	-	0.0	0.0	-	-	-
Total	2	-	5786.9	5786.9	6325.0	0	6325.0	-

d. Obligations and Expenditures -- N\A

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

	Initial Contract Price Target	Ceiling	Qty
Westinghouse Electric Corp. Pittsburgh,Pa N00024-82-C-5002, CPFF Award: December 29,1982	--	540.1	--

Current Target Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
N/A	540.1	N/A	540.1	540.1

c. MILCON -- N/A

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

a. Program Status

(1) Percent Program Completed: 44.4% (4 yrs/9 yrs)

(2) Percent Program Cost Appropriated: 98.0% ($5998.0\$6120.1)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs	Budget Year	Balance To Complete FYDP	Beyond FYDP	TOTAL
	(FY82-88)	(FY89)	(FY90-92)	(FY93)	
RDT&E	1.6	-	-	-	1.6
Procurement	5996.4	25.0	97.0	-	6118.4
Total	5998.0	25.0	97.0	0	6120.0

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

c. Annual Summary --

FISCAL YEAR	QTY	FY 82 Base-Year Dollars			Then-Year Dollars			ESCALATION RATE(%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
APPROPRIATION: RDT&E								
1983	-	1.5	-	1.5	-	-	1.6	4.9
Subtotal	-	1.5	-	1.5	-	-	1.6	
APPROPRIATION: SCN								
1982	-	-	432.5	432.5	475.0	-	475.0	7.50
1983	2	-	4601.6	4601.6	-	475.0	5495.9	3.80
1986	-	-	-	-	-	-	-	2.10
1987	-	-	-	9.2	10.4	-	10.4	1.60
1988	-	-	-	12.9	15.1	-	15.1	3.70
1989	-	-	-	20.7	25.0	-	25.0	3.80
1990	-	-	-	34.6	43.6	-	43.6	3.60
1991	-	-	-	10.6	13.7	-	13.7	3.30
1992	-	-	-	30.0	39.8	-	39.8	2.80
Total	2	-	5034.1	5152.1	622.6	475.0	6118.4	

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
APPROPRIATION: RDT&E			
1983	1.6	1.6	1.5
Subtotal	1.6	1.6	1.5
APPROPRIATION: SCN			
1982	475.0	472.5	387.2
1983	5495.9	5217.7	3097.7
1987	10.4	9.6	4.4
To complete	137.2	0.0	0.0
Total	6118.4	5699.8	3489.3

17. Production Rate Data (Cont"d):

d. Deliveries (PLan/Actual) --

	To Date
RDT&E	0/0
Procurement	4/0

18. Operating and Support Costs: N/A

3.

SAR-87-D88

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: (NAVSTAR GPS)/USER EQUIPMENT

AF-24 NAVSTAR

AS OF DATE: December 31, 1987

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SAF/PAS

88-0133-T

1. Designation and Nomenclature (Popular Name): Navstar GPS/Navstar Global Positioning System (Navstar)

2. DoD Component: U.S. Air Force (Lead Service User Equipment) U.S. Army, U.S. Navy.

3. Responsible Office and Telephone Number:

Navstar GPS Joint Program Office
Space Division
P.O. Box 92960
Los Angeles AFB, CA 90009-2960

PM: Colonel Gaylord Green
Assigned: October 22, 1985
AV 833-1526; COMM (213) 643-1526

4. Program Elements/Procurement Line Items:

RDT&E: PEs 63421F, 64478F, 64778F, 35164F, 35165F (Shared Funding) 64777N, 64778A

PROCUREMENT: AF - APPN 3020 ICN MGPS 00 NAVY APPN 1810 ARMY APPN 2031
AF - APPN 3010 ICN NAVY APPN 1506 ARMY APPN 2035
AF - 3080 ICN

MILCON: PE 35165F

5. Related Programs: NUDET Detection System (NDS); Space Shuttle Operations (PAM-D, Shuttle); and Space Boosters Program (Delta II)

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DFOISR 88-T-

6. 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. 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 in the operational constellation (+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 (Delta II), 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 AFB. 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. 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.

b. Significant Developments Since Last Report -- For this report the GPS program has added 20 replenishment satellites with a different procurement strategy (annual buy vs multiyear). The previous SAR (June 1987) was for 28 GPS satellites procured on a multiyear contract which was approved by Congress in 1982. The 20 replenishment satellites can only be procured on an annual basis unless Congress approves a multiyear procurement (FY 90). If a multiyear buy is approved for the twenty replenishment satellites potential savings of $256M (15% of the total replenishment cost) could be realized. During this period the Air Force negotiated the restructure of the production satellite contract. This restructure will slow the contractor build schedule to meet projected space shuttle and Delta II schedules. In addition, the satellite contract was modified for integration support, additional ground support equipment (for Delta II launches) and necessary hardware changes required to sustain the environment associated with a launch on the Delta II launch vehicle. The government accepted delivery of 20 integration user equipment sets. These user equipment sets will be used for aircraft integration and inplant reliability testing. The Army has rebaselined the GPS program and deleted the requirement for 297 user equipment sets. The Navy and Air Force user equipment procurement quantities remain unchanged. The ground control segment program management responsibilty transferred to Warner Robins Air Logistics Center on 1 Oct 87.

The Navstar GPS system 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 DCP (dated Jun 1986) threshold breaches.

9. Schedule:

	Development Estimate/ Approved Program	Current Estimate
a. Milestones:		
DSARC I (JRMB I)	Dec 73/Dec 73	Dec 73
DSARC II (JRMB II)	Jun 79/Jun 79	Jun 79
Space Segment		
System Design Review	Jan 80/NA	Jan 80
Preliminary Design Review	Mar 80/NA	Mar 80
Replenishment Satellite Contract Award	Oct 79/NA	Oct 79
Block II Satellite Contract Award	Dec 80/NA	Dec 80
Satellite Production Contract	Jan 82/NA	Sep 82
First Launch Ready Satellite	Apr 85/NA	May 87
First Production Satellite Launch	Jan 87/NA	Oct 88
Control Segment		
Development Contract Award	Sep 80/NA	Sep 80
Operational Control Segment (FOC)	Nov 87/NA	Apr 91
User Segment		
Phase IIB FSED Contract Awards	Jul 79/NA	Jul 79
Begin DT&E/IOT&E	Jan 83/NA	Aug 84
Complete DT&E/IOT&E	Aug 83/NA	May 86
Source Selection	Apr 85/NA	Apr 85
Phase III PDR	Dec 85/NA	Dec 85
Production Contract Award	Jan 84/NA	Aug 86
Phase III CDR	Jun 86/NA	Dec 86
Program		
*JRMB Milestone IIIA	Sep 83/Jun 86 (Ch-2)	Jun 86
Three Dimensional Capability (24 hrs/ day)	Dec 87/NA	Sep 91 (Ch-1)
*DAB IIIB	Mar 89/Sep 89 (Ch-2)	Sep 89

*Formerly DSARC

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9. Schedule (Cont'd):

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 DAB IIIB (Mar 89) milestones were also added. DAB IIIB, user equipment full rate production, is required to comply with Public Law 9894. The exercise of the first LRIP option was delayed from Mar 86 to Aug 86 and the Phase III CDR slipped from Jan 86 to Dec 86. The PMD has been revised to incorporate the STS standdown. In addition, the full operational capability of the GPS Control Segment has slipped from Nov 87 to Apr 91 due to the STS standdown. Navstar 13 was not launch ready as originally planned. The first satellite will be launched three months earlier than scheduled due to award of the Delta II contract. In addition, the GPS program will be three dimensional five months earlier than planned. The DAB 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.

c. Current Change Explanations --

(Ch-1) Launch schedule normalized to assure consistent support, constellation build, and to smooth resulting satellite replenishment requirement.

(Ch-2) Reflects USD(A) baseline approval.

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: PMD No. 4075(25) 9 May 1987; USD(A) memo, 9Feb 1988.

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10. (U) Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance A/	Current Estimate
a. (U) Technical --			
Expected Ground Power (End of Life) (dBW)			
a. L1 (C/A) B/	-160/-160	-155	-160
b. L1 (Precision Code) B/	-163/-163	-158	-163
c. L2 (Precision Code)	-166/-166	-159	-166
Cesium Clock Stability (f/f) B/	2X10-13/2X10-13	1.3X10-13	2X10-13
Time Transfer (Universal Coordinated Time) (nsec)	+/-100	+/-25	+/-100
User Equipment Reliability Mean Time Between Maintenance (hrs) C/			
a. Airborne			
1) 5 - Channel	550/500 (Ch-1)	130	500
2) 2 - Channel	550/500 (Ch-1)	130	500
b. Ground	850/500 (Ch-1)	216	500
c. Sea	900/680 (Ch-1)	300	680
User Equipment Maintainability Manhours to Repair (hrs) E/			
a. Airborne			
1) 5 - Channel	1.3/1.0	0.75	1.0
2) 2 - Channel	1.3/0.75	0.75	0.75
b. Ground	1.2/0.75		0.75
c. Sea	1.3/1.5	0.77	1.5
b. (U) Operational --			
(U) 3-D Position Accuracy of User Equipment B/ Spherical Error Probable (SEP)(m)	16/16	10 F/	16
(U) Block II Satellite Mean Mission Duration (yrs) B/	6/6	5 G/	6
(U) System Availability (%) B/ D/	98/98		98

(b)(1)

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

A/ The test results under demonstrated performance represent best trials data using prototype equipment that is representative of production equipment. Where no values appear, data is not yet available.
B/ DCP Threshold.
C/ Approved program changes requirement to measure mean time between operational failures.
D/ Probability that a minimum of 18 satellites are operational at any time.
E/ Approved program changed requirement to measure mean time to repair I-level.
F/ The 16 meter objective (18 satellite constellation) corresponds to 10 meters achieved with DT&E satellite spacing (based on 24 satellite constellation).
G/ Demonstrated performance is for Block I Spacecraft which have a design mean mission duration of 4.0 years. A 6 year mean mission duration represents Block II production satellite design.
H/ Time required to change the degradation level of the selective availability.

c. Previous Change Explanations — The mean time between maintenance was decreased for the airborne, ground and sea user equipment sets at Milestone IIIB. In addition, airborne user equipment 2 and 5 channel sets were separated for mean time between maintenance and maintainability manhours to repair.

d. Current Change Explanations — Ch-1 Reflects USD(A) baseline approval.

e. References:
Development Estimate: Decision Coordinating Paper (DCP) #133, Revision B, dated 1 Feb 80.

Approved Program: Decision Coordinating Paper (DCP) JRMB Milestone IIIA Version, dated June 1986; USD(A) memo, 9Feb 1988.

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11. Program Acquisition Cost: Satellite (Air Force)

(Current Estimate in Millions of Dollars)

	Development Estimate	Change	Current Estimate
a. Cost —			
Development (RDT&E)	$ 967.6	$-49.1	$ 918.5
Procurement	623.4	+907.4	1530.8
Spacecraft Flyaway	(583.6)	(+779.8)	(1363.4)
Other Weapon System Cost	(39.8)	(+127.6)	(167.4)
Construction (MILCON)	8.4	-3.7	4.7
Total FY 79 Base-Year $	1599.4	+854.6	2454.0
Escalation	707.3	+1118.9	1826.2
Development (RDT&E)	(204.9)	(+68.5)	(273.4)
Procurement	(496.1)	(+1054.1)	(1550.2)
Construction	(6.3)	(-3.7)	(2.6)
Total Then-Year $	$2306.7	$+1973.5	$4280.2
b. Quantities			
Development (RDT&E)	12	0	12
Procurement	28	20	48
Total	40	20	60
c. Unit Cost —			
Procurement:			
FY 79 Base-Year $	$22.264	$ +9.628	$31.892
Then-Year $	39.982	+24.206	64.188
Program:			
FY 79 Base-Year $	$39.985	$+0.915	$40.900
Then-Year $	57.668	+13.669	71.337

d. Approved Design to Cost Goal —

	(Average Unit Flyaway Cost) Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty: 28			
@ Peak Rate: 7/year			
FY 79 Base-Year $	20.336/20.336	22.710	25.000(+10%)
Then-Year $	54.812/54.812	46.898	N/A

e. Foreign Military Sales — None.

f. Nuclear Costs — None.

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11. Program Acquisition Cost: User Equipment (Tri-Service)

(Current Estimate in Millions of Dollars)

	Development Estimate	Change	Current Estimate
a. Cost —			
Development (RDT&E)	$ 941.8	- 61.4	$ 880.4
Procurement	1613.1	-262.1	1351.0
Flyaway Cost	(1115.9)	(-127.6)	(988.3)
Other Weapon System Cost	(497.2)	(-134.5	(362.7)
Construction (MILCON)	—	0.0	—
Total FY 79 Base-Year $	2554.9	-323.5	2231.4
Escalation	2320.9	-443.7	1877.2
Development (RDT&E)	(441.9)	(- 47.5)	(394.4)
Procurement	(1879.0)	(-396.2)	(1482.8)
Construction	(—)	(0.0)	(—)
Total Then-Year $	$4875.8	-767.2	$4108.6
b. Quantities			
Development (RDT&E)	129	0	129
Procurement	27210	-297	26913
Total	27339	-297	27042
c. Unit Cost —			
Procurement:			
FY 79 Base-Year $	$ 0.059	-0.009	$ 0.050
Then-Year $	0.128	-0.023	0.105
Program:			
FY 79 Base-Year $	$ 0.093	-0.010	$ 0.083
Then-Year $	0.178	-0.026	0.152

d. Approved Design to Cost Goal —

	(Average Unit Flyaway Cost) Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty: 26889			
@ Peak Rate: 390/mo			
FY 79 Base-Year $	0.041/0.041	0.040	0.101
Then-Year $	0.089/0.089	0.085	N/A

e. Foreign Military Sales -- Sales to date include 35 to West Germany for $10.6M, 3 to Canada for $.3M and 1 to Japan for $.6M.

f. Nuclear Costs -- None.

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12. Program Acquisition/Current Procurement Unit Cost Summary:
Satellite (Air Force)

(Current (Then-Year) Dollars in Millions)

a. Program Acquisition —	Current Year: SAR Current Estimate (Dec 87 SAR)	Current Year: UCR Baseline Estimate (Dec 86 SAR)	Budget Year: UCR Baseline Estimate (Dec 87 SAR)
Original Multiyear Procurement			
(1) Cost	2408.9	2378.1	2408.9
(2) Quantity	40	40	40
(3) Unit Cost	60.223	59.453	60.223
Annual Procurement 20 Replenishment Satellites			
(1) Cost	1871.3	0.0	1871.3
(2) Quantity	20	0	20
(3) Unit Cost	93.565	0.0	93.565
Total Procurement (Including Replenishment Satellites)			
(1) Cost	4280.2	2378.1	4280.2
(2) Quantity	60	40	60
(3) Unit Cost	71.337	59.453	71.337
b. Current Procurement --	(FY 1988)	(FY 1988) *	(FY 1989)
(1) Cost	92.6	92.6	75.6
Less CY Adv Proc	--	--	--
Plus PY Adv Proc	114.8	114.8	--
Net Total	207.4	207.4	75.6
(2) Quantity	4	4	0
(3) Unit Cost	51.850	51.850	N/A

12. Program Acquisition/Current Procurement Unit Cost Summary:
User Equipment (Tri-Service)

a. Program Acquisition —	Current Year: SAR Current Estimate (Dec 87 SAR)	Current Year: UCR Baseline Estimate (Dec 86 SAR)	Budget Year: UCR Baseline Estimate (Dec 87 SAR)
(1) Cost	4108.6	4160.0	4108.6
(2) Quantity	27042	27339	27042
(3) Unit Cost	0.152	0.152	0.152
b. Current Procurement —	(FY 1988)	(FY 1988) *	(FY 1989)
(1) Cost	179.4	179.4	170.6
Less CY Adv Proc	--	--	--
Plus PY Adv Proc	--	--	--
Net Total	179.4	179.4	170.6
(2) Quantity	1007	1007	1467
(3) Unit Cost	0.178	0.178	0.116

* Differs from Dec 86 SAR to reflect FY87 Appropriation Act.

13. Cost Variance Analysis: Satellite (Air Force)

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1172.5	1119.5	14.7	2306.7
Previous Changes:				
Economic	-37.0	-62.9	-1.4	-101.3
Quantity	--	--	--	--
Schedule	+6.8	+67.1	--	+73.9
Engineering	+106.4	+36.7	--	+143.1
Estimating	-278.4	-7.2	+0.5	-285.1
Other	--	--	--	--
Support	+57.3	+190.0	-6.5	+240.8
Subtotal	-144.9	+223.7	-7.4	+71.4
Current Changes:				
Economic	-0.7	+0.3	--	-0.4
Quantity	--	+844.9	--	+844.9
Schedule	--	+562.1	--	+562.1
Engineering	+162.7	+307.3	--	+470.0
Estimating	+0.8	-59.2	--	-58.4
Other	--	--	--	--
Support	+1.5	+82.4	--	+83.9
Subtotal	+164.3	+1737.8	--	+1902.1
Total Changes	+19.4	+1961.5	-7.4	+1973.5
Current Estimate	1191.9	3081.0	7.3	4280.2

The above current changes are primarily due to adding 20 replenishment satellites with a different procurement strategy (annual buy versus multiyear). The 1986 SAR for GPS is based on a multiyear procurement of 28 satellites which was approved by Congress in 1982. The 20 additional satellites can only be procured on an annual basis unless Congress approves a multiyear procurement.

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13. Cost Variance Analysis: Satellite (Air Force) continued

(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	—	—	—	—
Schedule	+4.5	—	—	+4.5
Engineering	+64.6	+25.3	—	+89.9
Estimating	-236.8	+17.4	+0.4	-219.0
Other	—	—	—	—
Support	+32.3	+92.0	-4.1	+120.2
Subtotal	-135.4	+134.7	-3.7	-4.4
Current Changes:				
Quantity	—	+376.0	—	+376.0
Schedule	—	—	—	—
Engineering	+84.8	+213.7	—	+298.5
Estimating	+0.7	+147.4	—	+148.1
Other	—	—	—	—
Support	+0.8	+35.6	—	+36.4
Subtotal	+86.3	+772.7	—	+859.0
Total Changes	-49.1	+907.4	-3.7	+854.6
Current Estimate	918.5	1530.8	4.7	2454.0

13. Cost Variance Analysis (Cont'd): Satellite (Air Force)

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.

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. Adjustments have been made to reflect only Block II satellite costs in the SAR.

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13. 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

Procurement:

Economic: Revised economic escalation indices.
Schedule: One year delay in satellite production start.
Engineering: Funding reduced with the deletion of crosslink ranging, additional hardening and autonomous housekeeping.
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.
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.

MILCON:

Economic: Revised economic escalation indices.
Estimating: Adjustment for difference between President's Budget and required funding.
Support: Deletion of Consolidated Space Operation Center (CSOC) contingency funding.

c. Current Change Explanations —

(Dollars in Millions)

	Base-Year $	Then-Year $
(1) RDT&E:		
Revised economic escalation indices. (Economic)	-	-Ø.7
Increase development & test associated with adding the replenishment satellite procurement (Engineering)	+84.8	+162.7
Support costs associated with the replenishment satellite-development & test effort (Support)	+Ø.8	+1.5

13. Cost Variance Analysis (Cont'd)

(Dollars in Millions)

c. Current Change Explanations --

	Base-Year $	Then-Year $
(1) RDT&E:		
Adjustment for current and prior year escalation change (Estimating)	+0.7	+0.8
(2) Procurement:		
Revised economic escalation indices. (Economic)	--	+0.3
Add 20 Replenishment Satellites on an annual procurement basis	+762.1	+1709.8
Increase flyaway cost associated with increase in 20 replenishment satellite procurement (Quantity)	(+376.0)	(+844.9)
Engineering variances associated with procurement of additional 20 replenishment satellites (Engineering)	(+213.7)	(+307.3)
Estimating changes applicable to the additional 20 replenishment satellites since the baseline (Estimating)	(+146.6)	(-60.6)
Increased costs attributable to schedule (Schedule)	--	(+562.1)
Support cost associated to the additional 20 replenishment satellites (Support)	(+25.8)	(+56.1)
Adjustment for current and prior year escalation change (Estimating)	+0.8	+1.4
Delay in launch recovery program support due to shuttle standdown ($upport)	+9.8	+26.3
(3) MILCON: None.		

d. References --

Development Estimate: Decision Coordinating Paper (DCP) #133, Revision B, 1 Feb 1980.

13. Cost Variance Analysis: User Equipment (Tri-Service)

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1383.7	3492.1	--	4875.8
Previous Changes:				
Economic	-7.9	-183.6	--	-191.5
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-64.8	-139.2	--	-204.0
Other	--	--	--	--
Support	--	-322.2	--	-322.2
Subtotal	-72.7	-645.0	--	-717.7
Current Changes:				
Economic	-0.2	+7.5	--	+7.3
Quantity	--	-13.9	--	-13.9
Schedule	--	+57.2	--	+57.2
Engineering	--	--	--	--
Estimating	-36.0	-116.4	--	-152.4
Other	--	--	--	--
Support	--	+52.3	--	+52.3
Subtotal	-36.2	-13.3	--	-49.5
Total Changes	-108.9	-658.3	--	-767.2
Current Estimate	1274.8	2833.8	--	4108.6

13. Cost Variance Analysis (Cont'd): User Equipment (Tri-Service)

(FY 1979 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	941.8	1613.1	—	2554.9
Previous Changes:				
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	-37.9	-69.2	—	-107.1
Other	—	—	—	—
Support	—	-159.8	—	-159.8
Subtotal	-37.9	-229.0	—	-266.9
Current Changes:				
Economic	—	—	—	—
Quantity	—	-6.0	—	-6.0
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	-23.5	-52.4	—	-75.9
Other	—	—	—	—
Support	—	+25.3	—	+25.3
Subtotal	-23.5	-33.1	—	-56.6
Total Changes	-61.4	-262.1	—	-323.5
Current Estimate	880.4	1351.0	—	2231.4

b. Previous Change Explanations:

RDT&E:

Economic: Revised economic escalation indices.
Schedule: None.
Engineering: None.
Estimating: Decreased aircraft integration efforts and prior year escalation.
Support: None.

Procurement:

Economic: Revised economic escalation indices.
Schedule: None.
Engineering: None.
Estimating: Decreased aircraft modification efforts and prior year escalation.
Decrease engineering change proposals.
Support: The associated savings with reduced aircraft modification efforts.

MILCON: None.

13. Cost Variance Analysis (Cont;d): User Equipment (Tri-Service)

c. Current Change Explanations:

(Dollars in Millions)

	Base-Year $	Then-Year $
(1) RDT&E:		
Revised economic escalation indices (Economic)	--	-0.2
Adjustment for current and prior year escalation change (Estimating)	+0.1	+0.2
Revised platform integration estimates from aircraft manufacturers (Estimating)	-23.6	-36.2
(2) Procurement		
Revised economic escalation indices (Economic)	--	+7.5
Adjustment for current and prior year escalation change (Estimating)	+1.0	+1.9
Reduce production procurement of Army user equipment sets. This reduced the total tri-service procurement from 27210 to 26913 (-297).	-6.3	-14.4
Reduction in Army 5 channel user user equipment sets (Quantity)	(-12.0)	(-25.8)
Increase in Army 1 channel user equipment sets (Quantity)	(+6.0)	(+11.9)
Decreased initial spares and support equipment associated with the reduced user equipment procurement (Support)	(-0.3)	(-0.5)
Change in the type of units procured	--	-1.9
Reduction in Air Force 5 channel user equipment sets (Schedule)	(-9.3)	(-25.6)
Increase in Air Force 1 channel user equipment sets (Schedule)	(+9.3)	(+23.7)
Procurement schedule restructured toward the outyears due to revised force structure requirements (Schedule)	--	+59.1

13. Cost Variance Analysis (Cont;d): User Equipment (Tri-Service)

c. Current Change Explanations:

(Dollars in Millions)

	Base-Year $	Then-Year $
Reduced planning estimates for second source requirements and aircraft integrations (Estimating)	-53.4	-118.3
Increased number of support equipment sets (support)	+25.6	+52.8

13. Cost Variance Analysis (Cont;d): User Equipment (Tri-Service)

d. References --

Development Estimate: Decision Coordinating Paper (DCP), Jun 1986.
(User Equipment)

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

a. Initial SAR/Development Estimate to Current Estimate

Total Program (Including Annual Procurement of 20 Replenishment Satellites)

PAUC (Initial SAR/ Development Estimate)	Changes								PAUC Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
57.668	-1.695	-5.141	+10.600	+10.218	-5.725	--	+5.412	+13.669	71.337

14. 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/ Development Estimate)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.178	-0.007	+0.002	+0.002	--	-0.013	--	-0.010	-0.026	0.152

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15. 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
$110.2M	$116.4M	148	$119.3M	$130.7M

	Cost Variance	Schedule Variance
Previous Cumulative Variance	-$6.7M	-$5.5M
Cumulative Variances to Date (12/31/87)	-$9.8M	-$6.5M
Net Change	-$3.1M	-$1.0M

Explanation of Change: The cumulative cost variance is (-$9.8M) or (-14.3%). The primary cumulative cost variance driver is the 5 Channel Receiver for both the Air and Sea applications. Additional efforts were required on the receiver processor and navigation software development than planned. Extensive changes required for Built-In-Test (BIT), Logistics Support Analysis (LSA) support, and documentation resubmittals prior to testing contributed to the cumulative cost variance. The program manager's estimate indicates that 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. The cumulative schedule variance is (-$6.5M) or (-8.6%). Extensive non-standard rework rejection rates, due to questionable quality, are requiring manufacture of new subassemblies and cards. Late receipt of critical parts and insufficient manning is another contributor to the cumulative schedule variance. Repeat Environmental Stress Screening (ESS) testing and limitations in Performance Qualification test support assets for the 5 channel receivers for both air and sea application have also contributed to the cumulative schedule variance. 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.

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

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
1332.1	N/A	28	1332.1	1332.1

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$0.0M	$0.0M
Cumulative Variances to Date (12/31/87)	+$9.5M	-$0.6M
Net Change	+$9.5M	-$0.6M

Explanation of Change: The cummulative cost variance and schedule variances are principally due to lower than expected expenditures and support requirements on resident Eastern Launch Site operations and orbital support. This was cuased by a two year STS launch delay. It is anticipated that these variances will be decreased once operational GPS satellites are launched. This is the initial schedule and cost report for the CPFF portion of the contract. There is no program impact for the above cost or schedule variances.

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
$133.5M	$137.5M	784	$137.1M	$142.3M

	Cost Variance	Schedule Variance
Previous Cumulative Variance	-$0.2M	-$2.8M
Cumulative Variances to Date (12/31/87)	-$0.0M	-$2.8M
Net Change	+$0.2M	$0.0M

Explanation of Change: The overall schedule variance is ($2.8M) or (15.1%). The cumulative schedule variance is largely due to start up problems in beginning a "new product" from a "new factory". The major cumulative schedule variance driver is a result of corrections required from qualification testing. A cost variance will result as more manpower will be expended to maintain the current schedule variance. There is no program impact for the above schedule variance.

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

c. MILCON -- No MILCON contracts.

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

a. Program Status --

(1) Percent Program Completed: 53.6% (15 yrs/28 yrs)

(2) Percent Program Cost Appropriated: 48.4% ($2072.0/$4280.2)

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

Appropriation	Current & Prior Yrs (FY74-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Balance To Complete Beyond FYDP (FY93-01)	Total
RDT&E	963.0	53.3	99.5	76.1	1191.9
Procurement	1101.7	75.6	563.2	1340.5	3081.0
MILCON	7.3	--	--	--	7.3
Total	2072.0	128.9	662.7	1416.6	4280.2

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

User Equipment (Tri-Service)

a. Program Status --

(1) Percent Program Completed: 53.6% (15 yrs/28 yrs)

(2) Percent Program Cost Appropriated: 31.2% ($1282.3/$4108.6)

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

User Equipment (Tri-Service)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY74-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Balance To Complete Beyond FYDP (FY93-01)	Total
RDT&E	866.9	103.0	277.7	27.2	1274.8
AF Aircraft	248.5	114.9	650.8	1031.7	2045.9
Navy Aircraft	6.0	4.5	57.0	139.7	207.2
Army Aircraft	38.9	10.1	169.2	15.8	234.0
Total Aircraft	(293.4)	(129.5)	(877.0)	(1187.2)	(2487.1)
AF Other	39.0	17.2	21.3	9.4	86.9
Navy Other	57.0	17.4	55.8	37.7	167.9
Army Other	26.0	6.5	45.4	14.0	91.9
Total Other	(122.0)	(41.1)	(122.5)	(61.1)	(346.7)
Total Procurement	415.4	170.6	999.5	1248.3	2833.8
GRAND TOTAL	1282.3	273.6	1277.2	1275.5	4108.6

16. Program Funding Summary (Cont'd): NAVSTAR GPS, December 31, 1987

c. Annual Summary - Satellite

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: RDT&E							
1974	-	-	-	9.4	-	-	6.4	N/A
1975	-	-	-	25.5	-	-	19.1	9.8
1976	-	-	-	72.2	-	-	58.9	9.4
197T	-	-	-	12.0	-	-	10.6	4.9
1977	-	-	-	56.3	-	-	50.2	4.6
1978	-	-	-	55.9	-	-	53.3	7.1
1979	-	-	-	53.9	-	-	56.0	7.1
1980	-	-	-	88.3	-	-	101.9	9.4
1981	-	-	-	78.8	-	-	100.7	11.9
1982	-	-	-	100.6	-	-	137.4	9.2
1983	-	-	-	67.3	-	-	96.2	4.9
1984	-	-	-	67.9	-	-	100.7	3.9
1985	-	-	-	49.1	-	-	75.2	3.4
1986	-	-	-	28.7	-	-	45.1	2.8
1987	-	-	-	15.5	-	-	25.1	2.7
1988	-	-	-	15.6	-	-	26.2	3.7
1989	-	-	-	30.5	-	-	53.3	3.8
1990	-	-	-	26.9	-	-	48.5	3.6
1991	-	-	-	13.8	-	-	25.7	3.3
1992	-	-	-	13.3	-	-	25.3	2.8
1993	-	-	-	9.2	-	-	18.0	2.3
1994	-	-	-	9.3	-	-	18.6	2.3
1995	-	-	-	5.0	-	-	10.2	2.3
1996	-	-	-	4.0	-	-	8.3	2.3
1997	-	-	-	3.5	-	-	7.5	2.3
1998	-	-	-	2.7	-	-	6.0	2.3
1999	-	-	-	2.0	-	-	4.5	2.3
2000	-	-	-	1.3	-	-	3.0	2.3
Subtotal	12	-	-	918.5	-	-	1191.9	-

c. Annual Summary - Satellite

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: Procurement							
1982	-	0.7	-	13.2	19.0	-	20.1	-
1983	-	21.9	-	69.5	111.5	-	111.5	9.0
1984	1	-	25.7	152.7	217.6	4.7	256.0	8.0
1985	6	-	128.7	192.6	183.0	76.3	331.4	3.4
1986	9	-	188.4	114.2	-	154.6	203.4	2.8
1987	8	-	158.6	47.0	-	180.7	86.7	2.7
1988	4	-	69.5	48.4	-	114.8	92.6	3.7
1989	-	-	11.2	38.3	-	-	75.6	3.8
1990	-	-	19.9	40.2	10.0	-	81.7	3.6
1991	1	-	60.1	87.1	52.6	10.0	181.7	3.3
1992	3	-	110.0	140.6	44.9	52.6	299.8	2.8
1993	3	-	107.1	115.9	65.2	44.9	252.8	2.3
1994	4	-	128.0	134.5	45.1	65.2	300.4	2.3
1995	3	-	117.0	118.1	63.2	45.1	269.8	2.3
1996	4	-	138.6	139.9	32.0	63.2	327.0	2.3
1997	2	-	59.4	60.0	-	32.0	143.5	2.3
1998	-	-	5.8	5.8	-	-	14.3	2.3
1999	-	-	4.3	4.3	-	-	10.8	2.3
2000	-	-	5.7	5.7	-	-	14.5	2.3
2001	-	-	2.8	2.8	-	-	7.4	2.3
Subtotal	48	22.6	1340.8	1530.8	844.1	844.1	3081.0	-

c. Annual Summary - Satellite

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: MILCON							
1984	-	-	-	4.7	-	-	7.3	3.8
Subtotal	-	-	-	4.7	-	-	7.3	-
Total	60	22.6	1340.8	2454.0	844.1	844.1	4280.2	

16. Program Funding Summary (Cont'd): User Equipment NAVSTAR GPS, December 31, 1987

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: RDT&E (Tri-Service)							
1974	-	-	-	9.3	-	-	6.3	N/A
1975	-	-	-	19.5	-	-	14.6	9.8
1976	-	-	-	40.8	-	-	33.3	9.4
197T	-	-	-	6.7	-	-	5.9	4.9
1977	-	-	-	31.3	-	-	27.9	4.6
1978	-	-	-	25.5	-	-	24.3	7.1
1979	-	-	-	37.7	-	-	39.2	7.1
1980	-	-	-	50.3	-	-	58.0	9.4
1981	-	-	-	46.4	-	-	59.3	11.9
1982	-	-	-	47.6	-	-	65.0	9.2
1983	-	-	-	45.3	-	-	64.7	4.9
1984	-	-	-	57.2	-	-	84.9	3.9
1985	-	-	-	58.8	-	-	90.0	3.4
1986	-	-	-	58.7	-	-	92.2	2.8
1987	-	-	-	60.2	-	-	97.6	2.7
1988	-	-	-	61.6	-	-	103.7	3.7
1989	-	-	-	59.0	-	-	103.0	3.8
1990	-	-	-	79.0	-	-	142.7	3.6
1991	-	-	-	46.1	-	-	85.6	3.3
1992	-	-	-	25.9	-	-	49.4	2.8
1993	-	-	-	2.8	-	-	5.5	2.3
1994	-	-	-	2.4	-	-	4.8	2.3
1995	-	-	-	8.3	-	-	16.9	2.3
Subtotal	129	-	-	880.4	-	-	1274.8	—

16. Program Funding Summary (Cont'd): NAVSTAR GPS, December 31, 1987

c. Annual Summary - User Equipment

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: RDT&E (Air Force)							
1974	-	-	-	1.5	-	-	1.0	N/A
1975	-	-	-	6.4	-	-	4.8	9.8
1976	-	-	-	19.5	-	-	15.9	9.4
197T	-	-	-	3.1	-	-	2.7	4.9
1977	-	-	-	15.5	-	-	13.8	4.6
1978	-	-	-	14.4	-	-	13.7	7.1
1979	-	-	-	18.9	-	-	19.6	7.1
1980	-	-	-	29.8	-	-	34.4	9.4
1981	-	-	-	19.2	-	-	24.5	11.9
1982	-	-	-	20.5	-	-	28.0	9.2
1983	-	-	-	18.1	-	-	25.9	4.9
1984	-	-	-	13.3	-	-	19.8	3.9
1985	-	-	-	13.5	-	-	20.7	3.4
1986	-	-	-	16.4	-	-	25.8	2.8
1987	-	-	-	17.4	-	-	28.3	2.7
1988	-	-	-	23.9	-	-	40.2	3.7
1989	-	-	-	28.8	-	-	50.2	3.8
1990	-	-	-	25.9	-	-	46.7	3.6
1991	-	-	-	17.8	-	-	33.0	3.3
1992	-	-	-	3.5	-	-	6.7	2.8
1993	-	-	-	2.8	-	-	5.5	2.3
1994	-	-	-	2.4	-	-	4.8	2.3
1995	-	-	-	8.3	-	-	16.9	2.3
Total	52	-	-	340.9	-	-	482.9	

16. Program Funding Summary (Cont'd): User Equipment NAVSTAR GPS, December 31, 1987

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: RDT&E (Navy)							
1974	-	-	-	6.0	-	-	4.1	N/A
1975	-	-	-	8.7	-	-	6.5	9.8
1976	-	-	-	13.5	-	-	11.0	9.4
197T	-	-	-	1.8	-	-	1.6	4.9
1977	-	-	-	7.4	-	-	6.6	4.6
1978	-	-	-	3.8	-	-	3.6	7.1
1979	-	-	-	9.5	-	-	9.9	7.1
1980	-	-	-	8.8	-	-	10.1	9.4
1981	-	-	-	13.4	-	-	17.1	11.9
1982	-	-	-	22.0	-	-	30.0	9.2
1983	-	-	-	19.7	-	-	28.1	4.9
1984	-	-	-	40.0	-	-	59.3	3.9
1985	-	-	-	37.7	-	-	57.7	3.4
1986	-	-	-	35.6	-	-	55.9	2.8
1987	-	-	-	40.0	-	-	64.8	2.7
1988	-	-	-	31.8	-	-	53.5	3.7
1989	-	-	-	25.2	-	-	44.0	3.8
1990	-	-	-	48.6	-	-	87.8	3.6
1991	-	-	-	23.7	-	-	44.1	3.3
1992	-	-	-	22.4	-	-	42.7	2.8
Total	77	-	-	419.6	-	-	638.4	
	Appropriation: RDT&E (Army)							
1974	-	-	-	1.8	-	-	1.2	N/A
1975	-	-	-	4.4	-	-	3.3	9.8
1976	-	-	-	7.8	-	-	6.4	9.4
197T	-	-	-	1.8	-	-	1.6	4.9
1977	-	-	-	8.4	-	-	7.5	4.6
1978	-	-	-	7.3	-	-	7.0	7.1
1979	-	-	-	9.3	-	-	9.7	7.1
1980	-	-	-	11.7	-	-	13.5	9.4
1981	-	-	-	13.8	-	-	17.7	11.9
1982	-	-	-	5.1	-	-	7.0	9.2
1983	-	-	-	7.5	-	-	10.7	4.9
1984	-	-	-	3.9	-	-	5.8	3.9
1985	-	-	-	7.6	-	-	11.6	3.4
1986	-	-	-	6.7	-	-	10.5	2.8
1987	-	-	-	2.8	-	-	4.5	2.7
1988	-	-	-	5.9	-	-	10.0	3.7
1989	-	-	-	5.0	-	-	8.8	3.8
1990	-	-	-	4.5	-	-	8.2	3.6
1991	-	-	-	4.6	-	-	8.5	3.3
Total	-	-	-	119.9	-	-	153.5	

16C. Annual Summary - User Equipment NAVSTAR GPS, December 31, 1987

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: Procurement (Tri-Service)							
1985	0	0.0	0.0	4.7	-	-	8.0	3.4
1986	333	19.2	25.4	58.6	-	-	100.9	2.8
1987	806	9.1	37.1	71.0	-	-	127.1	2.7
1988	1007	14.3	39.0	96.1	-	-	179.4	3.7
1989	1467	8.4	42.5	88.4	-	-	170.6	3.8
1990	3331	16.2	65.3	156.7	-	-	313.3	3.6
1991	4215	30.3	94.0	164.4	-	-	338.3	3.3
1992	4400	13.4	94.8	164.6	-	-	347.9	2.8
1993	3910	15.6	106.7	138.8	-	-	299.5	2.3
1994	2274	11.3	97.2	119.7	-	-	265.2	2.3
1995	1472	11.5	75.4	91.7	-	-	208.4	2.3
1996	1021	3.8	45.1	51.6	-	-	120.0	2.3
1997	853	3.7	36.4	46.5	-	-	111.0	2.3
1998	777	2.8	31.4	39.1	-	-	95.2	2.3
1999	456	5.6	17.4	28.8	-	-	71.8	2.3
2000	591	5.6	9.8	30.3	-	-	77.2	2.3
Subtotal	26913	170.8	817.5	1351.0	-	-	2833.8	
Total	27042	170.8	817.5	2231.4	-	-	4108.6	

16C. Annual Summary - User Equipment NAVSTAR GPS, December 31,1987

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: Aircraft Procurement (Air Force)							
1985				4.7	-	-	8.0	3.4
1986	70	7.0	8.2	27.6	-	-	49.1	2.8
1987	300	4.9	21.3	40.2	-	-	74.0	2.7
1988	307	8.9	21.8	61.6	-	-	117.4	3.7
1989	299	6.8	19.1	58.3	-	-	114.9	3.8
1990	564	12.8	16.1	96.0	-	-	194.4	3.6
1991	1081	28.2	45.2	104.1	-	-	216.7	3.3
1992	1286	13.4	48.8	112.6	-	-	239.7	2.8
1993	1752	15.6	79.6	106.2	-	-	231.2	2.3
1994	1565	10.6	80.5	101.5	-	-	226.1	2.3
1995	1125	11.5	63.7	79.3	-	-	180.7	2.3
1996	757	3.8	36.2	42.6	-	-	99.3	2.3
1997	683	3.7	31.4	41.5	-	-	99.1	2.3
1998	620	2.8	27.1	34.8	-	-	84.9	2.3
1999	300	5.6	13.3	24.6	-	-	61.4	2.3
2000	290	5.6	9.8	19.2	-	-	49.0	2.3
Total	10999	141.2	522.1	954.8	-	-	2045.9	
	Appropriation: Aircraft Procurement (Navy)							
1985	-	-	-		-	-	-	-
1986	-	-	-		-	-	-	-
1987	9	-	-	0.4	-	-	0.7	2.7
1988	146	0.1	0.4	2.8	-	-	5.3	3.7
1989	369	-	0.5	2.3	-	-	4.5	3.8
1990	828	2.0	4.5	7.1	-	-	14.5	3.6
1991	1097	1.0	7.2	10.2	-	-	21.3	3.3
1992	1227	-	8.4	10.0	-	-	21.2	2.8
1993	1078	-	6.5	10.0	-	-	21.8	2.3
1994	468	0.7	8.9	9.9	-	-	22.1	2.3
1995	266	-	9.3	10.0	-	-	22.7	2.3
1996	205	-	7.3	7.4	-	-	17.2	2.3
1997	135	-	4.5	4.5	-	-	10.8	2.3
1998	122	-	3.8	3.8	-	-	9.2	2.3
1999	121	-	3.6	3.7	-	-	9.3	2.3
2000	259	-	-	10.4	-	-	26.6	2.3
Total	6330	3.8	64.9	92.5	-	-	207.2	-

16C. Annual Summary - User Equipment NAVSTAR GPS, December 31,1987

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
		Appropriation: Aircraft Procurement (Army)						
1985		-	-	-	-	-	-	-
1986	67	3.6	4.1	7.7	-	-	13.7	2.8
1987	139	0.7	4.6	6.4	-	-	11.8	2.7
1988	157	2.5	4.0	7.0	-	-	13.4	3.7
1989	110	0.6	4.1	5.1	-	-	10.1	3.8
1990	882	0.8	22.5	27.8	-	-	56.4	3.6
1991	958	0.9	23.5	27.4	-	-	57.0	3.3
1992	950	0.0	23.3	26.2	-	-	55.8	2.8
1993	266	0.0	6.5	7.3	-	-	15.8	2.3
1994		-	-	-	-	-	-	2.3
1995		-	-	-	-	-	-	2.3
1996		-	-	-	-	-	-	2.3
1997		-	-	-	-	-	-	2.3
1998		-	-	-	-	-	-	2.3
1999		-	-	-	-	-	-	2.3
2000		-	-	-	-	-	-	2.3
Total	3529	9.1	92.6	114.9	-	-	234.0	-
		Appropriation: Other Procurement (Air Force)						
1985	-	-	-	0.0	-	-	0.0	-
1986	87	2.7	2.5	5.7	-	-	9.3	2.8
1987	121	0.5	2.2	6.5	-	-	11.0	2.7
1988	188	0.3	4.0	10.7	-	-	18.7	3.7
1989	375	0.5	7.5	9.5	-	-	17.2	3.8
1990	362	0.0	5.7	6.4	-	-	11.9	3.6
1991	150	0.0	2.4	2.5	-	-	4.7	3.3
1992	150	0.0	2.3	2.4	-	-	4.7	2.8
1993	150	0.0	2.2	2.3	-	-	4.7	2.3
1994	150	0.0	2.2	2.3	-	-	4.7	2.3
1995	-	-	-	0.0	-	-	0.0	2.3
1996	-	-	-	0.0	-	-	0.0	2.3
1997	-	-	-	0.0	-	-	0.0	2.3
1998	-	-	-	0.0	-	-	0.0	2.3
1999	-	-	-	0.0	-	-	0.0	2.3
2000	-	-	-	0.0	-	-	0.0	2.3
Total	1733	4.0	31.0	48.3	-	-	86.9	-

16C. Annual Summary - User Equipment NAVSTAR GPS, December 31, 1987

Fiscal Year	Qty	FY79 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
	Appropriation: Other Procurement (Navy)							
1985	-	-	-	-	-	-	-	-
1986	39	3.3	7.6	12.0	-	-	19.6	2.8
1987	177	1.7	7.7	14.3	-	-	24.2	2.7
1988	169	-	7.4	7.5	-	-	13.2	3.7
1989	214	-	9.6	9.6	-	-	17.4	3.8
1990	366	0.5	12.2	12.7	-	-	23.6	3.6
1991	244	0.2	7.9	10.7	-	-	20.5	3.3
1992	156	-	5.1	5.9	-	-	11.7	2.8
1993	114	-	6.0	6.0	-	-	12.0	2.3
1994	91	-	5.6	6.0	-	-	12.3	2.3
1995	81	-	2.4	2.4	-	-	5.0	2.3
1996	59	-	1.6	1.6	-	-	3.5	2.3
1997	35	-	0.5	0.5	-	-	1.1	2.3
1998	35	-	0.5	0.5	-	-	1.1	2.3
1999	35	-	0.5	0.5	-	-	1.1	2.3
2000	42	-	-	0.7	-	-	1.6	2.3
Total	1857	5.7	74.6	90.9	-	-	167.9	
	Appropriation: Other Procurement (Army)							
1985	-	-	-	-	-	-	-	-
1986	70	2.6	3.0	5.6	-	-	9.2	2.8
1987	60	1.3	1.3	3.2	-	-	5.4	2.7
1988	40	2.5	1.4	6.5	-	-	11.4	3.7
1989	100	0.5	1.7	3.6	-	-	6.5	3.8
1990	329	0.1	4.3	6.7	-	-	12.5	3.6
1991	685	0.0	7.8	9.5	-	-	18.1	3.3
1992	631	0.0	6.9	7.5	-	-	14.8	2.8
1993	550	0.0	5.9	7.0	-	-	14.0	2.3
1994	-	-	-	-	-	-	-	2.3
1995	-	-	-	-	-	-	-	2.3
1996	-	-	-	-	-	-	-	2.3
1997	-	-	-	-	-	-	-	2.3
1998	-	-	-	-	-	-	-	2.3
1999	-	-	-	-	-	-	-	2.3
2000	-	-	-	-	-	-	-	2.3
Total	2465	7.0	32.3	49.6	-	-	91.9	-

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

d. Obligations and Expenditures — Satellite

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated 1/	Expended 1/
Appropriation: RDT&E			
1974	6.4	6.4	6.4
1975	19.1	19.1	19.1
1976	58.9	58.9	58.9
197T	10.6	10.6	10.6
1977	50.2	50.2	50.2
1978	53.3	53.3	53.3
1979	56.0	56.0	56.0
1980	101.9	101.9	101.9
1981	100.7	100.7	100.7
1982	137.4	137.4	137.4
1983	96.2	96.2	96.2
1984	100.7	100.7	100.7
1985	75.2	75.2	75.2
1986	45.1	45.1	29.5
1987	25.1	24.8	8.9
1988	26.2	0.6	0.2
To Complete	228.9	N/A	N/A
Total	1191.9	937.1	905.2
Appropriation: Procurement			
1982	20.1	20.1	20.1
1983	111.5	111.5	111.5
1984	256.0	256.0	205.4
1985	331.4	331.4	296.2
1986	203.4	203.4	74.9
1987	86.7	60.2	0.8
1988	92.6	5.5	0.7
To Complete	1979.3	N/A	N/A
Total	3081.0	988.1	709.6
Appropriation: MILCON			
1984	7.3	7.3	7.3
Total	7.3	7.3	7.3

1/ As of 31 Dec 87 From Program Office Records

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

d. Obligations and Expenditures -- User Equipment

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated 1/	Expended 1/
Appropriation: RDT&E			
1974	6.3	6.3	6.3
1975	14.6	14.6	14.6
1976	33.3	33.3	33.3
197T	5.9	5.9	5.9
1977	27.9	27.9	27.9
1978	24.3	24.3	24.3
1979	39.2	39.2	39.2
1980	58.0	58.0	58.0
1981	59.3	59.3	59.3
1982	65.0	65.0	65.0
1983	64.7	64.7	64.7
1984	84.9	84.9	84.9
1985	90.0	90.0	72.4
1986	92.2	92.2	73.3
1987	97.6	96.7	36.4
1988	103.7	41.3	2.3
To Complete	407.9	N/A	N/A
Total	1274.8	803.6	667.8
Appropriation: Aircraft Procurement (3010)			
1985	8.0	8.0	5.6
1986	62.8	34.7	10.2
1987	86.5	41.2	8.1
1988	136.1	3.0	1.1
To Complete	2193.7	N/A	N/A
Total	2487.1	86.9	25.0
Appropriation: Other Procurement (3080)			
1986	38.1	38.1	11.3
1987	40.6	40.6	1.3
1988	43.3	2.6	0.2
To Complete	226.7	N/A	N/A
Total	348.7	81.3	12.8

1/ As of 31 Dec 87 From Program Office Records

17. Production Rate Data: Satellite (Air Force)

a. Annual Production Rates — Annual production rates shown differ from the annual funded 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 FY91 and delivery period is 48 months.

	Production Rates (Quantity/Year)			
Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum
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	2.8	2.8
1988	1.3	1.3	2.3	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	0.2	0.6
1992	0.0	0.0	0.7	3.0
1993	0.0	0.0	0.7	4.0
1994	0.0	0.0	1.0	3.0
1995	0.0	0.0	0.7	0.5
1996	0.0	0.0	1.0	N/A
1997	0.0	0.0	0.5	N/A

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
Prog Acq Cost	(BY$)	1490.7	+963.3	2454.0	-54.000	2400.0
	(TY$)	2182.8	+2,097.4	4280.2	-164.000	4116.2
PAUC	(BY$)	37.268	+3.632	40.900	- 0.900	40.000
	(TY$)	54.570	+16.767	71.337	- 2.734	68.603

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
Start Date (Mo/Yr)	9/83	N/A	9/83	N/A	9/83
Duration (in Months)	85	+120	205	+27	178
End Date (Mo/Yr)	9'90	N/A	9/2000	N/A	6/98

d. Deliveries (Plan/Actual) —

	To Date
RDT&E	12/12
Procurement	3/3

17. 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
1986	142.4	199.6	133.2	212.2
1987	269.2	269.2	322.4	784.2
1988	382.4	382.4	402.8	1168.4
1989	974.8	1023.6	586.8	1192.4
1990	1781.2	1781.2	1332.4	2042.0
1991	1954.8	1954.8	1686.0	1954.8
1992	1972.8	1972.8	1760.0	1972.8
1993	1318.0	1318.0	1564.0	1456.8
1994	694.0	694.0	909.6	N/A
1995	456.0	456.0	588.8	N/A
1996	317.6	317.6	408.4	N/A
1997	256.8	256.8	341.2	N/A
1998	141.6	141.6	310.8	N/A
1999	198.4	198.4	182.4	N/A
2000	24.0	24.0	236.4	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$)	2554.9	-323.5	2231.4	+251.4	1980.0
	(TY$)	4875.8	-767.2	4108.6	+733.1	3375.5
PAUC	(BY$)	0.093	-0.010	0.083	+0.010	0.073
	(TY$)	0.178	-0.026	0.152	+0.027	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
Start Date (Mo/Yr)	8/86	N/A	8/86	N/A	8/86
Duration (in Months)	200	--	200	+94	106
End Date (Mo/Yr)	3/03	N/A	3/03	N/A	6/95

d. Deliveries (Plan/Actual) —

	To Date
RDT&E	20/20
Procurement	0/0

18. Operating and Support Costs — N/A

N6 - AV-8B

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: AV-8B

AS OF DATE: DECEMBER 31, 1987

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1. Destination and Nomenclature : AV-8B/Attack, V/STOL, Close Air Support (HARRIER II)

2. DoD Component: Department of the Navy

3. Responsible Office and Telephone number:

Harrier Program Office
Naval Air Systems Command
Washington, D. C. 20361

PM: Col. L. C. Watt
Assigned: Mar 20, 1986
AV 222-8324; COMM(202) 692-5750

4. Program Elements:
RDT&E: 064214N
PROCUREMENT: 26110M; 26497M APPN 1506 ICN 0124
MILCON: 26496M, 26497M

5. Related Programs: F/A-18, F-15, GR5 (UK COLLABORATIVE PROGRAM), AND AV-8B(E) SPANISH PROGRAM.

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APR 13 1988

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6. Mission and Description: THE AV-8B(HARRIER II) is a second generation vertical/short takeoff and landing V/STOL light attack jet aircraft to be utilized by the Marine Corps. The primary mission of the AV-8B is to provide responsive close air support for the ground forces. This single piloted advanced V/STOL aircraft can operate from short fields, forward sites, roads and surface ships providing minimum response time to target. The aircraft incorporates basic aerodynamic improvements such as a composite, super critical, high-lift wing leading edge root extension, engine inlet modification, lift improvement devices, 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 in development for an early 1989 fleet introduction.

7. Program Highlights:

a. Significant Historical Developments: DSARC I (March 1976) authorized two prototype aircraft, designated YAV-8Bs, 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.

7. Program Highlights (continued)

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 operational testing of LASER/MAVERICK on the AV-8B (CNO PROJECT M567), development and operational testing of OMNIBUS 4 OFP software to provide expanded weapons delivery capability, operational testing of the ALR-67 (TEMP 592) and the ALQ-164 (TEMP 521) and completion of development and operational testing of the TAV-8B. Additionally, the first flight of the Night Attack FSD aircraft was accomplished on schedule in June 1987. 34 AV-8 aircraft (31 AV-8B and 3 TAV-8B) were delivered in CY-87. Total production deliveries through December 1987 number 102 AV-8B and 4 TAV-8B aircraft. Night attack capability will be incorporated in all FY 88 aircraft.

c. Changes Since "as of" Date: A three year multiyear procurement (FY89-FY91) was approved in the amended FY89 Presidents budget.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (revised 10 October 1986) threshold breaches.

9. Schedule:

a. (U) Milestones

	Development Estimate/ Approved Program	Current Estimate
Program 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	Jun 85/Aug 85	Aug 85

b. Previous Change Explanations:Technical performance demonstration slipped 5 months due to lack of sufficient instrumented test program.

c. Current Change Explanations:None

d. References:DCP 160 dtd 10 October 1986 and approved 16 January 1987. Approved Program: FY 1988/89 Biennial Presidents Budget as amended. DAE Baseline approved 17 Feb 1988.

10 [redacted] Technical/Operational Characteristics:

a. (U) Technical	Dev.Estimate/ Appvd. Program	Demonstrated Performance	Current Estimate
(U) Weight (lbs.) Empty	12,750/13,126	12,835	13,126
(U) Speed Maximum (Mach No.)	0.91/0.91	0.905	.91
(U) Dimensions (ft.)			
Length	46.33/46.33	46.33	46.33
Height	11.65/11.65	11.65	11.65
Span	30.33/30.33	30.33	30.33
(U) Spotting Factor (A-7-1.0)	.95/.95	TBD	.95
b. [redacted] Operational			
(U) Maximum Vertical Gross Take-Off (VTO) Weight (lbs.)	19,185/19,185	19,185	19,185
(U) Maximum Short Gross Take-off (STO) (Weight) (lbs.) (1,000 ft. roll)	28,350/28,350	30,060	30,060 CH-1
(U) Close Air Support Radius of Action (NM)			
VTO	50/50	TBD	50
STO	209/155	155	155
(U) Mean Flight Hours Between Failures (MFHBF(hrs.)	2.40/2.04	2.04	2.04
(U) Maintainability (DMMH/FH), (hrs.)	16.9/16.5	14.5	14.5 CH-2
(U) Standard Depot Level Maintenance Cycle (Airframe Hours)			
1st Period	1,000/1,000	TBD	1,000
2nd Period	800/800	TBD	800
3rd Period	600/600	TBD	600
(U) VTO Close Air Support Payload (lbs.)	2,850/2,850	TBD	2,850
(U) STO Close Air Support Payload (lbs.) (600' 20 kts WOD 87°F Tropical Day)	7,980/7,980	TBD	7,980

(b)(1) [redacted]

[redacted]

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

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.

d. Current Change Explanations CH-1 - - Maximum short gross take-off (STO) changed to reflect demonstrated performance with RR-406A engine. CH-2 - - Maintainability (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 : FY88/89 Biennial Presidents budget as amended. DAE Baseline approved 17 Feb 1988.

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

a. Cost - -	Development Estimate	Changes	Current Estimate
Development (RDT&E)	$ 872.7	$+ 243.4	$1116.1
rocurement	$4862.4	-1227.4	$3635.0
Airframe	(2650.5)	(- 519.7)	(2130.8)
Engine	(899.0)	(- 491.1)	(407.9)
Avionics	(258.9)	(- 62.7)	(196.2)
Other GFE	(145.5)	(- 105.2)	(40.3)
Total Flyaway	(3953.9)	(-1178.7)	(2775.2)
Other Wpn Sys Cost	(439.3)	(+ 121.9)	(561.2)
Initial Spares	(469.2)	(- 170.6)	(298.6)
Construction (MILCON)	5.5	-	5.5
Total FY79 Base-Year$	$5740.6	$- 984.0	4756.6
Escalation	3384.9	+ 127.9	3512.8
Development	(185.3)	(+ 140.0)	(325.3)
Procurement	(3196.8)	(- 12.1)	(3184.7)
Construction(MILCON)	(2.8)		(2.8)
Total Then-Year$	$9125.5	$- 856.1	8269.4
Quantities - -			
Development	6	-	6
Procurement	336	- 60	276
Total	342	- 60	282

11. Program Acquisition Cost (continued)

c. Unit Cost - -

Procurement				
FY79 Base-Year$	14.5	-	1.3	13.2
Then-Year$	24.0	+	0.7	24.7
Program:				
FY79 Base-Year$	16.8	+	0.1	16.9
Then-Year$	26.7	+	2.6	29.3

d. Approved Design to Cost Goal - - Not applicable.

e. 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.

f. Nuclear Cost -- None.

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

a. Program Acquisition - -	Current Year SAR Current Estimate (Dec 87 SAR)	Current Year UCR Baseline Estimate (Dec 86 SAR)	Budget Year UCR Baseline Estimate (Dec 87 SAR)
(1) Cost	8269.4	9486.1	8269.4
(2) Quantity	282	334	282
(3) Unit Cost	29.3	28.4	29.3

b. Program Acquisition - -	FY 1988 Appropriation Act (FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	627.5	627.5	568.5
Less CY Adv Proc	-150.0	-150.0	-40.2
Plus PY Adv Proc	43.0	43.0	70.0
Net Total	520.5	520.5	598.3
(2) Quantity	24	24	24
(3) Unit Cost	21.7	21.7	24.9

13. 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	+ 3.7	- 955.9		- 952.2
QUANTITY		- 171.0		- 171.0
SCHEDULE	+ 17.7	+1487.8		+1505.5
ENGINEERING	+ 181.1	+ 552.0		+ 733.1
ESTIMATING	+ 103.4	-1317.8	+ 8.9	-1205.5
OTHER				
SUPPORT		+ 450.7		+ 450.7
SUBTOTAL	+ 305.9	+ 45.8	+ 8.9	+ 360.6
CURRENT CHANGES				
ECONOMIC	+ 2.3	+ 206.2		+ 208.5
QUANTITY		-1302.7		-1302.7
SCHEDULE		- 94.7		- 94.7
ENGINEERING		- 0.6		- 0.6
ESTIMATING	+ 75.2	+ 200.4	- 8.9	+ 266.7
OTHER				
SUPPORT		- 293.9		- 293.9
SUBTOTAL	+ 77.5	-1285.3	- 8.9	-1216.7
TOTAL CHANGES	+ 383.4	-1239.5		- 856.1
CURRENT ESTIMATE	1441.4	6819.7	8.3	8269.4

3. Cost Variance Analysis : (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		- 77.6		- 77.6
SCHEDULE	+ 10.8	+ 784.0		+ 794.8
ENGINEERING	+ 115.7	+ 249.3		+ 365.0
ESTIMATING	+ 73.0	-1761.5	+ 5.0	-1683.5
OTHER				
SUPPORT		+ 161.6		+ 161.6
SUBTOTAL	+ 199.5	- 644.2	+ 5.0	- 439.7
CURRENT CHANGES				
QUANTITY		- 502.9		- 502.9
SCHEDULE		- 80.6		- 80.6
ENGINEERING		- 18.8		- 18.8
ESTIMATING	+ 43.9	+ 134.1	- 5.0	+ 173.0
OTHER				
SUPPORT		- 115.0		- 115.0
SUBTOTAL	+ 43.9	- 583.2	- 5.0	- 544.3
TOTAL CHANGES	+ 243.4	-1227.4		- 984.0
CURRENT ESTIMATE	1116.1	3635.0	5.5	4756.6

Cost Variance Analysis: (continued)
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. 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 and revised escalation rates.
Quantity:	Reduction in aircraft from 336 to 328.
Schedule:	Revised procurement schedule for 336 aircraft accelerated procurement schedule, and 4 additional years added to program:

	FY86 &Prior	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94
From:	138	47	48	60	35				
To:	138	42	42	42	42	22			

Engineering:	Addition of ASPJ. Increase due to night attack capability, ASPJ and ECPs 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 estimate, decrease dollar pound exchange rate, quantity adjustment, base year adjustment, 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.

3. Cost Variance Analysis :

b. Previous Change Explanations : (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.

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.

c. Current Change Explanations

	(Dollar Millions) Base Year	Then-Year
(1) RDT&E		
Revised escalation indices.(Economic)	N/A	+2.3
Non Recurring Costs increase due to the 408 Engine upgrade.(Estimating)	+43.9	+75.2
(2) Procurement		+206.2
Revised escalation indices.(Economic)	N/A	(+24.5)
Correction of previous error.(Economic)	N/A	(+181.7)
Decrease of 52 aircraft.(Quantity)	-502.9	-1302.7

13. Cost Variance Analysis :
c. Current Change Explanations (continued)

Accelerated procurement schedule. (Schedule)	-80.6	-94.7
Reduction of 52 aircraft.(Engineering)	-18.8	-0.6
Reduction of 52 aircraft.(Estimating)	+230.6	+344.4
Revised estimating reductions. (Estimating)	-96.5	-144.0
Prior Year readjustments plus the elimination of three years of support and spares due to the quantity change.(Support)	-115.0	-293.9

(3) MILCON

Military Construction estimate reduced - - no FY89 funding shown.(Estimating)	-5.0	-8.9

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

a. Initial SAR Estimate to Current Baseline Estimate -
(1) Same as current baseline

b. Current Baseline Estimate to Current Estimate -

PAUC (Dev Est)	Change								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Spt	Oth	Total	
26.683	-2.637	+0.451	+5.003	+2.597	-3.329	+0.556		+2.641	29.324

5. Contract Information: (Then Year Dollars in Millions)

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Corp., St. Louis, Mo. N0001985-C-0109, FFP Award: March 29, 1985 Definitized: July 30, 1987	$534.0	$ N/A	46

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$534.0	$ N/A	46	$534.0	$534.0

Variance analysis does not apply to FFP contracts.

Engine	Initial Contract Price Target	Ceiling	Qty
Rolls Royce, Ltd., Bristol, England N0001984-C-0340, FFP Award: August 19, 1985 Definitized: May 26, 1987	$149.0	$ N/A	46

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$148.1	$ N/A	46	$148.1	$148.1

Variance analysis does not apply to FFP contracts.

Airframe	Initial Contract price Target	Ceiling	Qty
McDonnell Douglas Corp. St. Louis, Mo. N0001985-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.

5. Contract Information : (Then Year Dollars in Millions) (continued)

Engine	Initial Contract Price Target	Ceiling	Qty
Rolls Royce, Ltd. Bristol, England N0001986-C-0004, FFP Award: July 2, 1986 Definitized: September 30, 1987	$146.8	$ N/A	42

Variance analysis does not apply to FFP contracts.

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$146.8	$ N/A	42	$146.8	$146.8

Airframe	Initial Contract Price Target	Ceiling	Qty
McDonnell Douglas Corp. St. Louis, Mo. N0001986-C-0302, FFP Award: July 31,1987 Definitized: Estimated Definitization date April 30, 1988.	$351.1	$ N/A	24

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$353.1	$ N/A	24	$335.5 2/	$335.5

Variance analysis does not apply to FFP contracts.

Engine	Target	Ceiling	Qty
Rolls Royce, Ltd. Bristol, England N0001986-C-0281,FFP Award: July 13,1987 Definitized: Estimated Definitization April 30, 1988	$49.3	$ N/A	24

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$49.3	$ N/A	24	$97.3	$97.3

Variance analysis does not apply to FFP contracts.

2/ $15.6 Million was negotiated out of the contractors proposal.

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

a. Program Status - -
(1) Percent Program Completed: 72% (13 yrs/18 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 79% ($6555.8/$8269.4)
(Funds Appropriated to Date in Millions/Total Program in Millions)

b. Appropriation Summary - -

(Then Year Dollars in Millions)

	Current & Prior (FY 76-88)	Budget Year (FY89)	FYDP (FY90-FY92)	Balance To Complete Beyond FYDP (FY93-95)	Total
RDT & E	1,339.5	39.2	62.7	0.0	1,441.4
PROCUREMENT	5,208.0	568.5	1,043.2	0.0	6,819.7
MILCON	8.3	0.0	0.0	0.0	8.3
TOTAL	6,555.8	607.7	1,105.9	0.0	8,269.4

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

		FY79 Base Yr. dollars			Then Yr. Dollars			Escal
Fiscal		Flyaway			Advance Proc			Rate
Year	Qty	Nonrec	Rec	Total	Debit	Credit	Total	(%)
Appropriation: RDT&E								
1976				5.2			4.3	6.6
1976T				2.2			1.9	2.9
1977				37.6			33.6	2.6
1978				61.2			58.9	6.8
1979	2			158.8			168.7	8.4
1980				155.3			182.4	10.5
1981				186.6			239.1	10.6
1982	4			166.5			224.5	7.6
1983				83.4			117.5	4.9
1984				69.5			101.5	3.8
1985				40.7			61.3	3.4
1986				43.5			67.3	2.8
1987				26.2			41.8	2.7
1988				22.2			36.7	3.7
1989				22.9			39.2	3.8
1990				11.8			21.0	3.6
1991				11.3			20.7	3.3
1992				11.2			21.0	2.8
SUBTOTL	6			1116.1			1441.4	

16. Program Funding Summary (Current Estimate in Millions of Dollars)
c. Annual Summary (continued)

		FY79 Base Yr. dollars			Then Yr. Dollars			Escal
Fiscal		Flyaway			Advance Proc			Rate
Year	Qty	Nonrec	Rec	Total	Debit	Credit	Total	(%)
Appropriation: Procurement								
1981		0.0	0.0	59.0	86.6	0.0	86.6	11.6
1982	12	14.1	326.5	414.2	35.6	86.6	659.3	14.3
1983	21	3.7	288.7	485.5	59.6	35.6	822.4	9.0
1984	27	0.9	269.0	451.6	95.8	59.6	795.8	8.0
1985	32	5.6	261.5	368.9	78.2	95.8	671.7	3.4
1986	46	0.3	338.4	452.8	77.4	78.2	851.0	2.8
1987	42	16.1	299.5	356.4	43.0	77.4	693.7	2.7
1988	24	5.6	208.4	311.2	150.0	43.0	627.5	3.7
1989	24	1.4	201.9	272.9	40.2	70.0	568.5	3.8
1990	24	0.0	200.6	252.3	30.0	70.2	541.1	3.6
1991	24	0.0	204.7	210.2	0.0	80.0	502.1	3.3
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	2.8
1993	0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
1994	0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
1995	0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
TOTAL	276.0	47.7	2599.2	3635.0	696.4	696.4	6819.7	
Appropriation: MILCON								
1983				3.2			4.6	4.9
1986				2.3			3.7	2.8
SUBTOTAL				5.5			8.3	
	282.0	47.7	2599.2	4756.6	696.4	696.4	8269.4	

16. Program Funding Summary : (continued)

d. Obligations and Expenditures

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1976	4.3	4.3	4.3
1976T	1.9	1.9	1.9
1977	33.6	33.6	33.6
1978	58.9	58.9	58.9
1979	168.7	168.7	168.7
1980	182.4	182.4	182.4
1981	239.1	239.1	235.6
1982	224.5	224.5	224.3
1983	117.5	117.5	111.5
1984	101.5	101.5	84.9
1985	61.3	61.3	59.9
1986	67.3	67.3	63.1
1987	41.8	41.5	31.8
1988	36.7	0.7	0.1
TO COMPLETE	101.9	N/A	N/A
TOTAL	1441.4	1303.2	1261.0

16. Program Funding Summary
d. Obligations & Expenditures (continued)

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: Procurement			
1981	86.6	86.6	83.2
1982	659.3	659.3	627.5
1983	822.4	822.4	736.1
1984	795.8	794.8	715.8
1985	671.7	671.6	548.9
1986	851.0	822.3	466.0
1987	693.7	674.7	51.0
1988	627.5	-	-
TO COMPLETE	1611.7	N/A	N/A
TOTAL	6819.7	4531.7	3228.5
Appropriation: MILCON			
1983	4.6	4.6	4.6
1986	3.7	3.7	3.7
TO COMPLETE			
TOTAL	8.3	8.3	8.3

17. Production Rate Data :

a. Annual Production Rates - -

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1981				
1982	12	12	12	12
1983	24	21	21	21
1984	54	27	27	27
1985	54	32	32	32
1986	54	46	46	46
1987	54	42	42	42
1988	54	42	24	24
1989	30	42	24	72 3/
1990		42	24	
1991		22	24	
1992				

3/ September 1990 would be the earliest theoretical date for total program completion at the maximum economic production rate.

17. 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
Prog. Acq. Cost (BY$)	4756.6	-0-	4756.6	-317.3	5073.9
(TY$)	8269.4	-0-	8269.4	-549.1	8818.5
PAUC (BY$)	16.9	-0-	16.9	-1.1	18.0
(TY$)	29.3	-0-	29.3	-2.0	31.3

c. Deliveries (Plan/Actual) - -

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Start Date (Mo./Yr.)	4/87	N/A	2/88	N/A	4/87
Duration (in Months)	125	-34	91	+42	49
End Date (Mo. /Yr.)	9/97	N/A	9/93	N/A	9/90

Deliveries (Plan/Actual) - -

	To Date
RDT&E	6/6
Procurement	105/102

18. Operating and Support Costs : Not Applicable.

SAR-87-077

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~~SECRET~~ As of: 31 December 1987

SELECTED ACQUISITION REPORT (RCS: DD-COMP (QA) 823)

AF-5 B-1B

PROGRAM: B-1B

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

SAF/P

88-0123-1

1. Designation/Nomenclature (Popular Name): B-1B

2. DOD Component: US Air Force

3. Responsible Office and Telephone Number:
B-1B Program Office PM: Maj Gen Elbert E. Harbour
Aeronautical Systems Division Assigned: 5 January 1987
Wright-Patterson AFB, OH AV 785-3281 COMM: (513) 255-3281

4. Program Elements:
RDT&E: PE 64226F APPN: 3600 (Baseline Program Content Only)
Procurement: PE 11126F APPN: 3010 ICN# B001B0
PE 78011F 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), B-1B Forward Looking Infrared Radar (FLIR) Development, B-1B Monopulse Development, MIL-STD-1760 Development, and B-1B Electronic Countermeasures (ECM) Updates.

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. The B-1B uses the B-1A aerodynamic shape and structure, as well as many of the B-1A systems.

~~Classified By: B-1B SCG, 31 Oct 84~~
~~Declassify On: OADR~~

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~~SECRET~~ ASD(PA) DFOISR 88-T-0586

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 100 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.

A major B-1B program milestone was achieved 25 September 1986 during flight tests at Edwards AFB when automatic terrain following runs were completed at the minimum set clearance of 200 feet. The Initial Operational Capability (IOC) milestone was met in September 1986.

b. Significant Development Since Last Report —

Aircraft deliveries reached a high of six aircraft accepted by the Air Force in November. These deliveries put us five ahead of the contractual schedule.

The B-1B now holds 36 world records for speed, distance and payload. On 4 July 1987, B-1B A/C #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 A/C #70 flew a 5,000 kilometer course with a payload of 30,000 kilograms at speeds in excess of 640 MPH.

B-1B A/C #9 successfully launched a live ALCM from the CSRL on 24 November 1987. Both B-1B and ALCM missions' objectives were met.

B-1B A/C #100 is in the final mate station at Palmdale and the SPO has begun the task of dispositioning over 180,000 pieces of special tooling/special test equipment, military property and plant equipment accountable under the Boeing, AIL, and Rockwell contracts to which the Government has title or vested rights to title. All offensive and defensive avionics systems have been delivered to Palmdale.

As of 31 December 1987, 27 B-1B aircraft were on station at Dyess AFB, 35 at Ellsworth AFB, 14 at Grand Forks AFB, and 3 at Edwards AFB.

The B-1B is expected to meet all current mission requirements.

c. Change Since "As of" Date — None.

8. Decision Coordinating Paper (DCP) Threshold Breaches:

There are currently 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/ NA	Apr 82
OSD Program Review	Sep 82/ NA	Feb 83
Configuration Review	Jan 83/ NA	Jan 83
DT&E/IOT&E Start	Apr 83/ NA	Mar 83
First Flight B-1/Aircraft #2	Apr 83/ NA	Mar 83
First B-1B Flight	Mar 85/ NA	Oct 84
FOT&E Phase I Start	Oct 85/ NA	Jul 85
DT&E/IOT&E Complete	Jun 86/ NA	May 89
IOC (15th Aircraft Delivery)	Sep 86/Sep 86	Sep 86
FOT&E Phase I Complete	Oct 87/ NA	Mar 89
Production Complete (100 A/C)	Jun 88/Jun 88	Jun 88

b. Previous Change Explanations —

OSD Program Review was changed to February 1983 by OSD direction. DT&E Start and First Flight of B-1A A/C #2 occurred in March 1983, one month ahead of schedule. Rollout of B-1B A/C #1 was early, resulting in an early first flight. Delivery of B-1B A/C #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 February 89. Final reports are due 90 days after completion of flight test.

c. Current Change Explanation — (none)

d. References —

Development Estimate: DCP dated 30 September 1983

Approved Program: PMD R-Q1010(14); 64226F/11126F, HQ USAF/RD msg 141145Z April 1986; DepSecDef B-1 Program Memorandum dated 4 November 1981 as amended by PMD R-Q1010(8), 64226F/11126F, 8 February 1984;USD(A) Memo,9 Feb 1988.

10. (U) Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. (U) Technical			
(U) Speed (MACH #):			
(U) Best cruise at altitude	0.72/0.72	0.72	0.72
(U) Penetration	0.85/0.85	0.85	0.85
(U) Altitude envelope (feet)	0-25,000/0-25,000	0-25,000	0-25,000
(U) Weapon Carriage			
(U) AGM-69A (Internal)	24/24	16	24
(U) AGM-86B (Internal/External)	8/14/8/12 (CH3)		8/12
(U) B61/B83 (Internal)	24/24	24	24
(U) MK-82 AIR/36DST(AIR) (Inter.)	84/84		84
(U) Takeoff Distance (feet)			
(U) 470,000 pound A/C	9,300/9,300		9,300
(U) 440,000 pound A/C	6,000/7,600		7,600
(b)(1)			
(U) Weight empty (pounds)	186,000/NA	181,400	186,000
b. (U) Operational			
(b)(1)			
(U) Reliability	0.92/0.92		0.92
(U) Readiness/Supportability:			
(U) Availability (B-1B Sys)	85%/85%		85%
(U) Maintainability (B-1B Sys)	37.6/37.6	28.1(CH2)	37.6
(U) Mean Time Between Unsched Maintenance Actions (Flight Hours)	1.0/1.0	0.65(CH2)	1.0

c. (U) Previous Change Explanations -- Following USDR&E direction, the Air Force decided in Feb 86 to limit B-1B AGM-86B weapon carriages to ensure compliance with existing arms control policies.

(b)(1)

d.

e. (U) References --

Development Estimate: DCP dated 30 Sep 83
Approved Program: PMD R-Q1010(5); 64226F/11126F dated 28 May 82; DepSecDef B-1 Program Memorandum dated 4 Nov 81 as amended by PMD R-Q1010(8), 64226F/11126F, 8 Feb 84; USD(A) Memo, 9 Feb 1988.

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

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. (U) Technical (Continued)			
(U) Load Data for Range Prediction:			
(U) Assumes 24 SRAM	- / 53040 lbs (CH-3)		53040 lbs (CH-3)
(U) Operating Weight	- / 191956 lbs (CH-3)		191956 lbs (CH-3)
(U) Take Off Gross Weight	- / 432850 lbs (CH-3)		432850 lbs (CH-3)
(U) Single Enroute Refueling	- / 100000 lbs (CH-3)		100000 lbs (CH-3).

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

	Development Estimate	Changes	Current Estimate
a. Cost —			
Development (RDT&E)	2538.9	403.2	2942.1
Procurement	17961.1	-803.0	17158.1
Airframe	(10584.9)	(-288.9)	(10296.0)
Engine	(1859.3)	(-602.1)	(1257.2)
Avionics	(2684.7)	(458.2)	(3142.9)
Total Flyaway	(15128.9)	(-432.8)	(14696.1)
Peculiar Support	(1768.0)	(-326.3)	(1441.7)
Initial Spares	(1064.2)	(-43.9)	(1020.3)
Construction (MILCON)*	0	0	0
TOTAL FY81 Base-Year$	20500.0	-399.8	20100.2
Escalation	9037.6	-2095.1	6942.5
Development (RDT&E)	(583.2)	(51.3)	(634.5)
Procurement	(8454.4)	(-2146.4)	(6308.0)
Construction (MILCON)*	0	0	0
TOTAL Then-Year$	29537.6	-2494.9	27042.7
b. Quantities —			
Development (RDT&E)	0		0
Procurement	100		100
TOTAL	100		100
c. Unit Cost —			
Procurement:			
FY81 Base Year$	179.611	-8.030	171.581
Then-Year$	264.155	-29.494	234.661
Program:			
FY81 Base-Year$	205.000	-3.998	201.002
Then-Year$	295.376	-24.949	270.427

d. Approved Design to Cost Goal — None

e. Foreign Military Sales — None

f. Nuclear Cost — None

* 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 Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition —			
1) Cost	27042.7	27293.4	27042.7
2) Quantity	100	100	100
3) Unit Cost	270.427	272.934	270.427
b. Current Procurement —	(FY88)	(FY88)	(FY89)
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

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	-107.2	-1543.1	-1650.3
Quantity			
Schedule			
Engineering			
Estimating	+571.5	-1121.0	-549.5
Other			
Support	0	-44.4	-44.4
SubTOTAL	+464.3	-2708.5	-2244.2
Current Changes:			
Economic	-5.6	-136.9	-142.5
Quantity			
Schedule			
Engineering			
Estimating	-4.2	+100.7	+96.5
Other			
Support	0	-204.7	-204.7
subTOTAL	-9.8	-240.9	-250.7
TOTAL CHANGES	+454.5	-2949.4	-2494.9
Current Estimate	+3576.6	+23466.1	+27042.7

(FY81 Constant Dollars (Base-Year) in Millions)

	RDT&E	PROC	Total
Development Estimate	+2538.9	+17961.1	+20500.0
Previous Changes:			
Quantity			
Schedule			
Engineering			
Estimating	+406.4	-502.8	-96.4
Other			
Support	0	-224.7	-224.7
subTOTAL	+406.4	-727.5	-321.1
Current Changes:			
Quantity			
Schedule			
Engineering			
Estimating	-3.2	+70.0	+66.8
Other			
Support	0	-145.5	-145.5
subTOTAL	-3.2	-75.5	-78.7
TOTAL CHANGES	+403.2	-803.0	-399.8
Current Estimate	+2942.1	+17158.1	+20100.2

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

Estimating (con't):

Gramm-Rudman-Hollings reduction during FY86 budget enactment process and Small Business Innovation Research (SBIR) assessment

Extension of flight test program for flight controls, terrain following and ECM systems

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

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

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 reduction of reserves during FY86 budget enactment process

Undistributed Budget Cuts taken from engineering change orders

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

c. Current Change Explanations —

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
Revised Feb 88 economic escalation indices (Economic)	N/A	-5.6
Prior year definitization of authorized effort (Estimating)	-5.2	-6.2
Correction of a prior inflation reduction and additional Small Business Innovative Research (SBIR). (Estimating)	+4.0	+5.7
Strategic Mission Data Planning System (SMDPS) Reduction (Estimating)	-5.4	-7.4
Balanced Technology Insertion reduction. Reduces Program Manager's ability to fix problems identified during flight test (Estimating)	-1.0	-1.5
Adjustment for prior and current year escalation.(Estimating)	+4.4	+5.2
2) Procurement		
Revised Feb 88 economic escalation indices (Economic)	N/A	-136.9
Unobligated contingent liability reduction	-114.5	-160.4
o Estimating	(-31.9)	(-44.7)
o Support	(-82.6)	(-115.7)
Prior year definitization of authorized effort	-22.7	-29.4
o Estimating	(-10.9)	(-13.5)
o Support	(-11.8)	(-15.9)
Annual estimate revision to realign support and ECP requirements	+2.7	+3.8
o Estimating	(+30.1)	(+43.5)
o Support	(-27.4)	(-39.7)
Adjustment for FY 86 and prior year escalation (Estimating)	+97.8	+136.9
o Estimating	(+82.7)	(+115.4)
o Support	(+15.1)	(+21.5)
Revised initial spares estimate (Support)	-38.8	-54.9

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

Development Estimate to Current Estimate

PAUC (Init SAR/Dev Est)	Changes (Then-Year Dollars in Millions								PAUC (Current Estimate)
	ECON	QTY	SCH	ENG	EST	SP	Other	Total	
295.376	-17.928				-4.530	-2.491		-24.949	270.427

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
$1731.7	$2035.1	0	$1731.7	$1745.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$19.9	($8.8)
Cumulative Variance to Date (1 Jan 88)	$6.5	($8.6)
NET CHANGE	($13.4)	$ .2

Explanation of change: The decrease in favorable cost variance is due to engineering changes from prequalification failures and additional computer-aided design. The schedule variance reflects continued integration problems such as the temperature controller and the engine instrument signal conditioning unit. No program impact.

Avionics	Initial Contract Price Target	Ceiling	Qty
Boeing Military Airplane Co. 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
$707.8	$812.2	1	$694.0	$688.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$14.1	($1.0)
Cumulative Variances to Date (31 Dec 87)	15.5	($1.1)
NET CHANGE	+1.4	-0.1

Explanation of change: The favorable cost variance results primarily from a continued favorable overhead position and lower than planned labor rates and skill mixes. 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
$14399.0	$16919.8	100	$14809.0	$14748.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	($130.5)	($10.1)
Cumulative Variances to Date (1 Jan 88)	($299.7)	($74.7)
NET CHANGE	($169.2)	($64.6)

Explanation of Change: Unfavorable change in CV is due to labor volume and rate impacts at the manufacturing facilities; administrative adjustment to realign logistic resources to future delivery schedules; higher than acticipated costs and lagging actuals for Lot V Crew Accomodations; and fallbacks on CCPs 086, 167, 168, and 325. The unfavorable change in SV is due to late starts and late completion in assembly (AFT Fuselage, AFT Intermediate Fuselage, Wing, Horizontal Stabilizer) because of rework and late receipt of materials, parts, and assemblies from subcontractors. No program impact.

Avionics	Initial Contract Price Target	Ceiling	Qty
Boeing Military Airplane Co. F33657-81-C-0213, FPIF Award: 11 Jun 82 Definitized: 11 Jun 82	$172.0	$183.1	9

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$2125.0	$2373.2	100	$2068.1	$2070.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$24.5	$12.6
Cumulative Variances to Date (31 Dec 87)	29.2	-8.6
NET CHANGE	+4.7	-21.2

Explanation of Change: The continued favorable contract cost performance was enhanced in 1987 by lower than planned overhead usage, labor rates, skill mixes, and travel expenditures. The deterioration in schedule was caused by a stop work on Aircraft Central Computer units (ACCs) (all are now delivered, and there was no production line impact) and behind schedule Radar Support Equipment. No program impact.

	Initial Contract Price Target	Ceiling	Qty
AIL Division of Eaton F33657-81-C-0215, FPIF Award: 22 May 82 Definitized: 22 May 82	$143.8	$171.1	4.6

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$2686.3	$3076.6	100	$2708.4	$2783.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$23.5	($56.4)
Cumulative Variances to Date (31 Dec 87)	($10.8)	($64.2)
NET CHANGE	($34.3)	($7.8)

Explanation of Change: Unfavorable change in cost variance resulted from increased personnel in project management, and materials usage variance for redesign of interface test adapters. Unfavorable schedule variance is due to late deliveries of mod generators and transmitter unitized subassemblies. Program impact: insufficient contract reserves.

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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$1456.5	N/A	368	$1456.5	$1456.5

* No CPR (FFP Contract)

c. MILCON - None

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

a. Program Status —

1) Percent Program Completed: 88.9% (8yrs/9yrs)

2) Percent Program Cost Appropriated: 99.2% ($26821.1/$27042.7)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current $ Prior Yrs (FY81-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP	Total
RDT&E	$3355.0	$221.6	0	0	$3576.6
Procurement	$23466.1	0	0	0	$23466.1
MILCON	0	0	0	0	0
TOTAL	$26821.1	$221.6	0	0	$27042.7

c. Annual Summary —

Fiscal Year	Qty	FY81 Base-Year Dollars			Then-Year Dollars			Rate
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	%
Approriation: RDT&E								
1981				209.8			219.0	11.9
1982				422.0			470.9	9.2
1983				642.4			750.4	4.9
1984				603.1			731.4	3.8
1985				361.2			451.8	3.4
1986				194.1			249.0	2.8
1987				87.3			115.7	2.7
1988				266.8			366.8	3.7
1989				155.4			221.6	3.8
subTOTAL	N/A			2942.1			3576.6	
Appropriation: Procurement								
1982	1	552.1	541.9	1303.3	257.0	0	1600.4	9.6
1983	7	798.8	1508.6	3040.4	660.0	257.0	3958.6	9.0
1984	10	833.9	1499.7	4374.7	1846.8	436.9	5936.3	8.0
1985	34	787.5	3511.7	5140.4	1544.0	1443.4	7196.7	3.4
1986	48	440.7	4221.2	3299.3	0	2170.5	4774.1	2.8
subTOTAL	100	3413.0	11283.1	17158.1	4307.8	4307.8	23466.1	
Appropriation: MILCON								
subTOTAL				N/A			N/A	
TOTAL	100			20100.2			27042.7	--

d. Obligations and Expenditures

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated*	Expended
Appropriation: RDT&E			
81	219.0	219.0	219.0
82	470.9	470.5	470.5
83	750.4	747.9	732.1
84	731.4	730.8	708.6
85	451.8	448.8	385.5
86	249.0	247.0	135.0
87	115.7	95.9	25.0
88	366.8	5.8	0
To Complete	221.6	0	0
TOTAL	3576.6	2965.7	2675.7
Appropriation: Procurement			
82	1600.4	1598.1	1577.6
83	3958.6	3958.5	3699.0
84	5936.3	5924.8	5367.9
85	7196.7	7100.9	5704.2
86	4774.1	4255.3	3684.5
TOTAL	23466.1	22837.6	20033.2
Appropriation: Construction			
N/A	N/A	N/A	N/A

*Reflects Program Office records as of 31 Dec 87

17. Production Rate Data:

a. Annual Production Rates—

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum
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 FY 84, 10 months for FY 85, and 13 months for FY 86.

b. Cost Variance - Dollars in Millions

	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max	Maximum
Prog Acq Cost (BY$)	20500.0	-399.8	20100.2		20100.2
(TY$)	29537.6	-2494.9	27042.7		27042.7
PAUC (BY$)	205.000	-3.998	201.002		201.002
(TY$)	295.376	-24.949	270.427		270.427

c. Schedule Variance

	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	1/82*		1/82		1/82
Duration (in Months)	78		108	30	78
End Date (Mo/Yr)	6/88		12/90		6/88

*Date of contract award.

d. Deliveries (Plan/Actual) —

	To Date: 31 Dec 87
RDT&E	N/A
Procurement	83/83

18. Operating and Support Cost: None

SAR-87-055

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SELECTED ACQUISITION REPORT (RCS: DD-COMP[Q&A] 823)
PROGRAM: PHOENIX (AIM-54C)

N-31 PHOENIX

AS OF DATE: December 31, 1987

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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 64354N		
PROCUREMENT:	PE 24162N	ICN: 2212	APPN: 1507
MILCON:	PE 72031N		

5. **Related Programs:** F-14A/D

[redacted]

This Page Unclassified

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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 the winner of competition to second-source the Phoenix missile. The contract awarded to Raytheon calls for production of 10 validation units in FY1986, and production quantities of 56 and 180 in FY1987 and FY1988 respectively. Raytheon will be in a head-to-head competition with HAC in FY1989.

(b)(1)

(U) The AIM-54C Phoenix Missile system satisfies the mission requirement.

c. (U) Changes since "as of" Date: None.

8. (U) **Decision Coordinating Paper (DCP) Threshold Breaches:** There are currently no DCP (dated November 21, 1980) threshold breaches.

9. **Schedule:**

a. Milestones:	**Development Estimate /Approved Program**	**Current Estimate**
Full Development Go-Ahead	Oct 76/Oct 76	Oct 76
Development Contract Award	Sep 77/Sep 77	Sep 77
Complete Section Integration Test	Dec 78/Dec 78	Mar 79
Pilot Production Contract	Jul 79/Jul 79	Sep 79
First Low Rate Production Contract	Dec 79/Dec 79	Dec 79
Delivery of EDM Missiles	Dec 80/ Dec 80	May 81
Complete Contractor Development	Apr 81/Apr 81	May 82
Pilot Production Missile Deliveries	Oct 81/Oct 81	Oct 81
Begin Navy Technical Evaluation	Oct 81/Oct 81	May 82
Complete Navy Technical Evaluation	Jun 82/Jun 82	Nov 82
Begin Navy Operational Evaluation	Jan 83/Jan 83	Mar 83
Complete Navy Operational Evaluation	Mar 84/Mar 84	Jun 84
Approval for Full Production (IIIB)	Mar 83/Mar 83	May 88
Begin Full Rate Production	Oct 83/Oct 90	Oct 90
Establish Second Source	N/A/Jun 86	Aug 86
IOC	Oct 83/Oct 83	Dec 86

9. **Schedule**: (continued)

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.

c. Current Change Explanations:
None.

d. References:
Development Estimate: DCP, dated November 21, 1980, subject "AIM-54 Improvement Program".
Approved Program: 1989 Amended Biennial President's Budget; DAE Approved Baseline

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

	Development Estimate Approved Program	Demonstrated Performance	Current Estimate
a.(U) Technical			
(U) MTBF (Captive)	505 hours	550 hours	505 hours
(b)(1)			
b.(U) Operational			
Launch wt (lbs)	1020	1018	1014
Length (inches)	156	156	156
Diameter (inches)	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: 1989 Amended Biennial President's Budget. DAE Approved Baseline.

f.(U) Approved Design to Cost Goal: None

g.(U) Foreign Military Sales: None

h.(U) Nuclear Costs: None

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

a. Cost:	Development Estimate	Changes	Current Estimate
Development (RDT&E)	73.8	49.3	123.1
Procurement	296.7	1288.4	1585.0
Total Flyaway	231.6	1175.7	1407.3
Other Wpn Syst Costs	56.9	94.7	151.6
Initial Spares	8.2	17.9	26.1
Construction	1.5	-0.2	1.3
Total FY77 Base-Year $	372.0	1337.4	1709.4
Escalation	92.3	1869.4	1961.7
Development (RDT&E)	11.4	37.3	48.7
Procurement	80.7	1832.0	1912.7
Construction	0.2	0.1	0.3
Total Then-Year $	464.3	3206.8	3671.1
b. Quantities			
Development (RDT&E)	30	15	45
Procurement	705	2651	3356
Total	735	2666	3401
c. Unit Cost			
Procurement			
FY77 Base-Year $	0.421	0.051	0.472
Then-Year $	0.535	0.507	1.042
Program			
FY77 Base-Year $	0.506	-0.004	0.503
Then-Year $	0.632	0.448	1.079

12. Program Acquisition/Current Procurement Unit Cost Summary:

(Current [Then -Year] Dollars in Millions)

	Current Year SAR Current Estimate	Budget Year UCR Baseline Estimate	Budget Year UCR Baseline Estimate
a. Program Acquisition:	(Dec. 87 SAR)	(Dec. 86 SAR)	(Dec. 87 SAR)
(1) Cost	3671.1	6815.1	3671.1
(2) Quantity	3401	7249	3401
(3) Unit Cost	1.079	.940	1.079
b. Current Procurement:	FY1988	FY1988*	FY1989
(1) Cost	344.2	344.2	465.5
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc.	20.0	20.0	0.0
Net Total	364.2	364.2	465.5
(2) Quantity	350	350	560
(3) Unit Cost	1.041	1.041	.831

*FY 88 Appropriated

13. Cost Variance Summary

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	-620.3	0.1	-608.5
Quantity		7098.7		7098.7
Schedule	10.1	380.6		390.7
Engineering	23.6	324.0		347.6
Estimating	41.2	-1548.6	-0.2	-1507.6
Support		588.9		588.9
Other		41.0		41.0
Subtotal	86.6	6264.3	-0.1	6350.8
Current Changes				
Economic		22.3		22.3
Quantity		-2348.7		-2348.7
Schedule		38.0		38.0
Engineering		4.0		4.0
Estimating		-602.1		-602.1
Support		-257.5		-257.5
Other		0.0		0.0
Subtotal	0.0	-3144.0	0.0	-3144.0
Total Changes	86.6	3120.3	-0.1	3206.8
Current Estimate	171.8	3497.7	1.6	3671.1

[Current (Base-Year) Dollars in Millions]

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	73.8	296.7	1.5	372.0
Previous Changes				
Quantity		2371.4		2371.4
Schedule	3.0	54.3		57.3
Engineering	16.0	142.1		158.1
Estimating	30.3	-345.3	-0.2	-315.2
Support		199.2		199.2
Other		20.5		20.5
Subtotal	49.3	2442.2	-0.2	2491.3
Current Changes				
Quantity		-832.0		-832.0
Schedule		6.0		6.0
Engineering		1.8		1.8
Estimating		-238.8		-238.8
Support		-90.9		-90.9
Other		0.0		0.0
Subtotal	0.0	-1153.9	0.0	-1153.9
Total Changes	49.3	1288.3	-0.2	1337.4
Current Estimate	123.1	1585.0	1.3	1709.4

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.
Support: Reassessment of spares and support equipment requirements.

MILCON

Economic: Revised escalation indices.
Estimating: Based on contract actual costs.

c. Current Change Explanations:

	Base Year $	Then Year $
Procurement		
Economic: Revised escalation indices.		22.3
Quantity: Reflects reduced acquisition objective.	-832.0	-2348.7
Schedule: Quantity shifts due to FY 88 reductions.	6.0	38.0
Engineering: FY86-88 Produceability upgrades.	1.8	4.0
Estimating: Adjustments reflecting contract actuals.	-238.8	-602.1
Support: Reflects decreased spares requirements.	-90.9	-257.5

d. References:
Development Estimate: DCP, dated November 21, 1980, subject "AIM-54 Improvement Program".
Approved Program: 1989 Amended Biennial President's Budget.

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	0.126	0.103	-0.620	0.097	0.012	0.447	1.079

15. Contract Information:

a. RDT&E: none

b. Procurement:

Guidance Control & Airframe		Target	Ceiling	Qty
Hughes Aircraft Company, Tucson		223.4	223.4	265

N00019-83-C-0014, FFP
Award: June 8, 1983
Definitized: March 28, 1986

Current Contract Price			Estimate at Completion	
Target	Ceiling	Qty	Contract	Prog Manager
223.4	223.4	265	223.4	223.4

Explanation of Change: No variances are reported on FFP contracts.

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: None to date.

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	319	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: 80.0% (12/15 years)
Percent of Cost Appropriated: 64.4% ($2,365.2/$3,671.1)

b. Appropriation Summary:

Appropriation	Prior Yrs FY77-FY88	Budg Yr FY89	FYDP FY90-FY92	Beyond FYDP FY93	Total
RDT&E	171.8				171.8
Procurement	2,191.8	465.5	840.4		3,497.7
MILCON	1.6				1.6
Total	2,365.2	465.5	840.4	0.0	3,671.1

c. Annual Summary:

Fiscal Year	Quantity	FY77 Base-Year Dollars Flyaway Cost Nonrec	Recurring	Total	Then-Year Dollars Advance Procurement Debit	Credit	Total	Escalation Rate (%)
				Appropriation: RDT&E				
1977				9.2			9.5	2.58
1978				6.4			7.1	6.80
1979	15			19.1			23.5	8.40
1980	30			27.9			38.0	10.59
1981				23.9			35.4	10.61
1982				21.1			32.9	7.60
1983				14.0			22.8	4.90
1984				1.5			2.6	3.80
Subtotal	45			123.1			171.8	
				Appropriation: WPN				
1979		0.0	0.0	7.7	10.7	0.0	10.7	8.72
1980	60	13.5	53.7	69.2	7.7	-10.7	107.4	11.80
1981	60	6.2	59.6	72.7	5.6	-7.7	125.6	11.60
1982	72	4.3	53.5	81.1	20.6	-5.6	151.5	14.30
1983	108	20.3	70.4	110.5	24.4	-20.6	218.8	9.00
1984	265	0.5	127.8	144.2	24.0	-24.4	296.5	8.00
1985	265	27.8	105.4	165.1	23.1	-24.0	350.0	3.40
1986	265	28.2	98.5	137.3	12.9	-23.1	300.8	2.80
1987	205	14.8	84.2	126.2	20.0	-12.9	286.3	2.70
1988	350	9.0	136.3	146.4	0.0	-20.0	344.2	3.70
1989	560	5.4	173.5	192.0	0.0	0.0	465.5	3.80
1990	560	3.0	158.5	171.6	0.0	0.0	428.4	3.60
1991	586	3.0	149.9	161.0	0.0	0.0	412.0	3.30
Subtotal	3356	136.0	1271.3	1585.0	149.0	-149.0	3497.7	
				Appropriation: MILCON				
1978				1.3			1.6	7.68
Subtotal				1.3			1.6	
TOTAL	3401	136.0	1271.3	1709.4	-149.0	149.0	3671.1	

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

d. Obligations and Expenditures

Fiscal Year	Then-Year $ (in Millions) Total	Obligated	Expended
	Appropriation: RDT&E		
1977	9.5	9.5	9.5
1978	7.1	7.1	7.1
1979	23.5	23.5	23.5
1980	38.0	38.0	38.0
1981	35.4	35.4	35.4
1982	32.9	32.9	32.9
1983	22.8	22.8	22.8
1984	2.6	2.6	2.6
Total	171.8	171.8	171.8
	Appropriation: WPN		
1979	10.7	10.7	10.7
1980	107.4	107.4	107.4
1981	125.6	125.6	125.6
1982	151.5	151.5	151.5
1983	218.8	218.8	218.8
1984	296.5	296.4	279.2
1985	350.0	350.0	263.7
1986	300.8	300.9	118.8
1987	286.3	231.4	48.7
1988	344.2	162.5	0.5
To Complete	1305.9		
Total	3497.7	1955.2	1324.9
	Appropriation: MILCON		
1978	1.6	1.6	1.6
Total	1.6	1.6	1.6

17. **Production Rate Data:**

a. Annual Production Rates:

	Production Rates (Quantity/Year)			
Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1980	60	60	60	60
1981	60	60	60	60
1982	72	72	72	72
1983	220	108	108	108
1984	307	265	265	265
1985	307	265	265	265
1986	307	265	265	265
1987	97	205	205	205
1988		350	350	350
1989		560	560	840
1990		560	560	866
1991		586	586	

b. Cost Variance

Item		Production Estimate	Variance CE - PdE	Current Estimate	Variance CE - Max	Maximum Economic
Prog Cost	BY$	1709.4	0	1709.4	+208.8	1500.6
	TY$	3671.1	0	3671.1	+330.2	3340.9
PAUC	BY$	0.503	0	0.503	+0.062	0.441
	TY$	1.079	0	1.079	+0.097	0.982

c. Schedule

Item	Production Estimate	Variance CE vs PdE	Current Estimate	Variance CE vs Max	Maximum Economic
Start Date	8/82	N/A	8/82	N/A	8/82
Duration	134	0	134	+12	122
End Date	9/93	N/A	9/93	N/A	9/92

d. Deliveries (Plan/Actual)

RDT&E	45/45
Procurement	830/1300

18. **Operating and Support Costs:** Not Applicable.

SAR-87-073

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: JTIDS Class 2 TDMA Terminal

AF-20 JTIDS

AS OF DATE: December 31, 1987

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CLEARED
MAR 17 1988
88-0130-L

1. Designation/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
Electronics Systems Division
Hanscom AFB, MA 01731-5000

PM: Lt Col Leslie F. Kenne
Assigned: December 22, 1987
AUTOVON: 478-5980 x3532
Commercial: (617) 274-3532

4. Program Element/Procurement Line Items:

RDT&E:	64754F	(Shared Funding)
	64771D	(Shared Funding)
	64702A	
	64232N	(Shared Funding)
	25604N	

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 (TAOC); Modular Contol Element (MCE); JTIDS Class 1 TDMA terminal; F-15 Eagle;

[redacted] (THIS PAGE IS UNCLASSIFIED)

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OASD(PA) DFOISR 88-F-0602

5. Related Programs (Cont'd):

F-14 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); Battle Force Information Management (BFIM) System; Army Data Distribution System (ADDS); Advance Combat Direction System(ACDS); Tactical Flag Command Center (TFCC); EHF SATCOM Terminal; C^2 Processor; EW Coordination Module; Amphibious OTH Command and Control; Link II Improvements; Afloat Correlation

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 the 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 DoD 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, cheaper, 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 -- The Class 2 Advanced Development Model (ADM) terminal underwent successful pod testing (completed January 1982) on F-4 and A-10 aircraft which demonstrated the utility of JTIDS in fighter aircraft. Following the DSARC IIA decision on 13 January 1981, the Under Secretary of Defense authorized FSED of the JTIDS Class 2 TDMA terminal to meet Air Force and Army requirements for jam-resistant tactical communications. Authorization was also given to develop 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. Class 2 Preliminary Design Review (PDR) was completed in October 1981 and Critical Design Review (CDR) in July 1982. In 1983, Singer began bilingual terminal

7. Program Highlights (Cont'd):

a. Significant Historical Developments (Continued) -- development which will give the TDMA terminal the capability to communicate in either Interim JTIDS Message Specification (IJMS) or Tactical Data Link J (TADIL J) message structure during the transition by all Services to the TADIL J message standard.

The Government accepted the first Army Full Scale Development (FSD) Class 2 terminal in March of 1984 and the first Air Force terminal in June of 1984. All 46 Class 2 terminals have been delivered.

The Class 2 flight demonstration (F-15) on 18 June 1985 at McDonnell Aircraft (McAir) in St Louis MO demonstrated several major functions of the FSD terminals worked including digital data via TADIL J, 16 Kbps digital voice, and internal terminal TACAN function. DT&E began in October 1985.

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 Joint Program Office (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 Navy Class 2 terminals to be delivered beginning in September 1989.

On 31 December 1985, the Air Force let a contract to Singer for Follow-on Terminal Development. This contract is 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).

b. Significant Developments Since Last Report - AF IOT&E and multi-service Investigative Operational Assessment (IOA) was completed in April 87 on JTIDS Class 2 Terminal. Although JTIDS terminal reliability was marginal, the system demonstrated overall satisfactory functional performance. The JPO has initiated an aggressive reliability growth program.

Two Class 2 Terminals (Borrowed F-15) were delivered for F-14D laboratory integration and testing in July - August 1987. A JPO team conducted a Preliminary Design Review (PDR) and initiated a Critical Design Review (CDR) for the Navy Class 2 terminals. Contract modifications were awarded to Singer to begin building Navy FSD Class 2 TDMA terminal long lead parts, interface units, and shipboard cabinets for integration.

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 FAADC^{2}I program.

The MIDS Concept Validation Contract was awarded to Singer on 18 Sep 1987.

FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

The JTIDS Class 2 TDMA Terminal is expected to satisfy the mission requirement.

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

8. Decision Coordinating Paper (DCP) Threshold Breaches:

The six month slip of DT&E in November 1984 caused an additional 2 month delay in IOT&E which pushed Milestone III into January of 1987 breaching the DCP threshold of December 1986. In October 1985, Milestone III slipped an additional two months to March of 1987 due to the late arrival of F-15s at Eglin AFB. In September 1986, Milestone III slipped an additional three months to June of 1987 because of a two month slip in the Class 2 DT&E/IOT&E. The reliability problem caused an additional 23 month slip to May 1989. The DCP Threshold Breach was reported in the December 1984 Air Force SAR.

9. Schedule

a. Milestones	Development Estimate/ Approved Program	Current Estimate	
Program Initiation	Mar 76/ NA	Mar 76	
Class 2 TDMA ADM Delivery	Aug 78/ NA	Aug 78	
Milestone II	Jan 81/Jan 81	Jan 81	
TDMA Development Contract Award	Jan 81/ NA	Jan 81	
Pod Preliminary OT&E	Jan 81/ NA	Jan 82	
Delivery of First FSD Terminal			
Army (Class 2)	Apr 83/Mar 84 Ch-5	Mar 84	
Air Force	Jul 83/Jun 84 Ch-5	Jun 84	
Navy	N/A /Jul 89 Ch-5	Sep 89	Ch-1
Army (Class 2M)	N/A /Mar 88	Mar 88	Ch-2
IOT&E/IOA Complete			
Army (Class 2)	Mar 87/Apr 87	Apr 87	
Air Force	Jan 86/Apr 87	Apr 87	
Army (Class 2M)	N/A /Nov 90	Nov 90	Ch-2
Milestone IIIA			
Air Force	Jun 86/May 89	May 89	Ch-3
Production Contract Award (AF)	Jun 86/ NA	May 89	Ch-3
Full Production			
Army (Class 2M)	N/A / NA	Mar 91	Ch-2
Milestone III A (NPDM)			
LRIP (Navy)	N/A / NA	Dec 91	
Begin Navy TECHEVAL	N/A / N/A A/	Aug 92	Ch-1
Begin Navy OPEVAL	N/A / N/A A/	Feb 93	Ch-1
Milestone III B (NPDM)			
Full Production (Navy)	N/A / N/A A/	Sep 93	Ch-1
Delivery of First Production Unit			
Air Force	Jun 88/Sep 91	Sep 91	Ch-3
Army (Class 2M)	N/A /Mar 93	Mar 93	Ch-2
Navy	N/A /Dec 93 Ch-5	Dec 93	
IOC			
Army (Class 2M)	Oct 89/Oct 88 B/	Sep 92	Ch-4
Air Force	Sep 88/Mar 92	Mar 92	Ch-3
Navy	N/A / N/A A/	Dec 93	

A/ The Navy has no Development Estimate or Approved Program.
B/ If no Class 2M production units are available, then development terminals will be used.

9. 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 timeframe. 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.

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.

9. Schedule (Cont'd)

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

The first production terminal will be delivered two years after the Production Contract Award.

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.

c. Current Change Explanations:

Ch-1 Planned milestones have slipped due to major program restructure resulting from FY 88 Congressional reductions in the Navy RDT&E, N program. The first FSD terminal delivery was delayed due to a Navy decision to delay procurement until improvement of Class 2 terminal reliability.

Ch-2 New Milestones added due to the Army's decision to use the Class 2M instead of the Class 2.

Ch-3 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.

Ch-4 Last Report was for Class 2 in the PHJ. This milestone is redefined to be the Class 2M in the FAADC^{2}I.

Ch-5 Reflects USD(A) Baseline approval.

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: FY 88/89 President's Budget Amended Feb 88;USD(A) Memo, 9 Feb 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(U) Coded/Uncoded Data Rate (double pulse Tx or Rx) (Kbps)	28.8/59.5 57.6/119.0	57.6/119.0 A/	57.6/119.0
(U) Number of Nets	4/4	5	128
(b)(1)			
(U) Relay Range (nm)	1200/1200	300 B/	1200
(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/.01	.01	.01
b. (U) Operational			
(U) MTBF (hr)(Field)	120/120 H/	28 F/	120
(U) MTBF (hr)(Lab)	500/500 H/	159 G/	500
(U) Mean Corrective Maintenance Time (min)	30/30	38	30

c. (U) Previous Change Explanation: None

d. (U) Explanation of Changes:

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: FY 88/89 President's Budget Amended Feb 88

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 sufficent data rate to support 3 voice channels per net.

F/ Apr 1987 OT results.

G/ Sep 87 Reliability Verification Test (RVT) #1 results. RVT #2 scheduled for FY 88.

H/ Approved Program represents SDDM goals. Threshold for Field MTBF is 102 hours; threshold for Lab MTBF is 400 hours.

JTIDS Class 2 TDMA Terminal, December 31, 1987

11. PROGRAM ACQUISITION COST: (Current Estimate in Millions of Dollars)

a. Cost --	Development Estimate	Changes	Current Estimate
Development (RDT&E)	$309.0	+652.5	$961.5
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total FY 81 Base-Year $	$309.0	+652.5	$961.5
Escalation	$73.5	+288.7	$362.2
Development (RDT&E)	($73.5)	(+288.7)	($362.2)
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total Then-Year $	$382.5	+941.2	$1323.7
b. Quantities --			
Development (RDT&E)	55	+74	129 A/
Procurement	N/A	N/A	N/A
Total	55	+74	129

c. Unit Cost -- N/A

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

A/ Due to the marginal reliability of the Class 2 terminals, the Navy is buying terminals in two blocks. Block 1 terminals will be used to maintain near term integration schedules. Block 2 terminals will include reliability improvements resulting from the Air Force JTIDS reliability growth program. The additional 24 terminals are required to replace Block 1 terminals with Block 2 terminals to achieve the correct equipment configuration for conducting final integration and CDT&E testing, and for conducting TECHEVAL and OPEVAL.

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	382.5	-	-	382.5
PREVIOUS CHANGES				
ECONOMIC	-40.8	-	-	-40.8
QUANTITY	+655.6	-	-	+655.6
SCHEDULE	+22.8	-	-	+22.8
ENGINEERING	+295.7	-	-	+295.7
ESTIMATING	-10.8	-	-	-10.8
OTHER	-	-	-	-
SUPPORT	+56.1	-	-	+56.1
SUBTOTAL	+978.6	-	-	+978.6
CURRENT CHANGES				
ECONOMIC	-5.6	-	-	-5.6
QUANTITY	+46.2	-	-	+46.2
SCHEDULE	-	-	-	-
ENGINEERING	+57.0	-	-	+57.0
ESTIMATING	-135.0	-	-	-135.0
OTHER	-	-	-	-
SUPPORT	-	-	-	-
SUBTOTAL	-37.4	-	-	-37.4
TOTAL CHANGES	+941.2	-	-	+941.2
CURRENT ESTIMATE	1323.7	-	-	1323.7

13. Cost Variance Analysis (Cont'd)
(FY 1981 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
DEVELOPMENT ESTIMATE	309.0	-	-	309.0
PREVIOUS CHANGES				
QUANTITY	+450.0	-	-	+450.0
SCHEDULE	-1.5	-	-	-1.5
ENGINEERING	+204.2	-	-	+204.2
ESTIMATING	-9.5	-	-	-9.5
OTHER	-	-	-	-
SUPPORT	+38.6	-	-	+38.6
SUBTOTAL	+681.8	-	-	+681.8
CURRENT CHANGES				
QUANTITY	+31.3	-	-	+31.3
SCHEDULE	-	-	-	-
ENGINEERING	+39.6	-	-	+39.6
ESTIMATING	-100.2	-	-	-100.2
OTHER	-	-	-	-
SUPPORT	-	-	-	-
SUBTOTAL	-29.3	-	-	-29.3
TOTAL CHANGES	+652.5	-	-	+652.5
CURRENT ESTIMATE	961.5	-	-	961.5

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

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.

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 Adminstrative 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.

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 indicies (Economic)	N/A	-5.6
Additional 24 terminals required for Navy to maintain platform integration, test and evaluation efforts while waiting for the reliability improvements in the Class 2 terminals. (Quantity)	+31.3	+46.2
Budget actions added MIDS FSD to JTIDS program (Engineering)	+39.6	+57.0
Increase cost for Continuation of DT/OT (Estimating)	+4.0	+5.7
Adjustment for Current and Prior AF/Army (Estimating)	+0.2	+1.9
Adjustment for FY 90 and Beyond AF/Army (Estimating)	+0.7	-0.7
Congressional Budget cuts and program restructure caused a delay in MIDS FSD (Estimating)	-23.3	-32.1
FY 88 Congressional budget cuts and Navy direction required major program restructure resulting in 50% reduction to Systems Integration Facility, deletion of backup systems intended to reduce risk, 20% reduction to design review/documentation approval efforts, 33% reduction to flight hours, and reductions to test planning and execution estimates. (Estimating)	-81.8	-109.8

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.

14. Program Acquisition Unit Cost (PAUC) History: N/A

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

a. RDT&E--

(1)	PME	Initial Contract Price Target	Ceiling	Qty
	Singer-Kearfott Division, Little Falls NJ, F19628-81-C-0007, FFP Award: January 14, 1981 Definitization: January 14, 1981	$49.7	$49.7	20

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$104.1	$104.1	46	$104.1	$104.1

This contract is over 95% complete and will not be shown in subsequent SAR reports.

Explanation of Changes: Cost Performance Report is not on contract.

(2)	Follow-on Development	Initial Contract Price Target	Ceiling	Qty
	Singer-Kearfott Division, Little Falls NJ, F19628-86-C-0035, FFP Award: December 31, 1985 Definitization: December 31, 1985	$23.6	$23.6	6

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$134.5 (Ch-1)	$134.5 Ch-1	27	$134.5 (Ch-1)	$134.5 (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) Class 2M logistics support ($3.3M); b) FQT-4 ($3.9M); c) Navy Airborne IU Design ($2.6M); d) Miscellaneous Contract Mods ($2.7M).

Explanation of Changes: Cost Performance Report is not on contract.

b. Procurement -- None

c. Milcon -- None

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

a. Program Status --

(1) Percent Program Completed: 61.9% (13/21)

(2) Percent Program Cost Appropriated: 49.8% (659.5/1323.7)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY76-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93-96)	Total
RDT&E	$659.5	$186.2	$256.2	221.8	1323.7

c. Annual Summary -- A/

PROGRAM: JTIDS CLASS 2 TDMA TOTAL PROGRAM

Fiscal Year	Qty	FY 81 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
			Appropriation: RDT&E					
1976	--	--	--	0.1	--	--	0.1	6.9
1977	--	--	--	1.4	--	--	1.0	2.9
1978	--	--	--	1.1	--	--	0.8	2.7
1979	--	--	--	7.5	--	--	6.4	6.8
1980	--	--	--	10.4	--	--	9.8	9.4
1981	--	--	--	20.1	--	--	21.0	11.9
1982	--	--	--	42.9	--	--	47.9	9.2
1983	--	--	--	37.5	--	--	43.8	4.9
1984	--	--	--	36.4	--	--	44.1	3.8
1985	--	--	--	64.8	--	--	81.1	3.4
1986	--	--	--	97.5	--	--	125.0	2.8
1987	--	--	--	106.1	--	--	140.6	2.7
1988	--	--	--	100.2	--	--	137.9	3.7
1989	--	--	--	130.5	--	--	186.2	3.8
1990	--	--	--	67.9	--	--	100.1	3.6
1991	--	--	--	54.4	--	--	82.7	3.3
1992	--	--	--	47.1	--	--	73.4	2.8
1993	--	--	--	45.2	--	--	72.1	2.3
1994	--	--	--	43.6	--	--	71.1	2.3
1995	--	--	--	32.7	--	--	54.6	2.3
1996	--	--	--	14.1	--	--	24.0	2.3
Total	129	--	--	961.5	--	--	1323.7	

A/ FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

c. Annual Summary (Cont'd) --

PROGRAM: JTIDS CLASS 2 TDMA AIR FORCE PROGRAM A/

Fiscal Year	Qty	FY 81 Base-Year Dollars			Then Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
		Appropriation: RDT&E						
1980	--	--	--	5.8	--	--	5.5	9.4
1981	--	--	--	17.3	--	--	18.1	11.9
1982	--	--	--	32.0	--	--	35.7	9.2
1983	--	--	--	20.5	--	--	23.9	4.9
1984	--	--	--	18.8	--	--	22.8	3.8
1985	--	--	--	46.7	--	--	58.4	3.4
1986	--	--	--	51.7	--	--	66.3	2.8
1987	--	--	--	49.2	--	--	65.2	2.7
1988	--	--	--	53.8	--	--	74.0	3.7
1989	--	--	--	76.2	--	--	108.7	3.8
1990	--	--	--	44.4	--	--	65.4	3.6
1991	--	--	--	36.5	--	--	55.5	3.3
1992	--	--	--	27.5	--	--	42.8	2.8
Total	37	--	--	480.4	--	--	642.3	

A/ FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

c. Annual Summary (Cont'd) --

PROGRAM: JTIDS CLASS 2 TDMA ARMY PROGRAM A/

Fiscal Year	Qty	FY 81 Base-Year Dollars			Then Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
		Appropriation: RDT&E						
1976	--	--	--	0.1	--	--	0.1	6.6
1977	--	--	--	1.4	--	--	1.0	2.9
1978	--	--	--	1.1	--	--	0.8	2.6
1979	--	--	--	7.5	--	--	6.4	6.8
1980	--	--	--	4.6	--	--	4.3	9.4
1981	--	--	--	2.8	--	--	2.9	11.9
1982	--	--	--	10.9	--	--	12.2	9.2
1983	--	--	--	17.0	--	--	19.9	4.9
1984	--	--	--	17.6	--	--	21.3	3.8
1985	--	--	--	18.1	--	--	22.7	3.4
1986	--	--	--	11.0	--	--	14.1	2.8
1987	--	--	--	11.7	--	--	15.5	2.7
1988	--	--	--	7.0	--	--	9.8	3.7
Total	33	--	--	110.8	--	--	131.0	

A/ FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

c. Annual Summary (Cont'd) --

PROGRAM: JTIDS CLASS 2 TDMA NAVY PROGRAM A/ B/

Fiscal Year	Qty	FY 81 Base-Year Dollars				Then Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total		
		Nonrec	Rec		Debit	Credit			
				Appropriation: RDT&E					
1986	--	--	--	34.8	--	--	44.6	2.8	
1987	--	--	--	45.2	--	--	59.9	2.7	
1988	--	--	--	39.3	--	--	54.1	3.7	
1989	--	--	--	54.3	--	--	77.5	3.8	
1990	--	--	--	23.5	--	--	34.7	3.6	
1991	--	--	--	17.9	--	--	27.2	3.3	
1992	--	--	--	19.6	--	--	30.6	2.8	
1993	--	--	--	45.2	--	--	72.1	2.3	
1994	--	--	--	43.6	--	--	71.1	2.3	
1995	--	--	--	32.7	--	--	54.6	2.3	
1996	--	--	--	14.1	--	--	24.0	2.3	
Total	59	--	--	370.2	--	--	550.4		

A/ FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

B/ The Current Estimate includes costs directly associated with the JTIDS/TADIL J terminals and excludes costs that are platform related.

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

d. Obligations and Expenditures -- A/ B/

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1976	0.1	0.1	0.1
1977	1.0	1.0	1.0
1978	0.8	0.8	0.8
1979	6.4	6.4	6.4
1980	9.8	9.8	9.8
1981	21.0	21.0	21.0
1982	47.9	47.9	47.9
1983	43.8	43.8	43.8
1984	44.1	44.1	44.1
1985	81.1	81.1	64.0
1986	125.0	125.0	76.3
1987	140.6	107.8	44.9
1988	137.9	11.3	2.0
To Complete	664.2	N/A	N/A
Total	1323.7	500.1	362.1

A/ Program Office records as of February 3, 1988.

B/ Beginning in FY 87, all Terminal development RDT&E money has been incorporated by OSD while the platform integration development RDT&E money continues to be controlled by each Service.

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
		56/50

18. Operating and Support Costs: N/A

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

PROGRAM: ARMY HELICOPTER IMPROVEMENT PROGRAM (AHIP) 87-038

11-19 OH-58D

AS OF DATE: December 31, 1987

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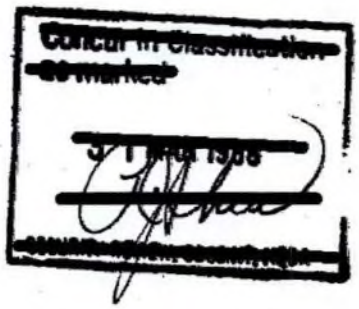

1. (U) Designation and Nomenclature (Popular Name): OH-58D Kiowa Scout Helicopter (AHIP).

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 John N. Tragesser
Assigned: April 15, 1985
AV: 693-1360; Commercial: (314) 263-1360

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

RDT&E: 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) OH-58D Kiowa helicopter is a major modification of the existing OH-58A Kiowa helicopter to incorporate improved hot-day and nap-of-the-earth (NOE) performance, a Mast Mounted Sight (MMS) day/night target acquisition designation system, improved NOE communication/navigation, and space, weight and power for later addition of the Air-to-Air Stinger. With these improvements, the AHIP scout will operate in air cavalry, attack helicopter and field artillery units and provide a day/night/limited visibility command and control, surveillance, and target acquisition and laser designation system at stand-off ranges for Army and Air Force precision guided munitions. The MMS will enhance survivability by allowing surveillance, target acquisition and target designation from extended ranges with minimal exposure. The AHIP scout will be capable of worldwide deployment and will be a highly survivable, mobile, flexible system providing a full range of support to the ground commanders.

7. (U) Program Highlights:

(U) a. Significant Historical Developments -- On 30 November 1979, a Special Army Systems Acquisition Review Council (ASARC) reaffirmed the need for an Advanced Scout Helicopter (ASH), and in July 1980, an ASARC management review formally approved a program to compete a modification effort that would incorporate day/night target acquisition/designation capabilities; improved Nap-of-the-Earth (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 a formal Source Selection Evaluation Board (SSEB) was established to review proposals received from helicopter manufacturers. On 21 September 1981, a Full Scale Engineering Development (FSED) contract was awarded to Bell Helicopter Textron, Inc. (BHTI), for development and qualification of an improved scout helicopter to be identified as the OH-58D. In March 1982, a formal ASARC II was conducted which approved the FSED program acquisition strategy designed to permit fielding of production aircraft in FY 86. The OH-58D aircraft entered formal Government Development Testing (DT) in July 1984, and a low rate initial production contract was awarded for 16 OH-58D helicopters, associated support equipment, and spare and repair parts. 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. Lot II (FY 85) production contract for 44 aircraft was awarded to BHTI, October 1985. Lot III (FY 86) production contract for 39 aircraft was awarded to BHTI on 2 August 1986. Approved quantity of OH-58Ds is 195 through FY 89, with the impending contract award for the Lot V (FY 88) production contracts planned for August 1988.

(U) b. Significant Developments Since Last Report -- Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 amended budget decisions. Congress approved FY 88 funding in the amount of $138.1M for Lot V production plus $22.0M advance procurement for a follow-on Lot VI buy in FY 89. Lot II aircraft production contract deliveries were completed 3Q87. BHTI is continuing to meet contract delivery schedules for Lot III (FY 86) aircraft without difficulty, with completion scheduled for 3Q88. A Lot IV (FY 87) production contract for 36 aircraft was signed September 1987. The OH-58D helicopter is expected to satisfy the mission requirement.

(U) c. Changes Since "As of" Date -- FY 87 advance procurement funding required to initiate action on long lead materiel to support Lot V (FY 88) buy of additional AHIPs was released by OSD and awarded to the contractors in February 1988.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: None

9. (U) Schedule:

(U) a. Milestones

Milestones	Development Estimate/ Approved Program	Current Estimate
FSD Contract Award	Sep 81/ NA	Sep 81
Long Lead Release	Jun 83/ NA	Jul 83
Initial Production Award	Oct 84/Sep 84	Sep 84
DT II/OT II Complete	Jan 85/Feb 85	Feb 85
Full Production Award	Jun 85/Oct 85	Oct 85
Start Follow-On Evaluation (FOE) ((Army Aerial Scout Test (AAST))	N/A /May 87	Mar 87
DSARC Review of FOE (AAST) Results	N/A /NA	Sep 87
IOC	3QFY86/May 87	May 87 (Ch-1)

b. (U) Previous Change Explanations:

Long Lead materiels contract award slipped one month because of late arrival of contractor proposal and more extensive negotiations. To preserve favorable contract ceiling price options negotiated within the FSED contract, the first year production option had to be exercised on or before 1 Oct 84. It was signed on 25 Sep 84. OT II was extended two weeks to allow time for additional tests and because of weather delays. Full Production Award was delayed due to delay in the ASARC/DSARC process. The original IOC was scheduled for 3QFY86 but a 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 6 months. A delay of an additional 6 months to 3QFY87 was due to the SDDM decision to field initially to the Field Artillery Aerial Observer (FAAO) role and requiring a Follow-On Evaluation (FOE). The FOE, which required additional resources, was needed to qualify the AHIP for the Attack and Air Cavalry roles. The IOC will be a divisional General Support Aviation Company (GSAC) with 6 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) Reflects AHIP system production Baseline, 26 Feb 1988.

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: FY88/89 Amended President's Budget; and "AHIP System Production Baseline," 26 February 1988.

10. (U) Technical/Operational Characteristics:

(U) a. Technical	Dev Est/ Appr Pgm 1/	Demonstrated Performance 1/	Current Estimate
Mast Mounted Sight (MMS) Performance			
(b)(1)			
(U) Mean Time Between Mission Affecting Failure (HR) (4 hour mission)	4.4/4.4	4.4	8.7
(U) Sortie Rate (Flight hours for Month)			
Peacetime	20/20	20	20
Wartime: Initial Surge	112/112	112	112
Sustained	65/65	65	65
(U) Maintenance Manhour/Flight Hr (AVUM)	3/3	3	1.16 (Ch-1)
(U) Mean Time to Repair (HRS) (AVIM)	2/2	2	.80 (Ch-1)
(U) Mean Time between failure (Specification)	NA/6.98	6.2	7.2
b. (U) Operational			
Vertical Rate of Climb (FT/MIN)			
2000 ft and 70°F	650/450	450	650 (Ch-1)
4000 ft and 95°F	500/HOGE	HOGE	500 (Ch-1)
Forward Flight Speed (KTAS)	112/100	100	118 (Ch-1)
Endurance (Hrs)	2.4/1.9	1.9	2.4

c. (U) Previous Change Explanation: Demonstrated Performance updated to reflect results of OT II. Current estimates reflect performance of production configuration. Nov 84 ROC revision defined reliability based on mean time between mission affecting failures in place of Operational Mission Reliability. Maintenance Reliability no longer used.

1/ Revised Approved Program and Demonstrated Performance to reflect the "AHIP System Production Baseline", 26 February 1988.

(b)(1)

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

(U) MTBMAF, changed from 8.7 to 4.4
(U) Maintenance Manhours/Flight Hr., changed from 1.07 to 3
(U) Mean Time to Repair, changed from .08 to 2
(U) VROC, 2000/70°F, changed from 725 to 450
(U) VROC, 4000/95°F, changed from 560 to HOGE
(U) Forward Flight Speed, changed from 120 to 100
(U) Endurance, changed from 2.4 to 1.9

d. Current Change Explanations --

(Ch-1) Revised calculations to current AHIP contract specification values established during DT II/OT II.

(b)(1)

(U) Maintenance Manhour/Flight Hr., changed from 3 to 1.16
(U) Mean time to Repair, changed from 2 to .80
(U) VROC, 2000/70°F, changed from 725 to 650
(U) VROC, 4000/95°F, changed from 560 to 500
(U) Forward Flight Speed, changed from 120 to 118

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: FY88/89 Amended President's Budget; and "AHIP System Production Baseline," 26 February 1988.

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

a. (U) Cost --	Development Estimate	Changes	Current Estimate
Development	$ 213.5	$ -3.3	$ 210.2
Procurement	1454.4	-466.0	988.4
Flyaway	(1152.9)	(-353.2)	(799.7)
Airframe	(329.7)	(-39.6)	(290.1)
Engine	(67.6)	(-34.3)	(33.3)
MMS/CDS	(559.1)	(-165.5)	(393.6)
Other Avionics	(148.9)	(-87.8)	(61.1)
Non Rec	(47.6)	(-26.0)	(21.6)
Other Wpn Sys Cost	(220.9)	(-138.9)	(82.0)
Initial Spares	(80.6)	(26.0)	(106.6)
Total FY 82 Base Year $	$1667.9	$-469.3	$ 1198.6
Escalation	863.7	-634.9	228.8
Development (RDT&E)	(14.6)	(-1.5)	(13.1)
Procurement	(849.1)	(-633.4)	(215.7)
Total Then-Year $	$2531.6	(-1104.2)	$1427.4

b. (U) Quantities --	Development Estimate	Changes	Current Estimate
Development (RDT&E)	5	N/A	5
Procurement	578	-383	195
Total	583	-383	200

c. (U) Unit Cost --

Procurement:			
FY 82 Base-Year $	$2.52	$+2.55	$5.07
Then-Year $	3.99	+2.18	6.17
Program:			
FY 82 Base-Year $	2.85	+3.14	5.99
Then-Year $	$4.34	$2.80	$7.14

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

(Average Unit Flyaway Cost)

	Dev Estimate/ Appr Program	Current Estimate	Latest Approved Threshold
@ Qty:	578/135	195	
@ Peak Rate:	10/mo	4/mo	
FY 82 Base-Year $	1.99/2.82	4.1	4.6
Then-Year $	3.19/3.64	5.0	5.52
@ Qty:	116/116	99	
@ Peak Rate:	10/mo	4/mo	
FY 82 Base-Year $	2.80/3.25	4.6	5.29
Then-Year $	3.82/4.15	5.3	6.10

e. (U) Foreign Military Sales -- None

f. (U) Nuclear Costs -- None

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

	Current Year		Budget Year
	Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a. (U) Program Acquisition--			
(1) (U) Cost	1427.4	1144.0	1427.4
(2) (U) Quantity	200	140	200
(3) (U) Unit Cost	7.14	8.17	7.14
b. (U) Current Procurement--	(FY 1988) 1/	(FY 1988 APPN)	(FY 1989)
(1) (U) Cost	160.1	160.1	170.0
Less CY Adv Proc	22.0	22.0	22.0
Plus PY Adv Proc	22.0	22.0	22.0
Net Total	160.1	160.1	170.0
(2) (U) Quantity	36	36	24
(3) (U) Unit Cost	4.45	4.45	7.1

1/ The Army will procure the maximum number of supportable systems consistent with the dollars appropriated.

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	TOTAL
Development Estimate	228.1	2303.5	2531.6
Previous Changes:			
Economic	-5.4	-325.0	-330.4
Quantity	-	-1302.1	-1302.1
Schedule	-	+177.0	+177.0
Engineering	+13.4	+33.7	+47.1
Estimating	-15.1	+242.2	+227.1
Support	-	-206.3	-206.3
Subtotal	-7.1	-1380.5	-1387.6
Current Changes:			
Economic	+2.0	-81.8	-79.8
Quantity	-	+286.0	+286.0
Engineering	-	+66.7	+66.7
Estimating	+.3	+10.5	+10.8
Support	-	-0.3	-0.3
Subtotal	+2.3	+281.1	+283.4
Total Changes	-4.8	-1099.4	-1104.2
Current Estimate	223.3	1204.1	1427.4

(FY 1982 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	213.5	1454.4	1667.9
Previous Changes:			
Quantity	-	-857.0	-857.0
Schedule	-	+73.0	+73.0
Engineering	+11.1	+21.0	+32.1
Estimating	-14.5	+174.3	+159.8
Support	-	-158.7	-158.7
Subtotal	-3.4	-747.4	-750.8
Current Changes:			
Quantity	-	+163.0	+163.0
Engineering	-	+45.7	+45.7
Estimating	.1	+72.4	+72.5
Support	-	+.3	+.3
Subtotal	+.1	+281.4	+281.5
Total Changes	-3.3	-466.0	-469.3
Current Estimate	210.2	988.4	1198.6

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

b. (U) Previous Change Explanations--

(1) (U) RDTE

Economic: Due to the application of January 1986 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.

(2) (U) Procurement

Economic: Due to the application of January 1986 and prior DA/OSD inflation guidance.

Quantity: Reduction of production program by 443 aircraft from 578 to 135.

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.

Estimating: Congressional cuts (IR&D).
Revised SPM based on first production contract cost.
Revised ECO costs for safety, RAM-D/O&S.

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.

(3) (U) MILCON: None

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
Economic: Revised 4 Feb 88 escalation rates	N/A	+2.0
Estimating: Corrections from previous SAR	+.1	+.3
(2) (U) Procurement		
Economic: Revised 4 Feb 88 escalation rates	N/A	-81.8
Quantity: Correction of Dec 86 SAR moving excess quantity dollars from Quantity to Estimating	+46.6	+133.2
Quantity: Increase of production program by 60 aircraft	+116.4	+152.8
Engineering		
Correction of Dec 85 SAR by moving SINCGARS, GPS from Estimating to Engineering	+21.0	+33.7
Addition of ATAS and memory upgrade for the MMS/CDS	+24.7	33.0

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

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

	(Dollars in Millions) Base-Year	Then-Year
Estimating:		
Correction of Dec 85 SAR moving SINCGARS, GPS from Estimating to Engineering	-21.0	-33.7
Correction of Dec 86 SAR by moving excess quantity change from Quantity to Estimating	-46.6	-133.2
Adjustments from learning curve differences and changes in escalation for an additional 60 aircraft	+140.0	+177.3
Support: Changes in spares, PGSE, and other support due to additional 60 aircraft	+0.3	-0.3

(3) (U) MILCON: None

d. (U) References --

Development Estimate: SDDMs, 31 August 1982 and 7 October 1985, subject: "Army Helicopter Improvement Program (AHIP) for the Scout Helicopter."

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

(U) Current Baseline Estimate to Current Estimate -

	Changes								
PAUC (Dev Est)	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Cur Est)
4.3	-2.05	+3.24	+.89	+.57	+1.19	-	-1.03	+2.8	7.1

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
$180.4	N/A	39

Estimated Price at Completion

Contractor	Program Manager
$180.4	$180.4

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

15. (U) Contract Information (Cont'd):

Lot IV (FY87) Production - Airframe
Bell Helicopter Textron, Inc., Hurst, TX
DAAJ09-87-C-0379, FFP
Award: September 30, 1987
Definitized: September 30, 1987

Initial Contract Price		
Target	Ceiling	Qty
$ 44.4	N/A	36

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 44.4	N/A	36	$ 44.4	$ 44.4

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: July 25, 1986
Definitized: September 29, 1987

Initial Contract Price		
Target	Ceiling	Qty
$ 77.2	N/A	39

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 77.2	N/A	39	$ 77.2	$ 77.2

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: 90% (9 yrs/10 yrs)

(2) (U) Percent Program Cost Appropriated: 88% ($1257.4/$1427.4)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY80-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-94)	Balance to Complete Beyond FYDP	Total
RDT&E	223.3	-	-	-	223.3
Procurement	1034.1	170.0	-	-	1204.1
TOTAL	1257.4	170.0	-	-	1427.4

c. (U) Annual Summary - Program funding and quantities reflect the FY 88/89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 amended budget decisions.

Fiscal Year	Qty	FY 82 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1980				8.4			7.4	9.4
1981	5	-	21.9	25.6			25.6	11.9
1982		2.1	33.5	37.5			38.5	7.6
1983		4.6	55.1	68.8			73.9	4.9
1984		13.8	14.0	45.2			50.4	3.8
1985		1.8	3.9	17.7			20.3	3.4
1986		-	-	6.1			7.2	2.8
Subtotal	5	22.3	128.4	210.2			223.3	
Appropriation: Procurement								
1983		2.6	27.2	35.1	17.3		38.3	9.0
1984	16	19.0	122.5	174.5	39.3	17.3	198.3	8.0
1985	44		154.5	199.2	47.8	39.3	233.5	3.4
1986	39		130.9	188	28.1	47.8	227.7	2.8
1987	36		109.3	141.0	22.0	28.1	176.2	2.7
1988	36		117.4	123.6	22.0	22.0	160.1	3.7
1989	24		116.3	127.1		22.0	170.0	3.8
Subtotal	195	21.6	778.1	988.4	176.5	176.5	1204.1	
Total	200	43.9	906.5	1198.6	176.5	176.5	1427.4	

d. (U) Obligations and Expenditure --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1980-83	145.4	145.4	145.4
1984	50.4	50.4	50.4
1985	20.3	20.1	17.3
1986	7.2	7.2	3.5
TOTAL	223.3	223.1	216.6
	Appropriation: Procurement		
1983	38.3	38.3	30.8
1984	198.3	197.0	189.2
1985	233.5	227.9	222.4
1986	227.7	202.5	133.1
1987	176.2	112.4	11.1
1988	160.1	0	0
TOTAL	1034.1	778.1	586.6

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 9 months for FY 84 and 11 months for FY 85.)

Fiscal Year	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	79
1988	120	32	36	-
1989	130	81	24	-
1990	120	116	-	-
1991	-	120	-	-
1992	-	82	-	-

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	(82 $)	2094.4	-895.8	1198.6	+67.1	1131.5
	(ESC $)	2943.4	-1516.0	1427.4	+105.2	1322.2
PAUC	(82 $)	3.6	+2.4	6.0	+0.3	5.7
	(ESC $)	5.0	+2.1	7.1	+0.5	6.6

c. (U) Schedule Variance.

	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	67	20	47
End Date (Mo/Yr)	11/92	N/A	06/91	N/A	11/89

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

	To Date
RDT&E	5/5
Procurement	81/85

18. (U) Operating & Support Costs: N/A

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SAR-87-066

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

PROGRAM: OHIO CLASS D-5 CAPABLE SUBMARINE

N-41 TRIDENT II SUB

AS OF DATE: DECEMBER 31, 1987

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Production Rate Data	[illegible]
Operating and Support Costs	[illegible]

[redacted]

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

[redacted] AS AMENDED [redacted] APR 11 1988 [redacted]

4. Program Elements:

RDT&E: 0603371N, 0604363N (J1546 only)
PROCUREMENT: 0101228N, APPN 1611 ICN 1040

5. Related Programs:

TRIDENT I Backfit and TRIDENT II (D-5) Missile, and TRIDENT I Systems.

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OASD(PA) DFOISR 88-T-C914

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 to Electric Boat.

b. Significant Development Since Last Report -- The December 1987 SAR Current Estimates are based on acquisition of eleven OHIO Class D-5 Capable Submarines at a shipbuilding rate of 1,0,1,1,1,1,1,1,1,1,1,1, beginning in FY 1981. To date, eight OHIO Class C-4 Capable submarines have been delivered and are operationally deployed. The estimates contained in this report are based on the acquisition of eleven OHIO Class D-5 Capable Submarines through FY 1992. In May 1987 the SSBN 739 (fourteenth ship) was awarded to Electric Boat.

c. Change Since "As Of" Date -- On 5 January 1988 the SSBN 740 (fifteenth ship) was competitively awarded to Elective Boat. This contract included options for the SSBN 741 and 742 (FY 1989 and FY 1990).

8. Decision Coordinating Paper (DCP) 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 DCP threshold breaches.

9. Schedule:

a. Milestones --

	Production Estimate/ Approved Program*	Current Estimate	
Complete Baseline Design	3/72	3/72	
Characteristics Approved	1/73	1/73	
Complete Ship Contract Design	8/84	8/84	
Production Contract Award	1/82	1/82	
Construction Started:			
(1) First Ship	1/82	1/82	
(2) Last Ship	1/88	12/91	(CH-1)
Launch:			
(1) First Ship	11/86	12/86	
(2) Last Ship	7/92	4/97	(CH-1)
Acceptance Trials:			
(1) First Ship	12/88	12/88	
(2) Last Ship	12/93	12/97	(CH-1)
Delivery:			
(1) First Ship	12/88	12/88	
(2) Last Ship	12/93	12/97	(CH-1)
System IOC	12/89	12/89	

* Production Estimate and Approved Program are the same therefore separate entries are not required.

b. Previous Change Explanations -- The Current Estimate is based on a total program of 11 submarines vice the 7 included in the Production Estimate.

c. Current Change Explanations --

(CH-1) The Current Estimate for start of construction, acceptance trials, and delivery for the last ship has advanced. The predicted delay due to the deletion of advance procurement funding for contractor furnished equipment long leadtime items has not been experienced.

(CH-2) The Current Estimate for launch of the last ship has been revised to reflect its relationship to new delivery schedule.

d. References --

Production Estimate: USD (R&E) Memo of July 22, 1981, subject OHIO Class Submarine program.

Approved Program: Amended FY 1988/1989 Biennial Budget. DAE Baseline, 17 Feb 1988.

10. (U) Technical/Operational Characteristics: The following characteristics are based on those of the currently deployed OHIO Class C-4 Configured Submarine. No Change is anticipated in the Demonstrated Performance.

a. Technical —	Production Estimate	Demonstrated Performance	Current Estimate
(U) Length Overall (Feet)	558		560
(U) Beam Max. (hull diameter in feet)	42	N O T	42
(U) Draft Navigation (feet)	35.5		36.5
(U) Submerged Displacement (tons)	18,500		18,700
(b)(1)			
(U) Propulsion		V A	
(1) (U) Type	Nuclear		Nuclear
(2) (b)(1)			
(U) Accommodations, Crew	155	L A B L	164
b. Operational —			
(b)(1)			
(U) Endurance			
(1) Range	Unlimited		Unlimited
(2) Stores (days)	90		90
(U) Armament			
(1) Missile Tubes	24		24
(2) Torpedo Tubes	4		4

c. Previous Change Explanations — None.

d. Current Change Explanation — None.

e. References —

Production Estimate: OPNAVINST C-9010.296, dated April 12, 1981, subject approved characteristics of the OHIO Class Submarine.

Approved Program: Amended FY 1988/1989 Biennial Budget.
DAE Baseline, 17 Feb 1988.

Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Submarine Costs --	Production Estimate (FY81-FY88)	Changes	Current Estimate (FY81-FY92)
Development (RDT&E)	49.3	23.0	72.3
Procurement (SCN)	9980.0	3415.8	13395.8
Construction (MILCON)	519.6	-101.2	418.4
Total FY83 Base-Yr $	10548.9	3337.6	13886.5
Escalation	3536.3	-971.3	2565.0
Development (RDT&E)	3.6	3.6	7.2
Procurement (SCN)	3416.8	-933.0	2483.8
Construction (MILCON)	115.9	-41.9	74.0
Total Then-Yr $	14085.2	2366.3	16451.5
b. Submarine Quantities --			
Development (RDT&E)	0	0	0
Procurement (SCN)	7	4	11
Total	7	4	11
c. Submarine Unit Cost --			
Procurement:			
FY83 Base-Yr $	1425.7	-207.9	1217.8
Then-Yr $	1913.8	-470.2	1443.6
Program:			
FY83 Base-Yr $	1507.0	-244.6	1262.4
Then-Yr $	2012.2	-516.6	1495.6

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- Department of Energy Costs: $154.6M

g. Excludes the following D5 Missile and General Support MILCON costs which are not applicable to the Submarine Acquisition Program:

TRIDENT II (D5) Missile -	668.4
General Support -	529.1
Total -	1197.5

Excludes FY1991 and FY1992 RDT&E costs ($3.9M) which are beyond IOC and are not acquisition related.

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

	Current Year (FY88)		Budget Year(FY89)
	SAR Current Estimate (Dec 87 SAR)	UCR Baseline Estimate (Dec 86 SAR)	UCR Baseline Estimate (Dec 87 SAR)
a. Program Acquisition --			
(1) Cost	16451.5	16878.0	16451.5
(2) Quantity	11	11	11
(3) Unit Cost	1495.6	1534.4	1495.6
b. Current Procurement -	(FY88 APPROPRIATION ACT)		(FY 1989)
(1) Cost	1283.3	1283.3	1399.4
Less CY Adv Proc	-137.1	-137.1	-137.4
Plus PY Adv Proc	150.4	150.4	146.4
Less Outfit/PDel	-22.5	-22.5	-31.3
Net Total	1274.1	1274.1	1377.1
(2) Quantity	1	1	1
(3) Unit Cost	1274.1	1274.1	1377.1

3. Cost Variance Analysis:

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

	RDT&E	SCN	MILCON	TOTAL
Production Estimate	52.9	13396.8	635.5	14085.2
Previous Changes:				
Economic	-2.9	-2888.5	-32.2	-2923.6
Quantity		7398.0		7398.0
Schedule				0.0
Engineering				0.0
Estimating	29.5	-1598.0	-113.1	-1681.6
Other				0.0
Support				0.0
Subtotal	26.6	2911.5	-145.3	2792.8
Current Changes:				
Economic	0.0	3.6	-0.1	3.5
Quantity		0.0		0.0
Schedule				0.0
Engineering				0.0
Estimating	0.0	-432.3	2.3	-430.0
Other				0.0
Support				0.0
Subtotal	0.0	-428.7	2.2	-426.5
Total Changes	26.6	2482.8	-143.1	2366.3
Current Estimate	79.5	15879.6	492.4	16451.5

(FY 1983 Constant (Base-Year) Dollars in Millions)

	RDT&E	SCN	MILCON	TOTAL
Production Estimate	49.3	9980.0	519.6	10548.9
Previous Changes:				
Quantity	0.0	5013.8	0.0	5013.8
Schedule				0.0
Engineering				0.0
Estimating	23.0	-1223.7	-103.1	-1303.8
Other				0.0
Support				0.0
Subtotal	23.0	3790.1	-103.1	3710.0
Current Changes:				

Quantity	0.0	0.0	0.0	0.0
Schedule				0.0
Engineering				0.0
Estimating	0.0	-374.4	1.9	-372.5
Other				0.0
Support				0.0
Subtotal	0.0	-374.4	1.9	-372.5
Total Changes	23.0	3415.7	-101.2	3337.5
Current Estimate	72.3	13395.7	418.4	13886.4

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) Procurement		
Revised Jan 88 economic escalation rates. (Economic)	N/A	3.6
Revised pricing based on actual and projected contract savings. (Estimating)	-374.4	-432.3
(2) MILCON		
Revised Jan 88 economic escalation rates. (Economic)	N/A	-.1
Revised construction estimates for Kings Bay. (Estimating)	+1.9	+2.3

14. Program Acquisition Unit Cost (PAUC) History:

a. Initial SAR Estimate to Current Baseline Estimate -- For the OHIO Class D5 Capable Submarine Program, the initial SAR estimate is the Current Baseline Estimate.

b. Current Baseline Estimate to Current Estimate --

	Changes (Then Year Dollars in Millions)								
PAUC BASELINE SAR EST. PAE	ECON	QTY	SCH	ENG	EST	SPT	OTHER	TOTAL	PAUC CURRENT ESTIMATE
2012.2	-265.5	-59.1	0.0	0.0	-192.0	0.0	0.0	-516.6	1495.6

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
1,690.4	1,915.1	3	1,617.2	1,635.7

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE VARIANCES	14.8	(1.0)
CUMULATIVE VARIANCES as of Sept 87	16.6	18.5
NET CHANGE	1.8	19.5

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 favorable net change in schedule variance is a result of a better than anticipated construction progress but it is not significant. 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
1,214.5	1,425.7	2	1,221.3	1,214.5

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE VARIANCES	(4.8)	9.7
CUMULATIVE VARIANCES as of Sept 87	(14.3)	17.5
NET CHANGE	(9.5)	7.8

15. Contract Information (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Explanation of Change: The cumulative 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
N00024-87-C-2023/FPIF
Award Date: May 26, 1987
(Group VI Construction, FY87 ship)

INITIAL CONTRACT PRICE		
Target	Ceiling	Qty
611.9	693.9	1

CURRENT CONTRACT PRICE		
TARGET	CEILING	QTY
611.9	693.9	1

ESTIMATED PRICE AT COMPLETION	
Contractor	Program Manager
621.9	611.9

	Cost Variance	Schedule Variance
PREVIOUS CUMULATIVE VARIANCES	N/A	N/A
CUMULATIVE VARIANCES as of Sept 87	(3.2)	(.3)
NET CHANGE	(3.2)	(.3)

Explanation of Change: The Navy believes that this procurement is too new to draw meaningful cost or schedule trend conclusions at this time.

Nuclear:
General Electric Company
Niskayuna, N.Y.
N00024-78-C-5235/CPFF
Award Date: July 1, 1977

INITIAL CONTRACT PRICE	
Target	Qty
378.4	N/A

CURRENT CONTRACT		PM'S EST. PRICE
Target	Qty	AT COMPLETION
378.4	N/A	362.4

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
N00024-78-C-5235	90%
N00024-67-F-5110	60%
N00024-85-C-4011	30%

15. Contract Information (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Nuclear:
Department of Energy
Germantown, MD
N00024-67-F-5110/EAO
Award Date: July 1, 1977

INITIAL CONTRACT PRICE	
Target	Qty
442.7	N/A

CURRENT CONTRACT		PM'S EST. PRICE AT COMPLETION
Target	Qty	
494.5	N/A	494.5

Explanation of Change: See above.

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 AT COMPLETION
Target	Qty	
194.5	N/A	194.5

Explanation of Change: See above.

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

a. Program Status --

(1) Percent Program Completed: 44.0% (8 yrs/18 yrs)

(2) Percent Program Cost Appropriated: 63.5% ($10447.9/$16451.5)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY81-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP	Total
RDT&E	66.1	7.6	5.8	0.0	79.5
SCN	9944.1	1399.4	4382.4	153.7	15879.6
MILCON	437.7	36.7	18.0	0.0	492.4
Total	10447.9	1443.7	4406.2	153.7	16451.5

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

c. Annual Summary --

Fiscal Year	Qty	FY 83 Base-Year Dollars			Then-Year Dollars			Escl Rate
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		(%)
Appropriation: RDT&E								
1982				24.6			24.6	7.6
1983				0.0			0.0	4.9
1984				9.0			9.5	3.8
1985				8.6			9.4	3.4
1986				7.9			8.9	2.8
1987				5.2			6.0	2.7
1988				6.4			7.7	3.7
1989				6.1			7.6	3.8
1990				4.5			5.8	3.6
Subtotal				72.3			79.5	
Appropriation: SCN								
1981	1		1406.4	1464.5	500.5	149.1	1493.4	9.6
1982	0			321.0	330.7		337.4	7.5
1983	1		1376.1	1194.5	81.3	286.0	1276.9	3.8
1984	1		1247.9	1488.3	308.8	322.4	1627.6	3.6
1985	1		1209.8	1190.0	265.4	287.8	1333.3	2.1
1986	1		1158.2	1064.4	150.4	266.4	1229.1	1.2
1987	1		1161.0	1142.1	146.4	175.0	1363.1	1.6
1988	1		1033.5	1041.0	137.1	150.4	1283.3	3.7
1989	1		1084.5	1102.1	137.4	146.4	1399.4	3.8

1990	1		1125.8	1158.1	151.5	137.1	1510.1	3.6
1991	1		1141.2	1058.3		137.4	1414.1	3.3
1992	1		1157.3	1066.4		151.5	1458.2	2.9
1993				25.2			35.1	2.3
1994				20.2			29.9	2.3
1995				20.2			29.5	2.3
1996				19.9			29.8	2.3
1997				11.2			17.1	2.3
1998				8.4			13.2	2.3
Subtotal	11		13101.7	13395.8	2209.5	2209.5	15879.6	

Appropriation: MILCON

1982				12.8			13.0	7.6
1983				14.0			14.8	4.9
1984				15.6			17.0	3.8
1985				85.7			96.2	3.4
1986				79.3			91.8	2.8
1987				109.4			131.1	2.7
1988				59.4			73.8	3.7
1989				28.6			36.7	3.8
1990				13.6			18.0	3.6
Subtotal				418.4			492.4	
Total	11		13101.7	13886.5	2209.5	2209.5	16451.5	

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions: Total	Obligated	Expended
Appropriation: RDT&E			
1982	24.6	24.6	24.6
1983	0.0		
1984	9.5	9.5	9.5
1985	9.4	9.3	7.3
1986	8.9	8.9	3.5
1987	6.0	5.8	0.8
1988	7.7	3.3	0.0
To Compl	13.4	N/A	N/A
Total	79.5	61.4	45.7
Appropriation: SCN			
1981	1493.4	1443.7	1304.4
1982	337.4	331.0	326.7
1983	1276.9	1158.7	883.9
1984	1627.6	1284.2	665.1
1985	1333.3	1079.7	445.5
1986	1229.1	953.5	146.9
1987	1363.1	844.3	59.6
1988	1283.3	4.0	0.0
To Compl	5935.5	N/A	N/A
Total	15879.6	7099.1	3832.1
Appropriation: MILCON			

1982	13.0	13.0	13.0
1983	14.8	14.8	14.8
1984	17.0	17.0	17.0
1985	96.2	96.2	96.2
1986	91.8	91.8	91.8
1987	131.1	131.1	42.0
1988	73.8	0.0	0.0
To Compl	54.7	N/A	N/A
Total	492.4	363.9	274.8

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.

~~SECRET RESTRICTED DATA~~

SAR-87-065

~~SECRET RESTRICTED DATA~~

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

PROGRAM: TRIDENT II (D-5) MISSILE

N-40 TRIDENT II M.S.L AS OF DATE: DECEMBER 31, 1987

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AS AMENDED

APR 11 1988

OFFICE OF FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA), DEPARTMENT OF DEFENSE

No Security Objection to Open Publication (AS AMENDED) 88-C-0418 APR 11 1988 Office of the Chief of Naval Operations Dept. of the Navy

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 010228N, 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.

~~Classified by:~~
~~OPNAVINST S5513.5A-Enclosure (27)~~
~~This material contains Restricted Data as defined in the Atomic Energy Act of 1954~~
~~Unauthorized disclosure subject to administrative and criminal sanctions.~~

OASD(PA) DFOISR 88-T-0913

(This page is unclassified)

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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.

b. Significant Development Since Last Report — Seven additional development flight tests have been launched from a flat pad at Cape Canaveral. Six of these test were fully successful and one test partially successful.

The initial missile production contract was awarded April 8, 1987.

The estimates included in the December 31, 1987 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 815 TRIDENT II missiles through FY 1999 to support eventual deployment of nineteen 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 —

(1) The ninth flight test was conducted in January 1988. The flight failed to meet test objectives. The test experienced an apparent electrical failure 153 seconds into flight which resulted in loss of control and automatic self-destruct. The cause is still under investigation. Despite the failure, valuable and timely subsystem data was acquired on aerodynamic heating and boost propulsion performance.

(2) The development flight test program has been reduced by a quantity of two missiles due to funding constraints resulting from FY 1988 Congressional budget reductions.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP threshold breaches.

9. Schedule:

a. Milestones —

	Planning Estimate/ Approved Program*	Current (PdE) Estimate
Initiated Concept Definition	10/77	10/77
Commenced Advanced Development Phase	10/80	10/80
Commenced Full Scale Engineering Development (Milestone II)	10/83	10/83
First Development Flight Test	1/87	1/87
Commitment to Full Scale Missile Production (Milestone III A)	3/87	4/87 (CH-1)
First Demonstration and Shakedown (DASO) Missile Test Flight	8/89	8/89
Confirmation of Full Scale Missile Production (Milestone III B)	N/A	9/89
Initial Operating Capability	12/89	12/89**

* Planning Estimate and Approved Program are the same, therefore separate entries are not required.

** May be less than full missile outload due to reduction of FY 1987 quantity to 21 D-5 missiles.

b. Previous Change Explanations -- None.

c. Current Change Explanation --

(CH-1) The initial missile production contract was awarded April 8, 1987.

d. References —

Planning Estimate:

SECDEF Report to Congress of March 7, 1980, subject SLBM Modernization Action Memorandum.

DEPSECDEF Memorandum to SECNAV of October 28, 1983, subject TRIDENT II Full Scale Engineering Development authorization.

DEPSECDEF Program Decision Memorandum of October 2, 1981, subject Funding of D-5 missile with December 1989 IOC.

Approved Program/Production Estimate: Amended FY 1988/ FY 1989 Biennial Budget. DAE Baseline, 17 Feb 1988.

10. Performance Characteristics:

a. Characteristics —

	DCP Threshold (at IOC)	Demonstrated Performance	Current (PdE) Estimate (b)(1)
[redacted]			

b. Previous Change Explanations --

Maximum Range Full Payload estimate based on detailed evaluation of hardware testing.

Latest estimate of military characteristics for the warhead for the TRIDENT II (D-5) MK-5 Reentry Body as cited by the joint DOD/DOE Military Liaison Committee in letter dated July 23, 1984.

c. Current Change Explanations —

(CH-1) Latest estimate provided in TRIDENT II (D-5) Decision Coordinating Paper (DCP) Update of February 24, 1987.

d. References —

Planning Estimates:

SECNAV Memorandum for DEPSECDEF, dated August 16, 1976, subject, TRIDENT II Missile Conceptual Goals and Tentative Milestones.
SECDEF Decision Memorandum, dated February 2, 1981, subject, SLBM Modernization.
CNO Memorandum, dated April 28, 1982, subject, TRIDENT II (D-5) Development Objectives.
DEPSECDEF Memorandum to SECNAV, dated October 28, 1983, subject, TRIDENT II (D-5) Full Scale Engineering Development authorization.
DOD/DOE Military Liaison Committee Letter dated July 23, 1984, subject, Characteristics for the TRIDENT II (D-5) MK5 Reentry Body.

Approved Program: DAE Baseline, 17 Feb 1988.
Budget

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

a. Missile Costs --	Planning Estimate (FY78-96)	Changes	Current Estimate (FY78-99)
Development (RDT&E)	9057.2	-662.8	8394.4
Procurement (WPN)	14988.3	2025.8	17014.1
Flyaway	12728.8	1248.6	13977.4
Other WPN Costs	2246.3	758.6	3004.9
Initial Spares	13.2	18.6	31.8
Construction (MILCON)	217.4	313.6	531.0
Total FY83 Base-Yr $	24262.9	1676.6	25939.5
Escalation	13382.2	-4450.1	8932.1
Development (RDT&E)	1739.5	-751.1	988.4
Procurement (WPN)	11600.1	-3793.8	7806.3
Construction (MILCON)	42.6	94.8	137.4
Total Then-Yr $	37645.1	-2773.5	34871.6
b. Missile Quantities --			
Development (RDT&E)	30	-2	28
Procurement (WPN)	710	105	815
Total	740	103	843
c. Missile Unit Cost --			
Procurement:			
FY83 Base-Yr $	21.1	-0.2	20.9
Then-Yr $	37.4	-6.9	30.5
Program:			
FY83 Base-Yr $	32.8	-2.0	30.8
Then-Yr $	50.9	-9.5	41.4

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- This item is not applicable to Trident II (D-5) Missile. U.S. support of the U.K. Trident II program is being accomplished under terms of the Polaris Sales Agreement of 1963 as extended and modified by exchanges of diplomatic notes in September 1980 and October 1982.

(b)(1)

g. Excludes the MILCON Costs for D5 Submarine (included in the OHIO Class D5 Capable Submarine SAR) and General Support which includes projects which are not solely dedicated to a specific weapon system.

D5 Submarine -	$492.4
General Support -	$529.1
TOTAL	$1,021.5

h. Excludes the RDT&E costs for Ballistic Missile Defense Penetration System, SLBM Effectiveness Enhancement and SLBM Retargeting system development. These costs are included in Program Element 0604363N (Project J0951) but are not included in the TRIDENT II (D5) Missile Development or Production baseline.

FY 1984 - FY 1992 $430.2

i. Excludes RDT&E FY91 & FY92 costs associated with TRIDENT II acquisition but budgeted subsequent to IOC. These costs are included in Program Element 0604363N (Project J0951) but are not included in the TRIDENT II (D5) Missile Development or Production baseline.

FY 1991 - FY 1992 $66.9

j. Consistent with previous TRIDENT II (D5) Missile Development and Production Estimate SARs, excludes the SCN, OPN, and O&MN costs identified in the Defense Enterprise Program (DEP) baseline for shipboard Strategic Weapons System (SWS) equipments. The SCN costs are included in the OHIO Class D-5 Capable Submarine SAR and are for the acquisition of all Strategic Weapons System (SWS) equipment for eleven submarines. The OPN and O&MN costs are for the acquisition of SWS equipment for the D-5 backfit of eight OHIO Class submarines and acquisition of SWS equipment for D-5 facilities in Kings Bay, GA and Bangor, WA.

	DEP Baseline		Current Estimate	
	Then-Year	FY1983 Base-Year	Then-Year	FY1983 Base-Year
SCN	3056.7	2601.7	2904.8	2464.8
OPN	1821.5	1445.5	1777.9	1397.2
O&MN	978.2	702.1	970.9	689.9

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

	Current Year (FY88)		Budget Year(FY89)
	SAR Current Estimate (DEC 87 SAR)	UCR Baseline Estimate (DEC 86 SAR)	UCR Baseline Estimate (DEC 87 SAR)
a. Program Acquisition --			
(1) Cost	34871.6	35518.5	34871.6
(2) Quantity	843	845	843
(3) Unit Cost	41.4	42.0	41.4
b. Current Procurement -	(FY88 APPROPRIATIONS ACT)		(FY89)
(1) Cost	2042.9	2042.9	1868.9
Less CY Adv Proc	-320.1	-320.1	-236.1
Plus PY Adv Proc	266.4	266.4	320.1
Net Total	1989.2	1989.2	1952.9
(2) Quantity	66	66	66
(3) Unit Cost	30.1	30.1	29.6

13. Cost Variance Analysis:

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

	RDT&E	WPN	MILCON	TOTAL
Planning Estimate	10796.7	26588.4	260.0	37645.1
Previous Changes:				
Economic	-588.6	-6257.5	-34.0	-6880.1
Quantity		3727.1		3727.1
Schedule		343.2		343.2
Engineering				0.0
Estimating	-754.9	995.7	442.4	683.2
Other				0.0
Support				0.0
Subtotal	-1343.5	-1191.5	408.4	-2126.6
Current Changes:				
Economic	-21.0	204.6	2.3	185.9
Quantity	-48.0			-48.0
Schedule				0.0
Engineering				0.0
Estimating	-1.4	-781.1	-2.3	-784.8
Other				0.0
Support				0.0
Subtotal	-70.4	-576.5	0.0	-646.9
Total Changes	-1413.9	-1768.0	408.4	-2773.5
Current Estimate	9382.8	24820.4	668.4	34871.6

(FY 1983 Constant (Base-Year) Dollars in Millions)

	RDT&E	WPN	MILCON	TOTAL
Planning Estimate	9057.2	14988.3	217.4	24262.9
Previous Changes:				
Quantity		1901.1		1901.1
Schedule		79.8		79.8
Engineering				0.0
Estimating	-622.3	619.3	315.5	312.5
Other				0.0
Support				0.0
Subtotal	-622.3	2600.2	315.5	2293.4
Current Changes:				
Quantity	-40.0			-40.0

Schedule				0.0
Engineering				0.0
Estimating	-0.5	-574.4	-1.9	-576.8
Other				0.0
Support				0.0
Subtotal	-40.5	-574.4	-1.9	-616.8
Total Changes	-662.8	2025.8	313.6	1676.6
Current Estimate	8394.4	17014.1	531.0	25939.5

13. Cost Variance Analysis (cont'd):

b. Previous Change Explanations --

RDT&E
Economic: Revised escalation indices.
Estimating: Final definitization of TRIDENT II (D-5) Operational Systems Development and Production Contracts and guidance development contract; revised estimating of potential change orders; Congressional reductions.

Procurement
Economic: Revised escalation indices.
Quantity: Additional missiles required for four additional submarines.
Schedule: Deferral of 24 missiles from FY 1987 through FY 1990 to FY 1998; requalification costs resulting from deferral of Production Continuity material procurements until required on lead time away basis.
Estimating: Latest repricing estimates; revised MK-6 Guidance estimates; Congressional reductions.

MILCON
Economic: Revised escalation indices
Estimating: Recategorization of construction projects such as missile and reentry body magazines from the General Support Program; revised construction estimates.

13. Cost Variance Analysis (cont'd):

c. Current Change Explanations —

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 88 economic escalation rates. (Economic)	N/A	-21.0
Delete 2 development flight test missiles. (Quantity)	-40.0	-48.0
Revised estimates and transfer of funds to Small Business Innovative Research. (Estimating)	-.5	-1.4
(2) Procurement		
Revised Jan 88 economic escalation rates. (Economic)	N/A	204.6
Congressional reductions. (Estimating)	-161.6	-210.0
Reduced MK-6 Guidance System Requirements. (Estimating)	-67.0	-90.0
Revised pricing based on projected contract savings. (Estimating)	-345.8	-481.1
(3) MILCON		
Revised Jan 88 economic escalation rates. (Economic)	N/A	+2.3
Revised construction estimates. (Estimating)	-1.9	-2.3

14. Program Acquisition Unit Cost (PAUC) History:

a. Initial SAR Estimate to Current Estimate --

PAUC BASELINE SAR EST. PE	Changes (Then Year Dollars in Millions)								PAU CURR ESTI
	ECON	QTY	SCH	ENG	EST	SPT	OTHER	TOTAL	
50.9	-7.9	-1.9	0.4	0.0	-0.1	0.0	0.0	-9.5	

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 Target	CONTRACT Ceiling	PRICE Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
335.1	N/A	1	346.8	355.1

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(10.5)	(9.4)
CUMULATIVE VARIANCES TO DATE (10/31/87)	(24.3)	(7.4)
NET CHANGE	(13.8)	2.0

Explanation of Change: The unfavorable cost variance is the result of machinery and fabrication problems and delays in the Launch Tube and Vertical Support Group areas; redesign and rework in the hoist area; and the need for increased testing. The slight improvement in the schedule variance is due to completion of many of the development activities. No impact is expected to major TRIDENT II program milestones as a result of the current schedule problems. The Government expects a small cost overrun. The initial and current quantity has been corrected to reflect the development quantity for the contract. Previous reports erroneously included procurement quantities.

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 Target	CONTRACT Ceiling	PRICE Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
443.3	N/A	4	442.4	443.3

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMMATIVE	.8	(13.0)
CUMULATIVE VARIANCES TO DATE (11/02/87)	(5.2)	(4.3)
NET CHANGE	(6.0)	8.7

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Explanation of Change: The slight worsening in the cost variance is due to additional efforts required in Quality Assurance, Quality Inspection Engineering, and Electronics resulting from module production problems, design and vendor changes. The unfavorable schedule variance has improved due to GEOS resolution of design and fabrication problems. All contractual milestones are being met and are expected to be met in the future. No cost overrun is expected. The initial and current quantity has been corrected to reflect the development quantity for the contract. Previous reports erroneously included procurement quantities.

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
709.6	N/A	2	763.5	769.1

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(15.6)	(12.1)
CUMULATIVE VARIANCES TO DATE (09/30/87)	(19.2)	(4.8)
NET CHANGE	(3.6)	7.3

Explanation of Change: The unfavorable cost variance is the result of continued hardware and software integration and test problems. The schedule improvement is the result of the contractor delivering the first suite of hardware and software to the SSBN 734 for grooming and checkout. The contract is still experiencing schedule delays in both hardware and software. These delays will not impact any major TRIDENT II program milestones. The Program Manager anticipates a price overrun of ($59.5M) at completion. The initial and current quantity has been corrected to reflect the development quantity for the contract. Previous reports erroneously included procurement quantities.

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
246.4	N/A	16	257.8	257.8

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(26.2)	(4.4)
CUMULATIVE VARIANCES TO DATE (10/30/87)	0.0	(.2)
NET CHANGE	26.2	4.2

Explanation of Change: The cost variance improvement is attributed largely to the fact that the contractor recently reprogrammed the RDT&E portion of the contract. RDT&E is 96% complete and the Program Manager is predicting an overrun of ($11.4M) at price. The favorable change in schedule variance is attributable to both the recent reprogramming, which eliminated ($3.1M) of schedule variance, and to completion of most remaining RDT&E efforts. Both schedule and technical progress have been satisfactory. The initial and current quantity has been corrected to reflect the development quantity for the contract. Previous reports erroneously included procurement quantities.

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	Target	Ceiling	Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
	4,242.8	N/A	30	4,242.8	4,242.8

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(157.2)	(16.7)
CUMULATIVE VARIANCES TO DATE (11/01/87)	(240.6)	(56.2)
NET CHANGE	(83.4)	(39.5)

Explanation of Change: The increased cost variance is due to greater than planned costs for Missile Body engineering and material, subcontracted specialized test equipment, and boost propulsion engineering. Corrective measures continue at both Lockheed and at the subcontractors. Given LMSC's Management Reserve, no impact on the price at completion is expected. The unfavorable schedule variance is due to delays driven by a cautious approach to resolution of some propulsion difficulties and by late delivery of electronic piece parts because of hardware and production problems. No impact to major program milestones is anticipated.

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Guidance Development:
Charles Stark Draper Laboratory
Cambridge, MA
N00030-84-C-0036, CPFF
Award Date: October 06, 1983
Definitized Date: March 07, 1984

INITIAL Target	CONTRACT Ceiling	PRICE Qty
846.4	N/A	-

CURRENT Target	CONTRACT Ceiling	PRICE Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
962.9	N/A	-	962.9	962.9

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(7.7)	(37.9)
CUMULATIVE VARIANCES TO DATE (9/30/87)	8.1	(17.3)
NET CHANGE	15.8	20.6

Explanation of Change: The improved cost variance is due to reburdening of some efforts and increased manufacturing efficiencies. The schedule variance improvement is due to guidance systems development nearing completion. No program milestones have been missed and no development impact is expected.

b. Procurement (WPN) —

Missile:
Lockheed Missiles and Space Company, Inc.
Sunnyvale, CA
N00030-84-C-0100, CPIF
Award Date: October 21, 1983
Definitized Date: March 21, 1984

INITIAL Target	CONTRACT Ceiling	PRICE Qty
1,473.0	N/A	52

CURRENT Target	CONTRACT Ceiling	PRICE Qty	ESTIMATED PRICE AT COMPLETION Contractor	Program Manager
1,523.7	N/A	52	1,523.7	1,523.7

	COST VARIANCE	SCHEDULE VARIANCE
PREVIOUS CUMULATIVE	(10.7)	(37.6)
CUMULATIVE VARIANCES TO DATE (11/01/87)	(5.5)	(21.9)
NET CHANGE	5.2	15.7

15. CONTRACT INFORMATION (cont'd): (THEN-YEAR DOLLARS IN MILLIONS)

Explanation of Change: The slight improvements in both the cost and schedule variances reflect completion of the initial production efforts. Neither trend is expected to lead to an unfavorable program schedule or cost variance at completion.

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

a. Program Status --

(1) Percent Program Completed: 50.0% (11 yrs/ 22 yrs)

(2) Percent Program Cost Appropriated: 37.4% ($13049.0/$34871.6)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY78-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP	Total
RDT&E	8662.9	824.0	195.9	0.0	9682.8
WPN	4059.1	1868.9	6294.3	12598.1	24820.4
MILCON	327.0	15.4	242.2	83.8	668.4
Total	13049.0	2408.3	6732.4	12681.9	34871.6

16. Program Funding Summary (Cont'd): (Current Estimate in Milli
c. Annual Summary --

Fiscal Year	Qty	FY 83 Base-Year Dollars			Then-Year Dollars			
		Flyaway		Total	Advance Proc		Total	Rate
		Nonrec	Rec		Debit	Credit		(%)
Appropriation: RDT&E								
1978				5.0			5.0	6.8
1979				5.0			5.0	8.4
1980				25.6			25.6	10.6
1981				96.7			96.7	10.6
1982				198.4			198.4	7.6
1983				343.9			351.0	4.9
1984				1370.1			1449.0	3.8
1985				1820.0			1983.4	3.4
1986				1733.8			1943.1	2.8
1987				1354.3			1565.4	2.7
1988				867.7			1040.3	3.7
1989				421.6			524.0	3.8
1990				152.4			195.9	3.6
Subtotal	28			8394.4			9382.8	
Appropriation: WPN								
1985			9.6	137.4	24.4	0.0	161.1	3.4
1986			42.2	419.9	235.7	0.0	508.4	2.8
1987	21		786.3	1073.4	266.4	235.7	1346.7	2.7
1988	66		1319.9	1571.6	320.1	266.4	2042.9	3.7
1989	66		1232.7	1391.2	236.1	320.1	1868.9	3.8
1990	66		1263.0	1603.1	250.4	236.1	2217.3	3.6
1991	72		1228.2	1477.2	244.9	250.4	2095.2	3.3

1992	72		1172.9	1365.3	261.0	244.9	1981.8	2.8
1993	72		1184.9	1305.1	249.5	261.0	1938.0	2.3
1994	72		1159.9	1283.5	249.7	249.5	1949.7	2.3
1995	72		1126.4	1262.1	249.9	249.7	1961.3	2.3
1996	72		1120.0	1241.0	248.1	249.9	1972.9	2.3
1997	72		1110.5	1189.5	219.4	248.1	1934.5	2.3
1998	72		989.0	1079.6	10.8	219.4	1796.3	2.3
To Compl	20		231.8	614.2	0.0	35.2	1045.4	2.3
Subtotal	815		13977.4	17014.1	3066.4	3066.4	24820.4	

Appropriation: MILCON

1984				72.7			79.3	3.8
1985				73.4			82.4	3.4
1986				109.0			126.2	2.8
1987				17.5			21.0	2.7
1988				14.6			18.1	3.7
1989				12.0			15.4	3.8
1990				85.9			113.7	3.6
1991				12.1			16.4	3.3
1992				80.6			112.1	2.8
1993				3.9			5.5	2.3
1994				9.6			14.0	2.3
1995				2.6			3.9	2.3
1996				0.0			0.0	2.3
1997				0.0			0.0	2.3
1998				5.0			7.9	2.3
To Compl				32.2			52.5	2.3
Subtotal				531.0			668.4	
Total	843		13977.4	25939.5	3066.4	3066.4	34871.6	

16. Program Funding Summary (Cont'd):
d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation: RDT&E		
1978	5.0	5.0	5.0
1979	5.0	5.0	5.0
1980	25.6	25.5	25.0
1981	96.7	96.4	93.6
1982	198.4	197.6	193.6
1983	351.0	346.6	341.2
1984	1449.0	1447.0	1198.4
1985	1983.4	1983.0	1954.1
1986	1943.1	1942.7	1861.7
1987	1565.4	1557.9	1166.5
1988	1040.3	341.8	0.1
To Compl	719.9	N/A	N/A
Total	9382.8	7948.5	6844.2
	Appropriation: WPN		
1985	161.1	160.3	155.5
1986	508.4	507.1	294.1
1987	1346.7	1233.7	101.2
1988	2042.9	598.0	0.0
To Compl	20761.3	N/A	N/A
Total	24820.4	2499.1	550.8
	Appropriation: MILCON		
1984	79.3	44.0	43.8
1985	82.4	74.1	72.4

1986	126.2	120.4	108.0
1987	21.0	120.4	108.0
1988	18.1	0.0	0.0
To Compl	341.4	N/A	N/A
Total	668.4	358.9	330.2

17. Production Rate Data:

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 for FY87 funding were planned for delivery over a five month period and the 21 missiles in the Current Estimate are planned for delivery over a four month period.)

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	66	72
1993	72	72	72	72
1994	72	72	72	72
1995	72	72	72	72
1996	72	72	72	72
1997	72	72	72	72
1998	72	72	72	72
1999		72	72	72
2000		72	72	72
2001		60	60	72

b. Cost Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost (BY$)	26556.3	-616.8	25939.5	29.9	25909.6
Prog Acq Cost (TY$)	35518.5	-646.9	34871.6	179.1	34692.5
PAUC (BY$)	31.4	-0.6	30.8	0.1	30.7
PAUC (TY$)	42.0	-0.6	41.4	0.2	41.2

c. Schedule Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	Apr 1987	0	Apr 1987	0	Apr 1987
Duration (in Months)	154	0	154	3	151
End Date (Mo/Yr)	Jan 2001	0	Jan 2001	3	Oct 2000

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	9/9
Procurement	0/0

18. Operating and Support Costs: Not applicable since TRIDENT II (D5) Missile is not a new SAR.

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

PROGRAM: DDG 51 Guided Missile Destroyer

N-12 DDG51-3

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name): DDG 51 Guided Missile 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. Greene, Jr., USN
ASSIGNED: June 11, 1987
AUTOVON: 222-7395
COMMERCIAL: (202) 692-7395

4. Program Elements/Procurement Line Items:

RDT&E: PE 0603589N
Project 1337-001 changed to PE 0604307N Project 1337/1937
PE 0604567N Project 0857-565; Project 1803-065 (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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~~Declassify on: OADR~~

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~~CONFIDENTIAL~~ OASD(PA) DFOISR 88-T-0912

6. Mission and Description: The Navy has a priority requirement for a battle force capable surface combatant as a replacement for retiring battle force guided missile destroyers. This program provides for FY 1989 follow 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 (BIW) in April 1985. Limited production approval was granted 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 would delay the delivery of DDG 51 by nine months. The schedule delay is attributable to a number of factors, including; a 99-day strike at the Bath shipyard in 1985; requirement for additional AEGIS Combat System testing; drawing design problems with Computer Aided Design (CAD); and changes to Government Furnished Information. The Navy has negotiated the cost and schedule impact of the proposed delay.

b. Significant Developments Since Last Report -- The Navy awarded the DDG 52 construction contract to Ingalls Shipbuilding Division (ISD) in May 1987, establishing ISD as the second source for DDG 51 Class construction. The DDG 53 construction contract was awarded to Bath Iron Works in September 1987.

Bath Iron Works has proposed an additional seven month delay to the DDG 51 delivery date as a result of shipyard production inefficiencies. The Navy has negotiated contract provisions to incorporate the delay, recognizing that the delay is caused by factors solely attributable to BIW.

BIW has initiated significant efforts aimed at alleviating their problems, including expanded production capabilities, a management reorganization, an increased workforce, and numerous employee incentives. Recent results indicate their initiatives are having the intended effect.

No DDG 51 Class ships are funded in FY 1988. The Congress deferred these units from the budget in order to take advantage of the economy of buying out the remaining CG 47 Class Guided Missile Cruisers in FY 1988.

Program funding in FY 1988 of $10.4M is provided to fund options in the MK 45 multiyear procurement contract and provide funding to initiate procurement of outfitting materials for DDG 51.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (#1337 Rev 1, Change 1, dated 22 August 1986), threshold breaches.

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 52 Delivery	N/A/Sep 91	Sep 91 (CH-1)
(7)	DDG 51 IOC	Oct 90/Oct 90	Feb 92 (CH-2)
(8)	DDG 53 Delivery	N/A/N/A	Jul 92 (CH-1)

b. Previous Change Explanations -- None

- DDG 52 award delayed to May 1987 due to RFP changes to strengthen solicitation provisions.

c. Current Change Explanations --

(CH-1) - New Milestone

(CH-2) - Delay to DDG 51 IOC date due to schedule delays proposed by Bath Iron Works and negotiated and accepted by the Navy.

d. References --

Production Estimate: DCP #1337 Rev 1, Change 1, dated 22 August 1986.

Approved Program: FY 1988/89 Amended Biennial Budget.
DAE Baseline of February 1988.

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DDG 51 Guided Missile Destroyer Class, December 31, 1987

II. Technical/Operational Characteristics:

	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical --			
(1)(U) Ship:		N/A	
a)(U) Length (Feet)	466/466		466
b)(U) Beam (Feet)	59/59		59
c)(U) Navigational Draft(Feet)	30.6/30.6		30.6
d)(U) Displacement (LT)	8,300/8,300		8,300
e)(U) Propulsion	LM 2500 Gas Turbine/ LM 2500 Gas Turbine		LM 2500 Gas Turbine
f)(U) Accommodations	341/341		341
b. Operational --			
(1)(U) Ship:		N/A	
a)(U) Top Speed (Knots)	30/30		30
(b)(1) [redacted]			
c)(U) Armament			
1(U) Anti-Submarine Warfare			
(U) ASW System	N/A/SQQ-89		SQQ-89
(U) ASROC	VLA/VLA		VLA
(U) Helo	SEAHAWK Land & Refuel; LAMPS Electronics/ SEAHAWK Land & Refuel; LAMPS Electronics		SEAHAWK Land & Refuel; LAMPS Electronics
2(U) Anti-Air Warfare			
(U) Launchers	MK 41 VLS/MK 41 VLS		MK 41 VLS
(U) Missiles	SM-2 MR/SM-2 MR		SM-2 MR
(U) Missile Fire Control System	3 MK 99/3 MK 99		3 MK 99
(U) Guns	2 PHALANX/2 PHALANX		2 PHALANX
3(U) Anti-Surface/Strike Warfare			
(U) Guns	1 5" 54/1 5" 54		1 5" 54
(U) Gunfire Control System	MK 160/MK 160		MK 160
(U) Anti-Ship Cruise Missile	HARPOON/HARPOON		HARPOON
(U) Cruise Missile	TOMAHAWK/TOMAHAWK		TOMAHAWK

[redacted]

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

	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
b. Operational --			
4(U) Electronic Warfare	SLQ-32,SRBOC/ SLQ-32,SRBOC		SLQ-32,SRBOC
5(U) Radars			
(U) Surface	SPS-67/SPS-67		SPS-67
(U) 3D	SPY-1D/SPY-1D		SPY-1D

c. Previous Change Explanations -- None

d. Current Change Explanations -- None

Production Estimate: DCP #1337 Rev 1, Change 1, dated 22 August 1986.

Approved Program: FY 1988/89 Amended Biennial Budget.
DAE Baseline of February 1988.

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

	Production Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	979.8	-26.7	953.1
Procurement (SCN)	15,948.3	-203.0	15,745.3
Basic Ship Costs	(5,383.6)	(+162.1)	(5,545.7)
HM&E and Combat System Elements	(9,427.9)	(-387.2)	(9,040.7)
Other Costs	(621.9)	(+40.7)	(662.6)
OF/PD	(514.9)	(-18.6)	(496.3)
Construction (MILCON)	25.6	-0.2	25.4
Total FY 87 Base-Year $	16,953.7	-229.9	16,723.8
Escalation	3,163.8	+424.9	3,588.7
Development (RDT&E)	(-63.2)	(+1.0)	(-62.2)
Procurement (SCN)	(3,224.8)	(+423.7)	(3,648.5)
MILCON	(2.2)	(+0.2)	(2.4)
Total Then-Year $	20,117.5	+195.0	20,312.5 1/

1/ Excludes $49.1M of FY 1992 Advance Procurement for the FY 1993 ships.

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

	Production Estimate	Changes	Current Estimate
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	23	-	23
Total	23	-	23
c. Unit Cost --			
Procurement: (SCN)			
FY87 Base-Year $	693.4	-8.8	684.6
Then-Year $	833.6	+9.6	843.2
Program:			
FY87 Base-Year $	737.1	-10.0	727.1
Then-Year $	874.7	+8.5	883.2

d. Approved Design to Cost Goal -- There is no design to cost goal which has been established for DDG 51. In DCP 1337 an average follow ship cost threshold of $700M in FY 83$ was established for ships 6-10. This threshold is shown below. The current average cost estimate for ships 6-10 is $639.9M in FY 83$. The current estimate shown below is the average unit sailaway cost for the 23 ships in the current FYDP.

	(Average Unit Sailaway Cost)	
	DCP 1337	Current Estimate
FY 87 Base Year $	768.1	663.0
Then-Year $	822.6	817.0

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

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

	Current Year		Budget Year
	SAR Current Dec 87 SAR	UCR Baseline Estimate Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	20,312.5	20,117.5	20,312.5
(2) Quantity	23	23	23
(3) Unit Cost	883.2	874.7	883.2
		(FY 88 Budget)	
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	10.4	10.4	2,211.6
Less CY Adv Proc	-5.5	-5.5	-78.4
Plus PY Adv Proc	0.0	0.0	+77.3
Less OF/PD	-4.9	-4.9	-4.3
Net Total	0.0	0.0	2,206.2
(2) Quantity	-	-	3
(3) Unit Cost	-	-	735.4

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	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current 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
Total Changes	-25.7	220.7	-	195.0
Current Estimate	890.9	19,393.8	27.8	20,312.5

(FY 1987 (Base-Year) Dollars in Millions)

Production Estimate	979.8	15,948.3	25.6	16,953.7
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current 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
Total Changes	-26.7	-203.0	-0.2	-229.9
Current estimate	953.1	15,745.3	25.4	16,723.8

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		
Revised Jan 1988 economic escalation rates (Economic)	N/A	+2.2
Revised program funding requirements (Estimating)	-26.7	-27.9
(2) SCN		
Revised Jan 1988 economic escalation rates (Economic)	N/A	+219.3
Change in Profile from 3, 3, 3, 5 to 0, 3, 5, 6 (FY88-FY91) (Schedule)	N/A	+144.1
Revisions to procurement estimates reflecting revised estimates for all ship systems and the impact to End Cost (BY 87 $) due to adjustments of projected ship construction escalation requirements resulting from revised inflation indices (Estimating)	-184.5	-121.7
Impact to outfitting and post delivery requirements for the revised procurement schedule and change in procurement quantity (Support)	-18.5	-21.0

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations --	(Dollars in Millions) Base-Year	Then-Year
(3) MILCON		
Revised Jan 88 economic escalation rates (Economic)	N/A	+0.2
Revised program funding requirements (Support)	-0.2	-0.2

d. References --

Production Estimate: - FY 1988/89 President's Budget Estimate, DDG 51 Ship Data Sheets

Current Estimate: - FY 1988/89 Amended Biennial Budget
DDG 51 Ship Data Sheets
Includes the following Program Elements:
RDT&E,N: 0603589N changed to 0604307N, 0604567N
SCN: PE 24222N/APPN 1611N
MILCON: P-214

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	+9.6	--	+6.3	--	-6.5	--	-0.9	+8.5	883.2

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

a. RDT&E --

Combat System Development	Initial Contract Price Target	Ceiling	Qty
RCA Government Systems Moorestown, N.J. N00024-84-5105, CPAF February 1984	$233.0	N/A	N/A

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$218.8	N/A	N/A	$218.8	$218.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ + 6.5	$ - 1.5
Cumulative Variances To Date (12/87)	$ + 1.2	$ - 0.6
Net Change	$ - 5.3	$ + 0.9

Explanation of Change: Cost variance results from the contractor's favorable performance. Schedule variance is not significant. Program manager's assessment remains at the estimated price and is within approved funding.

b. SCN --

Ship Construction (DDG 51) 1/	Initial Contract Price Target	Ceiling	Qty
Bath Iron Works Bath, Maine N00024-85-C-2144, FPI April 1985	$322.0	$399.1	1

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$339.9	$423.8	1	$394.5	$428.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ - 4.0	$ - 0.1
Cumulative Variances To Date (1/88)	$ -58.2	$ -33.8
Net Change	$ -54.2	$ -33.7

Explanation of Change: Cost and schedule negative variances are primarily the result of delay to detail design effort. Current target and ceiling have been adjusted to reflect negotiated changes.

1/ Bath Iron Works submitted a revised DDG 51 construction schedule which would delay the delivery of DDG 51 by nine months. The schedule delay is attributable to a number of factors, including; a 99-day strike at the Bath shipyard in 1985; a requirement for additional AEGIS Combat System testing; drawing design problems with Computer Aided Design (CAD); and changes to Government Furnished Information. The Navy has negotiated the cost and schedule impact of the proposed delay. BIW has also proposed an additional seven month delay to the DDG 51 delivery date as a result of shipyard production inefficiencies. The Navy has negotiated contract provisions to incorporate the delay recognizing that the delay is caused by factors solely attributable to BIW.

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

b. SCN --

Ship Construction (DDG 52)

Ingalls Shipbuilding
Pascagoula, Mississippi
N00024-87-C-2256, FPI
May 1987

Initial Contract Price		
Target	Ceiling	Qty
$162.2	$191.4	1

Current Contract Price		
Target	Ceiling	Qty
$162.2	$191.4	1

Estimated Price At Completion	
Contractor	Program Manager
$232.9	$242.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (1/88)	0	0
Net Change	N/A	N/A

Explanation of Change: None.

c. SCN --

Ship Construction (DDG 53)

Bath Iron Works
Bath, Maine
N00024-87-C-2257, FPI
September 1987

Initial Contract Price		
Target	Ceiling	Qty
$189.8	$214.5	1

Current Contract Price		
Target	Ceiling	Qty
$189.9	$214.5	1

Estimated Price At Completion	
Contractor	Program Manager
$249.1	$278.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (1/88)	0	0
Net Change	N/A	N/A

Explanation of Change: None.

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

d. SCN --

AEGIS Weapon System (DDG 51 and CG 60,61,62) 1/	Initial Contract Price Target	Ceiling	Qty
RCA Government Systems N00024-85-5100 FPI Moorestown, NJ December 23, 1985	$372.4	$414.0	4

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$414.8	$441.2	4	$ 414.8	$ 414.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ - 0.7	$ - 8.5
Cumulative Variances To Date (12/87)	$ + 2.8	$ - 6.2
Net Change	$ + 3.5	$ + 2.3

Explanation of Change: Current target and ceiling have been adjusted to reflect negotiated changes and contractor and Program Manager EACs have been increased accordingly.

1/ This is a combined procurement contract for the DDG 51 and CG 47 class ships, and is reported in the SARs of each program.

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

a. Program Status --
(1) Percent Program Completed: 50.0% (9 yrs/18 yrs)

(2) Percent Program Cost Appropriated: 18.3% ($3,713.7/$20,312.5)

b. Appropriation Summary --

	(Then-Year Dollars in Millions)				
Appropriation	Current & Prior Yrs (FY80-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93-97)	Total
RDT&E	828.1	37.8	25.0	0.0	890.9
SCN	2,866.3	2,211.6	13,937.7	378.2	19,393.8
MILCON	19.3	8.5	0.0	0.0	27.8
Total	3,713.7	2,257.9	13,962.7	378.2	20,312.5

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

c. Annual Summary --

Fiscal Year	Qty	FY 87 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1980				14.9			10.5	10.6
1981				45.1			35.3	10.6
1982				121.2			102.0	7.6
1983				170.8			150.7	4.9
1984				132.2			121.1	3.8
1985				146.1			138.4	3.4
1986				101.8			99.1	2.8
1987				89.5			91.3	2.7
1988				75.3			79.7	3.7
1989				34.5			37.8	3.8
1990				14.1			16.0	3.6
1991				4.4			5.1	3.3
1992				3.2			3.9	2.8
Subtotal				953.1			890.9	
Appropriation: SCN								
1984			-	-		78.6	78.6	3.6
1985	1	171.2	830.3	1001.5	112.3	-	942.8	2.1
1986			-	-		104.1	104.1	1.2
1987	2	55.1	1473.7	1528.8	70.4	79.8	1730.4	1.6
1988			-	4.7	-	10.4	10.4	3.7
1989	3		1832.9	1836.9	77.3	82.7	2211.6	3.8
1990	5		3196.3	3245.1	75.7	124.7	4000.5	3.6
1991	6		3847.4	3909.5	81.0	120.7	4915.2	3.3
1992	6		3842.3	3917.4	49.1	89.0	5022.0	2.8
1993			-	64.4		78.0	78.0	2.3
1994			-	83.9		104.0	104.0	2.3
1995			-	87.3		110.7	110.7	2.3
1996			-	62.6		81.2	81.2	2.3
1997			-	3.2		4.3	4.3	2.3
Subtotal	23	226.3	15022.9	15745.3	465.8	1068.2	19393.8	

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

c. Annual Summary --

Fiscal Year	Qty	FY 87 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: MILCON								
1986				4.5			4.6	2.8
1987				-			-	2.7
1988				13.4	-	-	14.7	3.7
1989				7.5	-	-	8.5	3.8
Subtotal				25.4	-	-	27.8	
Total	23	226.3	13601.2	15302.3	465.8	1068.2	20312.5	

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1980	10.5	10.5	10.5
1981	35.3	35.3	35.3
1982	102.0	102.0	102.0
1983	150.7	150.7	150.7
1984	121.1	121.1	121.1
1985	138.4	138.4	138.4
1986	99.1	99.1	83.2
1987	91.3	87.1	54.8
1988	79.7	14.2	1.7
To Complete	62.8	N/A	N/A
Subtotal	890.9	758.4	697.7
Appropriation: SCN			
1984	78.6	78.0	65.0
1985	942.8	770.0	443.2
1986	104.1	85.0	36.2
1987	1,730.4	947.6	57.5
1988	10.4	-	-
To Complete	16,527.5	N/A	N/A
Subtotal	19,393.8	1,880.6	601.9

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: MILCON			
1986	4.6	4.2	3.9
1988	14.7	-	-
To Complete	8.5	N/A	N/A
Subtotal	27.8	4.2	3.9
Total	20312.5	2643.2	1303.5

17. Production Rate Data: Not Applicable (Exempt: Less than six ships per year).

18. Operating and Support Costs: Not Applicable.

SAR-87-074

AF-21 KC-135R

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: KC-135R

AS OF DATE: December 31, 1987

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DECLASSIFIED

1. Designation and Nomenclature (Popular Name): KC-135R Modernization Program

2. 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: 11142F (Shared Funding)
   PROCUREMENT: 11142F APPN 3010 ICN C13500 (Shared Funding)
   O&M (Installation): 72207F (Shared Funding)

5. Related Programs: None

SAF/PAS
88-0099-T
OASD(PA) DFOISR 88-T-0466

6. Mission and Description: The KC-135R is a modification to KC-135A strategic tanker aircraft being developed and procured to provide increased aerial refueling capabilities. Modification includes four fuel efficient turbofan CFM56/F108 engines and strengthened main landing gear and other system improvements. The reengined KC-135 is characterized by increased fuel off-load capability, improved fuel efficiency, enhanced takeoff performance, and reduced environmental impact compared to the KC-135A. This system replaces the KC-135A.

7. Program Highlights:

a. Significant Historical Developments--In December 1977, Boeing Military Airplane Company was selected as prime contractor to provide technical and cost information for replacing engines and modernizing KC-135A tanker aircraft. In January 1980, the CFM56/F108 engine was selected and Boeing was awarded a contract leading to the design and production of hardware for converting KC-135A into KC-135R aircraft. In January 1981, the Government of France entered into agreement with the U.S. Government to provide a portion of the development funding and to fund conversion of French C-135F aircraft on the KC-135R modification line. The first modified aircraft was rolled-out on 22 June 1982. The first production contract for nine modification kits was awarded on 28 February 1982. KC-135R Development Test and Evaluation (DT&E) was conducted at Wichita, KS, and Edwards AFB CA, from 4 August 1982 to 5 April 1983, in a combined DT&E and Operational Test and Evaluation (OT&E) program. A total of 55 flights, 315.4 hours were flown. The KC-135R demonstrated satisfactory compliance with performance, flying qualifications, and propulsion specifications. In May 1984, Boeing Military Airplane Company (BMAC) was awarded a follow-on production contract for thirty shippable airframe kits. In July 1984, a contract for kit installation on one KC-135A airplane was awarded to Hayes International to establish a qualified competitive source for kit installation. The first modified KC-135R airplane was delivered to the U.S. Air Force on 29 June 1984. The PMRT from AFSC to AFLC for the airframe portion of the program occurred 30 October 1984. The installation contract for FY86 was awarded to Boeing in October 1985 as a result of competition with Hayes International. The PMRT from AFSC to AFLC for the F-108 engine occurred in June 1986.

b. Significant Developments Since Last Report--One hundred one KC-135R aircraft have been delivered to date. Six Main Operating Bases, two Tanker Task Force activities, a Forward Operating Location and two Regional Engine Maintenance Organizations have been activated. A total of 195 kits and 133 installations have been procured. FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

The KC-135R satisfies the mission requirement.

c. Changes Since "As of" Date - None

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no 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/ NA	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: Program Management Directive (PMD) Number 7021(14)/ 11142F, 31 August 1981; USD(A) Memo, 9 Feb 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 Reengine Program, April 1, 1981 and Program Management Directive (PMD) number 7021(14)/11142F, August 31, 1981.

Approved Program: Decision Coordination Paper (DCP), KC-135R Reengine Program, April 1, 1981 and Program Management Directive (PMD) Number Production Estimate: Program Management Directive (PMD) Number 7021 (14)/11142F, 31 August 1981

Approved Program: Program Management Directive (PMD) Number 7021(14)/ 11142F, 31 August 1981; USD(A) Memo, 9 Feb 1988.

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

	Production Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	91.6	- 1.9	89.7
Procurement	4941.5	+2329.0	7270.5
Airframe	(2033.0)	(+346.2)	(2379.2)
Engine	(2348.0)	(+1735.1)	(4083.1)
Total Flyaway	(4381.0)	(+2081.3)	(6462.3)
Other Weapon System Costs	(208.0)	(+34.7)	(242.7)
Initial Spares	(352.5)	(+213.0)	(565.5)
O&M (Installation)	196.0	+ 11.5	207.5
Total FY81 Base-Year $	5229.1	+2338.6	7567.7
Escalation	2600.1	+2278.9	4879.0
Development (RDT&E)	(5.6)	(- 0.6)	(5.0)
Procurement	(2515.2)	(+2239.6)	(4754.8)
O&M (Installation)	(79.3)	(+ 39.9)	(119.2)
Total Then-Year $	7829.2	+4617.5	12446.7
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	334	+304	638
Total	334	+304	638
c. Unit Cost --			
Procurement:			
FY81 Base-Year $	14.795	-3.399	11.396
Then Year $	22.325	-3.477	18.848
Program:			
FY81 Base-Year $	15.656	-3.794	11.862
Then-Year $	23.441	-3.932	19.509

d. Approved Design to Cost Goal -- None

e. Foreign Military Sales -- Sales to date total eleven (11) for an estimated cost of $220,012,101 which includes two years of initial spares, support equipment, French peculiar design changes and eleven (11) installations.

f. Nuclear Costs -- None

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

	Current Year		Budget Year
	SAR Current Estimate (Dec 87 SAR)	UCR Baseline Estimate (Dec 86 SAR)	UCR Baseline Estimate (Dec 87 SAR)
a. Program Acquisition --			
(1) Cost	12446.7	12857.2	12446.7
(2) Quantity	638	641	638
(3) Unit Cost	19.509	20.058	19.509
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	705.1	627.7	593.8
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	705.1	627.7	593.8
(2) Quantity	47	36	36
(3) Unit Cost	15.002	17.436	16.494

13. Cost Variance Analysis:

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

	RDT&E	PROC	O&M	TOTAL
Production Estimate	97.2	7456.7	275.3	7829.2
Previous Changes:				
Economic	-0.2	- 495.5	- 10.3	- 506.0
Quantity	-	+6051.5	+189.0	+6240.5
Schedule	-	+ 367.2	+ 9.7	+ 376.9
Engineering	-	-	-	-
Estimating	-2.3	-1393.9	-111.6	-1507.8
Other	-	-	-	-
Support	-	+ 424.4	-	+ 424.4
Subtotal	-2.5	+4953.7	+ 76.8	+5028.0
Current Changes:				
Economic	-	- 5.3	- .1	- 5.4
Quantity	-	- 63.5	- 2.0	- 65.5
Schedule	-	- 78.1	- 1.8	- 79.9
Engineering	-	-	-	-
Estimating	-	- 338.3	- 21.5	- 359.8
Other	-	-	-	-
Support	-	+ 100.1	-	+ 100.1
Subtotal	0.0	- 385.1	- 25.4	- 410.5
TOTAL CHANGES	-2.5	+4568.6	+ 51.4	+4617.5
CURRENT ESTIMATE	94.7	12025.3	326.7	12446.7

(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	-	+3218.2	+109.0	+3327.2
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 1.9	- 896.0	- 81.6	- 979.5
Other	-	-	-	-
Support	-	+ 191.4	-	+ 191.4
Subtotal	- 1.9	+2513.6	+ 27.4	+2539.1
Current Changes:				
Quantity	-	- 30.4	- 1.0	- 31.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 210.5	- 14.9	- 225.4
Other	-	-	-	-
Support	-	+ 56.3	-	+ 56.3
Subtotal	0.0	- 184.6	- 15.9	-200.5
Total Changes	- 1.9	+2329.0	+ 11.5	+2338.6
Current Estimate	89.7	7270.5	207.5	7567.7

13. 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

Schedule: procurement program stretchout

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

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 indicies on prior year support costs

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

Schedule: installation schedule stretchout associated with kit procurement stretchout

Estimating: removal of interim contract support costs from the SAR; refinement of estimate based on contract negotations; revised estimate of "Over and Above" contingency costs; estimating changes applicable to increase of six aircraft; adjustment for impact of revised economic indicies on prior years

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)	---	-5.3
Quantity decreased from 641 to 638, 2 aircraft lost through attrition and 1 aircraft previously included in error (Quantity)	-30.4	-63.5
Schedule change associated with an increase in procurement in FY86 (43 to 46) and FY88 (36 to 47) (Schedule)	---	-78.1
Revised hardware estimate based on latest contract prices (Estimating)	-148.6	-227.6
Recategorization of engine production support costs from Flyaway to Support		
Estimating	-75.0	-129.5
Support	+75.0	+129.5
Adjustment for prior year inflation indices (Estimating)	+13.1	+18.8
Revised estimate for data and spares based on latest contract prices (Support)	-21.6	-33.3
Adjustment for prior year inflation indices (Support)	+2.9	+3.9

13. Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year $	Then-Year $
(2) O&M (Installation)		
Revised economic escalation indices (Economic)	---	-.1

13. Cost Variance Analysis (Cont'd):

Decreased installation costs associated with deletion of three aircraft from planned program (Quantity)	-1.0	-2.0
Installation schedule rephased (compressed) to accommodate the kit procurement schedule change (Schedule)	---	-1.8
Reduced installation cost estimate based on contract experience (Estimating)	-14.9	-21.5

d. References --

Production Estimate: FY 1984 President's Budget, January 1983

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

Initial SAR/Production Estimate (PdE) to Current Estimate (CE)

PAUC (Initial SAR/PdE)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
23.441	-0.802	-1.491	+0.466	0.000	-2.927	+0.822	0.000	-3.932	19.509

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

a. RDT&E - no active contracts

b. Procurement --

(1) Airframe Modification Kits
Boeing Military Airplane Co
F34601-85-C-0135, FFP
Award Date: March 25, 1985
Definitized: N/A

Initial Contract Price

Target	Ceiling	Qty
174.8	N/A	43

Current Contract Price

Target	Ceiling	Qty
174.8	N/A	43

Estimated Price at Completion

Contractor	Program Manager
174.8	174.8

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

(2) Airframe Modification Kits
Boeing Military Airplane Company
F34601-86-C-2171, FFP
Award Date: July 11, 1986
Definitized: N/A

Initial Target	Contract Ceiling	Price Qty
151.8	N/A	43

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
143.6	N/A	43	143.6	143.6

First time contract reported in SAR.

(3) Airframe Modification Kits
Boeing Military Airplane Co
F34601-87-C-2269, FFP
Award Date: July 31, 1987
Definitized: N/A

Initial Target	Contract Ceiling	Price Qty
165.0	N/A	50

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
162.6	N/A	50	162.6	162.6

First time contract reported in SAR.

(4) Engine
CFM International
F33657-84-C-2128, OPT I, FFP
Award Date: April 10, 1985
Definitized: N/A

Initial Contract Price Target	Ceiling	Qty
396.9	N/A	175

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
352.0	N/A	175	352.0	352.0

(5) Engine
CFM International
F33657-84-C-2128, Opt II, FFP
Award Date: April 10, 1985
Definitized: N/A

Initial Contract Price Target	Ceiling	Qty
425.0	N/A	181

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
376.9	N/A	181	376.9	376.9

(6) Engine
CFM International
F33657-84-C-2128, Opt III, FFP
Award Date: May 12, 1987
Definitized: N/A

Initial Contract Price Target	Ceiling	Qty
542.6	N/A	244

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
542.6	N/A	244	542.6	542.6

First time contract reported in SAR.

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
CFM International	F33657-84-C-2128, Basic

These contracts are more than 95% complete and have been deleted and replaced with later contracts.

d. 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: 46.2% (12 yrs/26 yrs)

(2) Percent Program Cost Appropriated: 34.6% ($4304.1/12446.7)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY77-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Balance To Complete Beyond FYDP (FY93-02)	Total
RDT&E	94.7	-	-	-	94.7
Procurement	4144.3	593.8	2015.0	5272.2	12025.3
O&M	65.1	13.2	50.9	197.5	326.7
Total	4304.1	607.0	2065.9	5469.7	12446.7

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

c. Annual Summary -- *

Fiscal Year	Qty	FY81 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1977	-			2.6			1.9	6.9
1978	-			3.3			2.6	6.8
1979	-			8.2			7.0	8.4
1980	-			10.6			10.0	9.4
1981	-			15.5			16.2	11.9
1982	-			22.2			24.9	9.2
1983	-			21.8			25.5	4.9
1984	-			5.5			6.6	3.8
Subtotal	-			89.7			94.7	
Appropriation: Procurement								
1980	-	4.7		4.7			5.0	9.7
1981	1	47.9	19.8	93.3	22.2		108.9	11.9
1982	9	31.7	154.2	193.6		11.5	237.7	9.6
1983	19	11.4	239.2	351.5		10.7	457.7	9.0
1984	30	4.7	330.3	399.2			541.7	7.9
1985	43	2.0	398.7	472.1			661.0	3.4
1986	46	2.1	411.2	458.7			663.7	2.8
1987	50	.5	460.0	509.3			763.5	2.7
1988	47	.3	447.7	454.0			705.1	3.7
1989	36		355.7	370.0			593.8	3.8
1990	36		357.0	401.2			662.7	3.6
1991	36		357.0	394.8			669.2	3.3
1992	36		357.0	393.7			683.1	2.8
1993	36		357.0	399.8			709.2	2.3
1994	36		357.0	400.3			726.6	2.3
1995	36		357.0	400.5			743.8	2.3
1996	36		357.0	400.7			761.3	2.3
1997	36		357.0	401.3			779.9	2.3
1998	36		357.0	401.8			798.8	2.3
1999	33		327.2	370.0			752.6	2.3
Subtotal	638	105.3	6357.0	7270.5	22.2	22.2	12025.3	

* FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Con't): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	FY81 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: O&M (Installation)								
1982	1			2.6			2.9	9.4
1983	-			2.1			2.4	4.6
1984	5			8.4			10.1	4.0
1985	28			15.9			19.8	3.4
1986	33			9.1			11.6	2.8
1987	32			6.6			8.7	2.7
1988	34			7.0			9.6	3.7
1989	45			9.3			13.2	3.8
1990	47			9.7			14.2	3.6
1991	36			11.9			18.0	3.3
1992	36			12.0			18.7	2.8
1993	36			12.1			19.2	2.3
1994	36			12.1			19.7	2.3
1995	36			12.2			20.2	2.3
1996	36			12.1			20.6	2.3
1997	36			12.1			21.1	2.3
1998	36			12.2			21.7	2.3
1999	36			12.2			22.2	2.3
2000	36			12.2			22.7	2.3
2001	36			12.2			23.3	2.3
2002	17			3.5			6.8	2.3
Subtotal	638			207.5			326.7	
Total	638	105.3	6357.0	7567.7	22.2	22.2	12446.7	

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated 1/	Expended 1/
Appropriation: RDT&E			
1977	1.9	1.9	1.9
1978	2.6	2.6	2.6
1979	7.0	7.0	7.0
1980	10.0	10.0	10.0
1981	16.2	15.9	15.7
1982	24.9	24.3	24.3
1983	25.5	24.8	20.3
1984	6.6	5.9	3.5
Total	94.7	92.4	85.3
Appropriation: Procurement			
1980	5.0	5.0	5.0
1981	108.9	108.9	108.9
1982	237.7	237.7	237.7
1983	457.7	457.7	457.7
1984	541.7	541.7	541.7
1985	661.0	632.5	557.6
1986	663.7	620.9	294.0
1987	763.5	683.0	2.3
1988	705.1	0.0	0.0
TO COMPLETE	7881.0		
TOTAL	12025.3	3287.4	2204.9
Appropriation: O&M (Installation)			
1982	2.9	2.9	2.9
1983	2.4	2.4	2.4
1984	10.1	10.1	10.1
1985	19.8	19.8	19.3
1986	11.6	11.6	11.6
1987	8.7	8.7	8.7
1988	9.6	0.0	0.0
TO COMPLETE	261.6		
Total	326.7	55.5	55.0

1/ Reflects program office records as of 31 December 1987.

17. Production Rate Data (Cont'd):

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum
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	47	72
1989			36	72
1990			36	72
1991			36	72
1992			36	72
1993			36	72
1994			36	8
1995			36	
1996			36	
1997			36	
1998			36	
1999			33	

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Prog Acq Cost (BY$)	5229.1	+2338.6	7567.7	+ 380.8	7186.9
(TY$)	7829.2	+4617.5	12446.7	+1239.5	11207.2
PAUC (BY$)	15.656	-3.794	11.862	+ .650	11.212
(TY$)	23.441	-3.932	19.509	+2.025	17.484

c. Schedule Variance --

Item	Production Estimate	Variance (SE less (PdE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	7/81	-	7/81	-	7/81
Duration (in Mos)	98	+149 mos	247	+ 87 mos	160
End Date (Mo/Yr)	9/89	+149 mos	12/01	+ 87 mos	11/93

D. Deliveries (Plan/Actual)	To Date
RDT&E	N/A
Procurement	101/101

18. Operating and Support Costs -- Not applicable

(3)

SELECTED ACQUISITION REPORT [RCS: DD-COMP (Q&AR) 823] SECRET

SAR-87-080

PROGRAM: AMRAAM (AIM-120A)

AF-1 AMRAAM

AS OF DATE: December 31, 1987

(U) INDEX

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SAF/PAS
88-0131-T

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 Thomas R. Ferguson, Jr.
Armament Division — Assigned: July 2, 1984
Eglin AFB, FL 32542 — AV 872-2307; COMM (904) 882-2307

Naval Air Systems Command (PMA-268) — Captain Norbert W. Melnick, USN
AMRAAM Joint System Program Office — Assigned: January 31, 1986
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 64314F
PROCUREMENT,AF: APPN 3020 ICN MAMRAO PE 27163F
MILCON: None

RDT&E,N: PE 64314N PROJ W0981
PROCUREMENT,N: APPN 1507 ICN 2206 PE 26138M
APPN 1507 ICN 2206 PE 24162N
MILCON: None

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OASD(PA) DFOISR 88-F-0587

5. (U) Related Programs: F-14, F-15, F-16, F/A-18, A6F, 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. Compar ed 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 December 1983, with Hughes Aircraft Company behind schedule, the Air Force elected not to proceed with the production options. 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 $7.0 billion (FY84$). A successful mission in December 1986 demonstrated the launch of two missiles from an F-16C against two QF-100 drones. Producibility Enhancement Contracts were awarded to Hughes and Raytheon in July and August 1986 respectively.

7. (U) Program Highlights (continued):

a. Significant Historical Developments (continued): The July 1987 Authorization Bill for procurement states that missile costs may not exceed $7 billion (in Fiscal Year 1984 dollars) based upon procurement of 24,000 missiles. However, this amount ($7.0B) may be adjusted to reflect the effects of the FY 1987 and succeeding FYs Congressional Funding actions. Any such adjustment will be reported to Congress in this report. The FY 1987 Congressional funding actions which reduced Lot I from 260 to 180 missiles and Lot II from 833 to 630 missiles (resulting in extending the ramp-up of Lot IV into Lot V) did increase the Congressional Cap from $7.000B to $7.172B in Fiscal Year (FY) 1984 dollars.

b. Significant Developments Since Last Report: Through December 1987, 51 FSD guided AMRAAM Air Vehicle Instrumented (AAVI) launches have been completed. They were launched from F-16, F-15, F/A-18, and F-14 aircraft at White Sands Missile Range, NM; Eglin AFB, FL; Pacific Missile Test Center, CA; and Naval Weapons Center, CA. The success rate for these launches is greater than 80 percent. 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. Long Lead Contracts for Lot I Production were awarded in November and December 1986 with Full Go-Ahead Options exercised for Lot I production in October 1987. AMRAAM received a favorable Low Rate Initial Production (LRIP, Milestone IIIA) decision by the Defense Acquisition Board (DAB) in June 1987. In December 1987, Hughes Aircraft Company was awarded a Long Lead Contract for Lot II Production. Negotiations continue with Raytheon for Lot II Long Lead.

The 1988 Appropriation Act for Procurement reduced Lot II funding from $837M to $673.1M (including initial spares) and quantities from 630 to 400, which caused a curtailment of the production ramp-up rate and forced an additional procurement lot. The impact of this reduction extended the ramp-up of both producers from Lots IV and V to V and VI). 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, however, increased the cost cap from $7.172B to $7.585B in FY 1984 dollars.

AMRAAM is expected to meet all mission requirements.

c. Changes since "As Of" Date: Program Funding and Quantities reflect the FY88/89 President's Budget, as adjusted for FY88 Congressional Direction and FY89 Amended Budget Levels.

8. (U) Decision Coordination Paper (DCP) Threshold Breaches: There are currently no DCP (dated 1 June 1987) or ADM (dated 19 October 1987) Threshold Breaches.

9. (U) Schedule:

a. Milestones:

	Development Estimate/ Approved Program	Current Estimate
Preliminary Design Review	Aug 82/ NA	Aug 82
DSARC II (DAB) (SDDM)	Nov 82/Nov 82	Nov 82
Advance Buy Long Lead for Lot I	NA / NA	Dec 86
DAB IIIA (Lot I Low Rate Initial Production)	NA /Jun 87 (CH-1)	Jun 87 (CH-1)
Production Contract Full Go-Ahead for Lot I	NA /Oct 87 (CH-2)	Oct 87 (CH-2)
DAB IIIB (Lot III Full Go-Ahead Rate Production)	NA /Mar 89	Mar 89
IOC	Sep 86/Oct 89	Oct 89
DT&E/IOT&E Complete	-/Apr 89(Ch-3)	Apr 89(Ch-3)
FOC	- /Jul 91(Ch-3)	Jul 91(Ch-3)

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.

c. Current Change Explanations:

(CH-1) Schedule slip (from Apr 87 to Jun 87) 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 1 May 1987.

(CH-2) 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 Contracts.

(Ch-3) Reflects USD(A) Baseline Approval.

d. References:

Development Estimate: SDDM dated 3 November 1982, #X22681

Approved Program: FY88/89 Amended President's Budget, dated 18 February 1988; OSD(A) Memo 9 Feb 1988.

10. (S) Technical/Operational Characteristics:

a. (U) Technical	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(U) Weight (lbs)	327/350		335
(U) Length (in)	143/ NA	143.9	143.9
(U) Reliability 1/			
Ready Storage (hrs) 2/	60000/45000		45000
Availability (%)	86/82		93
Captive-Carry (MTBM-Type 1) (Hrs) 3/	600/450		1000

b. (S) Operational

(b)(1)

1/ (U) Standard reliability terminology per AFR 80-5.
2/ (U) Mature missile values are shown.
3/ (U) Mature missile values (90,000 operational flight hours). The Captive-Carry MTBM (Type I) threshold value applicable to Milestone IIIA is 100 hours. The Captive-Carry MTBM (Type I) value applicable to Milestone IIIB is 200 hours.
4/ (U) Per Joint Service Operation Requirement (JSOR) conditions and definitions.
5/ (U) Non-maneuvering, co-speed, co-altitude target.
6/ (U) Ro, 2M2 cross-section, clear air
HPRF - High Pulse Repetition Frequency
MPRF - Medium Pulse Repetition Frequency
7/ (U) Probability of K-Kill (Reference AMRAAM System Specification).
8/ (U) Miss distance in accordance with system specification.

(b)(1)

11/ (U) Missile separation distance from launch aircraft at occurrence of missile target intercept. The F-Pole requirement for the AMRAAM is not a significant measure of operational performance since the missile's active seeker allows the aircraft to exercise a significant launch and maneuver without tracking missile to the target.

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, 27 November 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.

d. (U) Current Change Explanations:

(CH-1) Adjustment based on aerodynamic data derived from flight test.

e. (U) Reference:

Development Estimate: SDDM, 3 November 1982, #X22681.

Approved Program: Decision Coordinating Paper, 27 November 1985.

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

	Nov 82 Development Estimate	Changes	Current Estimate 1/
a. Cost			
Development (RDT&E)	730.2	8.1	738.3
Procurement	4031.6	332.4	4364.0 *
Air Vehicle Flyaway	3508.2	593.6	4101.8
Other Weapon Sys Cost	264.0	-89.6	174.4
Initial Spares	84.9	-25.9	59.0
Other Procurements	174.5	-145.7	28.8
Construction	--	--	--
Total FY 78 Base-Year $	4761.8	340.5	5102.3
Escalation	6829.8	-732.9	6096.9
Development (RDT&E)	447.9	-35.6	412.3
Procurement	6381.9	-697.3	5684.6
Construction (MILCON)	--	--	--
Total Then-Year $	11591.6	-392.4	11199.2
b. Quantities			
Development (RDT&E)	169	-58	111
Procurement	24335	-15	24320
Total	24504	-73	24431
c. Unit Cost			
Procurement:			
FY 78 Base-Year $	0.166	0.013	0.179
Then-Year $	0.428	-0.015	0.413
Program:			
FY 78 Base-Year $	0.194	0.015	0.209
Then-Year $	0.473	-0.015	0.458

* This equates to $7,515.0M (FY84$)

1/ Program Funding and Quantities reflect the FY88/89 President's Budget, as adjusted for FY88 Congressional Direction and FY89 Amended Budget Levels.

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

d. Approved Design to Cost Goal:

(Average Unit Flyaway Cost)

	Dev Estimate/ Appr Program	Current Estimate	Latest Appr Threshold*
Air Force			
Qty: 17,108			
Peak Rate: 250/mo			
FY78 Base-Year $	0.154/0.182	0.182	0.182
Then-Year $	0.397/0.415	0.415	0.415
Navy			
Qty: 7,212			
Peak Rate: 250/mo			
FY78 Base-Year $	0.122/0.136	0.136	0.136
Then-Year $	0.315/0.327	0.327	0.327

* FY89 Amended President's Budget

e. Foreign Military Sales: None

f. Nuclear Costs: None

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

(Current (Then-Year) Dollars in Millions) 2/

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition			
(1) Cost	11199.2	10461.7	11199.2
(2) Quantity	24431	24431	24431
(3) Unit Cost	0.458	0.428	0.458

2/ Unit cost baselines have been computed by dividing the total Air Force & Navy costs by the total Air Force and Navy Quantities

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

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
b. Current Procurement	FY 1988	FY 1988 3/	FY 1989
(1) Cost	673.1	673.1	890.8
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	42.2	42.2	0.0
Net Total	715.3	715.3	890.8
(2) Quantity	400	400	1520
(3) Unit Cost	1.788	1.788	0.586

3/ Differs from the December 1986 SAR to reflect the FY 1988 Appropriations Act in accordance with the Congressional change to SAR law.

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	-43.1	-2066.2		-2109.3
Quantity	-39.2	0.0		-39.2
Schedule	-19.1	277.2		258.1
Engineering	5.1	170.3		175.4
Estimating	55.3	833.4		888.7
Other	0.0	0.0		0.0
Support	0.0	-303.6		-303.6
Subtotal	-41.0	-1088.9		-1129.9
Current Changes				
Economic	-1.9	65.0		63.1
Quantity	0.0	0.0		0.0
Schedule	0.0	116.7		116.7
Engineering	0.0	0.0		0.0
Estimating	15.4	797.6		813.0
Other	0.0	0.0		0.0
Support	0.0	-255.3		-255.3
Subtotal	13.5	724.0		737.5
Total Changes	-27.5	-364.9		-392.4
Current Estimate	1150.6	10048.6		11199.2

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

(FY 1978 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	29.7	337.7		367.4
Other	0.0	0.0		0.0
Support	0.0	-150.7		-150.7
Subtotal	1.3	105.1		106.4
Current Changes				
Quantity	0.0	0.0		0.0
Schedule	0.0	0.0		0.0
Engineering	0.0	0.0		0.0
Estimating	6.8	337.8		344.6
Other	0.0	0.0		0.0
Support	0.0	-110.5		-110.5
Subtotal	6.8	227.3		234.1
Total Changes	8.1	332.4		340.5
Current Estimate	738.3	4364.0		5102.3

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

b. Previous Change Explanations:

RDT&E	
Economic:	Revised economic escalation indicies.
Schedule:	Revised estimate due to the reduction of evaluation missiles.
Engineering:	Addition and deletion of Pre-Planned Product Improvement (P^3I) effort.
Estimating:	Funds transferred from P^3I 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.
PROCUREMENT	
Economic:	Revised economic escalation indicies.
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.
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. Reestimate based on impact of revised escalation indicies. Adjustment to flyaway caused by schedule change due to Congressional realignment of quantities. Adjustment for current and prior year escalation.
Support:	Revised support cost requirements resulting from revised schedule. Incorporated contractor maintenance support and deferred organic depot until completion of production. Reestimate of initial spares support. Reevaluation and rephasing of initial spares.
MILCON	N/A

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

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Revised Economic Escalation Indicies (Economic)	0.0	-1.9
Adjustment for Current and Prior Year escalation (Estimating)	1.1	1.9
Addition of FYs 93 & 94 to the Navy RDT&E Program for missile/ Navy aircraft platforms development and testing (Estimating)	9.9	21.4
Adjustment due to FY88 Congressional Actions reducing flight test content (Estimating)	-3.8	-7.0
Adjustments to fund Small Business and Unfunded Requirements at additional risk to completion of flight test program (Estimating)	-0.1	-0.2
Rephasing of Navy F-14 Flight Test Program Analysis (Estimating)	-0.3	-0.7
(2) PROCUREMENT		
Revised Economic Escalation Indicies (Economic)	0.0	65.0
Adjustment due to Congressional Quantity Realignment from FY88 to the outyears	239.5	687.3
Schedule impact due to Congressional realignment of quantities from FY88 to the outyears, extending ramp-up rate (Schedule)	(0.0)	(116.7)

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

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(2) PROCUREMENT		
Revised estimating methodology to support the DAB and Congressional realignment of quantities (Estimating)	(239.5)	(570.6)
Adjustment for escalation rate change in FYs 90-92 (Estimating)	-12.9	-29.1
Adjustment for Current and Prior Year escalation (Estimating)	-1.4	-2.8
Revision of the Program Office Estimate to incorporate the results of negotiations and contracts (Lots I & II)	112.6	258.9
Revised estimate for Special Tooling/Special Test Equipment (ST/STE) to incorporate contract & negotiation results (Estimating)	(-9.2)	(-14.7)
Revised estimate for Production Test requirements (Estimating)	(30.2)	(69.3)
Revision of the estimate for Production Support Activities including technical analysis (Estimating)	(72.6)	(166.5)
Adjustment of the APREP investment costs of the projects and additional flight test requirements for projects (Estimating)	(12.1)	(23.2)
Revised estimate for incorporation of Tech Mod at the AMRAAM Contract Facilities (Estimating)	(6.9)	(14.6)

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

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(2) PROCUREMENT		
Adjustment for Current and Prior Year escalation (Support)	-0.1	-0.2
Adjustment made to reflect recategorization of Navy Other Line Item Costs to Nonrecurring Costs (Support)	-97.6	-231.3
Rephase of the Joint Depot to incorporate Joint Depot Maintenance Group decision for a five year Interim Contractor Support period, with Organic Depot capability at Alameda, CA (USN facility) at the end of the ICS period (Support)	4.4	6.6
Revision of the Program Office Support Equipment (PSE) Estimate to incorporate the results of negotiations and contracts (Lots I & II)	-21.4	-41.3
Revision & rephase of the Data Requirements to incorporate the results of Contracts & Negotiations (Support)	(-8.9)	(-17.5)
Revision & rephase of Training Equipment Requirements incorporating results of negotiations and current contracts (Support)	(-11.6)	(-26.0)

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

c. Current Variance Analysis:

	(Dollars in Millions) Base Year	Then Year
(2) PROCUREMENT (continued)		
Revision & rephase of the Containers and Peculiar Support Equipment estimate to incorporate results of negotiations and competitive procurement (Support)	(-0.9)	(2.2)
Revision of the Initial Spares estimate to incorporate FY88 Congressional Actions and rephase of the AMRAAM program (Support)	4.2	10.9

d. References: Secretary of Defense Decision Memorandum, 3 November 1982, #X22681.

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	-0.084	0.000	0.015	0.007	0.070	0.000	-0.023	-0.015	0.458

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

a. RDT&E

AMRAAM (AIM-120A):

	Initial Contract Price		
	Target	Ceiling	Qty
AMRAAM FSD Hughes Aircraft Company Missile Systems Division Canoga Park, CA F08635-82-C-0001, FPI/FFP Award: 11 December 1981	398.1	526.5	94

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
416.7	562.1*	94	806.8	811.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-4.4	-20.5
Cumulative Variances to Date (Nov 87)	-17.8	-6.1
Net Change	-13.4	+14.4

* Includes award fee and FFP Line Items

Explanation of Change: Development of the AMRAAM Air Vehicle continues to be the primary cost and schedule variance driver. Major sources of the variances are problems encountered in developing the Guidance Section, Missile Integration and Assembly, and Control Section. Impact on the Contract: The contractor is in compliance with the contract delivery schedule of 75 months (actual FSD duration, to support the test program, will extend four (4) months beyond final delivery). However, in order to maintain schedule deliveries, the contractor is utilizing additional unplanned manpower which has contributed significantly to the cost growth. Government liability on this contract is limited to the ceiling price of $562.1M.

b. PRODUCTION

	Initial Contract Price		
	Target	Ceiling	Qty
Below Chassis Level STE Raytheon Company Bedford, MA F08635-85-C-0084, FPIF Award: 8 July 1985 Definitization: 3 January 1986	45.5	52.6	0

15. (U) Contract Information (continued):

b. PRODUCTION (continued)

Below Chassis Level STE (continued)
F08635-85-C-0084, FPIF

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
45.5	52.6	0	48.5	48.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-1.1	-1.3
Cumulative Variances to Date (Nov 87)	-5.7	-1.9
Net Change	-4.6	-0.6

Explanation of Change: The initial late transfer of technical data (acceptance requirements documents) from Leader to Follower impacted the schedule on some stations by one (1) month. Raytheon's internal actions (allocations of manpower, delays in installing stations awaiting power installation, etc.) have caused further delays. Thirty-one (31) of the 35 stations are complete through fabrication. Impact to the Contract: The contract deliveries will extend to March 1988 and the contract price will exceed the target price. This is the last SAR submission for this contract.

	Initial Contract Price		
	Target	Ceiling	Qty
Qualification Lot	76.2	89.9	15

Raytheon Company
Bedford, MA
F08635-86-C-0002, FPIF
Award: 4 November 1985
Definitization: 10 June 1986

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
76.2	89.9	15	74.1	78.8

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-0.3	-0.9
Cumulative Variances to Date (Nov 87)	-0.6	-3.5
Net Change	-0.3	-2.6

15. (U) Contract Information (continued):

b. PRODUCTION (continued)

Qualification Lot
Raytheon Company
F08635-86-C-0002, FPIF (continued)

Explanation of Change: The unfavorable cost and schedule variance to date was initially a result of lower than anticipated receipt of material from vendors, a high volume of Engineering Change Order activity and management problems associated with engineering documentation. Late test equipment also contributed to the schedule variance. The unfavorable cost variance is primarily the result of higher than anticipated hardware support activities. Impact to the Contract: The JSPO projects a one to two (1-2) month delay in missile deliveries.

	Initial Contract Price		
	Target	Ceiling	Qty
Lot I Low Rate Initial Production	264.7	N/A	105

Hughes Aircraft Company
Missile Systems Division
Canoga Park, CA
F08635-87-C-0070, FFP**
Award: 31 October 1987 (Full Go-Ahead)
Definitization: 11 December 1986

** CPR data is not required on Firm Fixed Price (FFP) Contracts

Change Explanation: This is the first SAR submission for this Contract.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars) 1/

a. Program Status

(1) Percent Program Completed: 57.1% (12 yrs/21 yrs)

(2) Percent Program Cost Appropriated: 23.6% ($2644.3/$11199.2)

b. Appropriation Summary

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Years	Budget Year	Balance to Complete FYDP	Balance to Complete Beyond FYDP	Total
	(FY77-88)	(FY89)	(FY90-92)	(FY93-97)	
RDT&E	1100.1	13.6	15.5	21.4	1150.6
Procurement	1544.2	890.8	2965.4	4648.2	10048.6
MILCON					0.0
Total	2644.3	904.4	2980.9	4669.6	11199.2

1/ Program Funding and Quantities reflect the FY88/89 President's Budget, as adjusted for FY88 Congressional Direction and FY89 Amended Budget Levels.

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

c: Annual Summary

Fiscal Year	Qty*	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E (Air Force/Navy)								
1977				5.0			4.8	--
1978				12.5			12.7	6.0
1979				30.6			34.4	8.4
1980				42.7			53.5	9.4
1981				34.0			47.1	11.9
1982				95.1			140.9	9.2
1983				138.0			213.8	4.9
1984				123.0			197.9	3.8
1985				127.2			211.1	3.4
1986				55.1			93.9	2.8
1987				23.7			41.6	2.7
1988				26.5			48.4	3.7
1989				7.2			13.6	3.8
1990				4.0			7.8	3.6
1991				1.9			3.8	3.3
1992				1.9			3.9	2.8
1993				1.9			4.0	2.3
1994				8.0			17.4	2.3
Subtotal	111	**	**	738.3			1150.6	

* Of the 111 total RDT&E Quantity, only Guided Test Vehicles are reported.
** Not Available

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

c: Annual Summary

Fiscal Year	Qty*	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement (Air Force/Navy)								
1984	--	15.3	--	15.3	--	--	27.8	8.0
1985	--	37.3	--	37.3	--	--	69.8	3.4
1986	--	69.8	--	98.7	56.1	--	191.1	2.8
1987	180	79.4	213.5	290.2	42.2	-56.1	582.4	2.7
1988	400	93.3	240.1	323.8	--	-42.2	673.1	3.7
1989	1520	69.9	319.0	414.9	--	--	890.8	3.8
1990	*	49.5	401.2	498.8	--	--	1102.3	3.6
1991	*	26.2	336.6	431.9	--	--	978.7	3.3
1992	*	15.4	340.7	381.4	--	--	884.4	2.8
1993	*	7.3	373.1	397.6	--	--	943.2	2.3
1994	*	7.2	346.5	369.1	--	--	895.9	2.3
1995	*	7.2	341.0	363.0	--	--	901.3	2.3
1996	*	8.5	326.3	349.7	--	--	888.2	2.3
1997	*	8.1	369.4	392.3	--	--	1019.6	2.3
Subtotal	24320	494.4	3607.4	4364.0	98.3	-98.3	10048.6	
Total	24431			5102.3	98.3	-98.3	11199.2	

*The distribution of annual procurement buys for FY 1990 and beyond has not been completely determined. These numbers will be reported in the first SAR submission following OSD approval.

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

c: Annual Summary

Fiscal Year	Qty*	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E (Air Force)								
1977				5.0			4.8	--
1978				6.6			6.7	6.0
1979				14.3			16.1	8.4
1980				20.9			26.2	9.4
1981				16.5			22.9	11.9
1982				92.9			137.6	9.2
1983				135.2			209.5	4.9
1984				118.5			190.6	3.8
1985				122.5			203.3	3.4
1986				52.6			89.6	2.8
1987				20.9			36.7	2.7
1988				13.1			23.9	3.7
Subtotal	94	**	**	619.0			967.9	

* Of the 94 total Air Force RDT&E Quantity, only Guided Test Vehicles are reported. This included AMRAAM Air Vehicles Instrumented (AAVIs), AMRAAM Air Vehicles (AAVs), Inspect and Repair as Necessary (IRANs), and Follower GTVs.

** Not Available

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

c: Annual Summary

Fiscal Year	Qty*	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement (Air Force)								
1984	--	15.3	--	15.3	--	--	27.8	8.0
1985	--	37.3	--	37.3	--	--	69.8	3.4
1986	--	69.8	--	98.7	56.1	--	191.1	2.8
1987	180	79.4	213.5	290.2	42.2	-56.1	582.4	2.7
1988	400	93.3	240.1	323.8	--	-42.2	673.1	3.7
1989	1470	64.3	309.5	387.1	--	--	831.0	3.8
1990	*	41.0	328.3	390.2	--	--	862.3	3.6
1991	*	14.1	251.3	299.7	--	--	679.1	3.3
1992	*	4.0	214.6	224.2	--	--	519.9	2.8
1993	*	0.8	235.5	241.1	--	--	572.0	2.3
1994	*	0.7	207.1	211.3	--	--	512.8	2.3
1995	*	0.7	204.0	208.2	--	--	517.0	2.3
1996	*	1.6	195.2	200.7	--	--	509.7	2.3
1997	*	1.6	297.3	303.0	--	--	787.5	2.3
Subtotal	17108	423.9	2696.4	3230.8	98.3	-98.3	7335.5	
Total	17202	--	--	3849.8	98.3	-98.3	8303.4	

*The distribution of annual procurement buys for FY 1990 and beyond has not been completely determined. These numbers will be reported in the first SAR submission following OSD approval.

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

c: Annual Summary

Fiscal Year	Qty*	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E (Navy)								
1978				5.9			6.0	6.0
1979				16.3			18.3	8.4
1980				21.8			27.3	9.4
1981				17.5			24.2	11.9
1982				2.2			3.3	9.2
1983				2.8			4.3	4.9
1984				4.5			7.3	3.8
1985				4.7			7.8	3.4
1986				2.5			4.3	2.8
1987				2.8			4.9	2.7
1988				13.4			24.5	3.7
1989				7.2			13.6	3.8
1990				4.0			7.8	3.6
1991				1.9			3.8	3.3
1992				1.9			3.9	2.8
1993				1.9			4.0	2.3
1994				8.0			17.4	2.3
Subtotal	17	**	**	119.3			182.7	

* Of the 17 total RDT&E Quantity, only Guided Test Vehicles are reported.
** Not Available

6. (U) Program Funding Summary: (continued)

c: Annual Summary

Fiscal Year	Qty*	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement (Navy)								
1989	50	5.6	9.5	27.8	--	--	59.8	3.8
1990	*	8.5	72.9	108.6	--	--	240.0	3.6
1991	*	12.1	85.3	132.2	--	--	299.6	3.3
1992	*	11.4	126.1	157.2	--	--	364.5	2.8
1993	*	6.5	137.6	156.5	--	--	371.2	2.3
1994	*	6.5	139.4	157.8	--	--	383.1	2.3
1995	*	6.5	137.0	154.8	--	--	384.3	2.3
1996	*	6.9	131.1	149.0	--	--	378.5	2.3
1997	*	6.5	72.1	89.3	--	--	232.1	2.3
Subtotal	7212	70.5	911.0	1133.2	0.0	0.0	2713.1	
Total	7229			1252.5	0.0	0.0	2895.8	

*The distribution of annual procurement buys for FY 1990 and beyond has not been completely determined. These numbers will be reported in the first SAR submission following OSD approval.

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

d. Obligations and Expenditures ***

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E (Air Force/Navy)			
1977	4.8	4.8	4.8
1978	12.7	12.7	12.7
1979	34.4	34.4	34.4
1980	53.5	53.5	53.5
1981	47.1	47.1	47.1
1982	140.9	140.9	140.9
1983	213.8	213.8	213.7
1984	197.9	197.9	197.6
1985	211.1	211.1	195.2
1986	93.9	93.9	60.7
1987	41.6	26.5	3.8
1988	48.4	1.8	0.3
To Complete	50.5	N/A	N/A
Total	1150.6	1038.4	964.7

*** Reflects latest accounting records as of 15 February 1988

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

d. Obligations and Expenditures ***

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: Procurement (Air Force/Navy)			
1984	27.8	27.8	24.2
1985	69.8	69.8	48.9
1986	191.1	187.5	110.6
1987	582.4	430.2	32.2
1988	673.1	65.5	0.0
To Complete	8504.4	N/A	N/A
Total	10048.6	780.8	215.9

*** Reflects latest accounting records as of 15 February 1988

17. (U) Production Rate Data

a. Annual Production Rates:

Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum
1985	249	N/A		N/A
1986	1067	N/A		N/A
1987	1964	N/A	196.4 1/	N/A
1988	3000	N/A	400	N/A
1989	3000	N/A	1270	N/A
1990	3000	N/A	2550	N/A
1991	3000	N/A	2255	N/A
1992	3000	N/A	2420	N/A
1993	3000	N/A	3000	N/A
1994	3055	N/A	3000	N/A
1995		N/A	3000	N/A
1996		N/A	3000	N/A
1997		N/A	3245	N/A

1/ Funded Delivery Period is eleven (11) months

17. (U) Production Rate Data (continued)

b. Cost Variance:

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less max)	Maximum
Prog Acq Cost (BY$)	N/A	N/A	5102.3	N/A	N/A
Prog Acq Cost (TY$)	N/A	N/A	11199.2	N/A	N/A
PAUC (BY$)	N/A	N/A	0.209	N/A	N/A
PAUC (TY$)	N/A	N/A	0.458	N/A	N/A

c. Schedule Variance:

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less max)	Maximum
Start Date (Mo/Yr)	N/A	N/A	12/86 2/	N/A	N/A
Duration (in Mos)	N/A	N/A	164	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	07/99 3/	N/A	N/A

2/ Date of Contract Award: 12/86
3/ Projected Date of Last Delivery: 07/99

d. Deliveries (Plan/Actual):

	To Date
RDTE	92/72
Procurement	0/0

18. (U) Operating and Support Costs: N/A

PROGRAM: IUS

SAR-87-070

AS OF DATE: DECEMBER 31, 1987

AF-18 IUS

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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 Dennis E. Beebe
   Assigned: January 31, 1985
   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)

SAF/PAS
88-0119-T

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)

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[redacted]
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[redacted]

OASD(PA) DFOISR 88-T-0555

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 taken over responsibility of what was then called the "Interim Upper Stage" with the agreement that we would accommodate NASA requirements as needed.

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, two separate contract restructures. Two of those FSD vehicles have been launched. In October 1982, a 3871 lb. DSCS II/III satellite launched on a Titan T34-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 the third restructure of the FSD contract. Eventually, the problem was successfully identified and resolved.

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 Feb 84, 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 payload to be completely destroyed before deployment. The Shuttle/Centaur program cancellation (early summer 1986) resulted in an additional future classified payload for the IUS.

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 is only funding four of these vehicles). In July, the Inertial Upper Stage was selected, and the program is proceeding into negotiations at the present time.

b. Significant Developments Since Last Report -- Since the last SAR report was submitted, there have been no IUS missions.

The buy of five IUS vehicles intended for DSP satellites 18-22 has been cancelled because vehicles intended for use with DSCS have become available. Five Defense Satellite Communication Systems (DSCS) payloads (ten satellites) have been taken off the shuttle in favor of a competitive second generation Medium Launch Vehicle (MLV-II). Since the MLV-II will not utilize the IUS, these IUS vehicles are available for DSP launches.

FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional Action and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

The Inertial Upper Stage system is expected to satisfy mission requirements.

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

8. Decision Coordinating Paper (DCP) Threshold Breaches:
There are currently no DCP (dated 29 March 1978) threshold breaches.

9. Schedule:

a. Milestones --	Development Estimate/ Approved Program	Current Estimate
JRMB II (Full Scale Dev.)	Mar 78/Mar 78	Mar 78
Development Contract Award	Mar 78/ NA	Mar 78
Engine Qualification Test		
(1) Titan Configured	Oct 82/ NA	Oct 82
(2) STS Configured	Jan 83/ NA	Jan 83
First Flight Vehicles		
(1) Titan Configured	Oct 82/ NA	Oct 82
(2) STS Configured	Mar 83/ NA	Mar 83
First Production Contract Award	Jan 83/ NA	Jan 83
Initial Launch Capability (ILC)*		
(1) Titan Configured	Oct 82/Oct 82	Oct 82
(2) STS Configured	Mar 83/Apr 83	Apr 83
Delivery of First Production Contract Vehicle	Nov 83/ NA	Jun 84

*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. No current changes in approved program or current estimate.

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: PMD R-S 5068(27), 22 February 1983; R-S 7123(13), 19 December 1983; R-S 7123(15), 3 December 1986; USD(A) memo, 9 Feb 1988.

10. Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical			
Reliability (%)			
(1) Titan 34D	96/NA	100	99.3
(2) Space Shuttle	96/ 98.5 (Ch-3)	67	98.5
(3) Titan IV	96/99.3 (Ch-3)	N/A	99.3
Accuracies			
(1) GSO Position (NM)	+/-92/ +/-92	+/-28.0	+/-91
(2) GSO Velocity (ft/s)	+/-78/ +/-78	+/- 7.8	+/-38
(3) GSO Inclination (Degrees)	+/-0.12/ +/-0.12	+/-.02	+/-0.10
b. Operational			
Payload Wt. to Geosynch. Orbit (GSO) from the Space Shuttle (lb.) (park orbit @ 175 NM)	5,000/5,250 (Ch-3)	5,133	5,137 (Ch-1)
Payload Wt. to GSO from Titan 34D (lb.)	4,000/ NA	3,871	3,853
Payload Wt. to GSO from Titan IV (lb.) (park orbit @ 62 x 195 NM)	5,300/5,290 (Ch-3)	N/A	5,250 (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. Reliability 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 reflects two-thirds of the missions being said to be 100% successful. Position, velocity and inclination first changed from +/- 92 NM, 78 ft/s and 0.12 degrees to +/- 58 NM, 50 ft/s and 0.055 degrees respectively, due to the use of sophisticated gamma guidance techniques. In 1985, they became +/-28.0 NM, 7.8 ft/s and 0.02 degrees. The newer parameters were taken from STS missions as opposed to Titan 34D. The estimated payload weight to GSO from the Space Shuttle changed from 5089 pounds to 5002 pounds. There are two causes: 1. SRM-1 and SRM-2 specific impulses are approximately 0.5% lower than predicted (accounting for about 45 pounds). 2. Vehicle weight increased due to the IUS anomaly fix (accounts for about 40 pounds). The estimated payload weight to GSO on the Titan 34D changed from 4000 to 3924 to reflect the maximum predicted satellite payload weight. The SRM-1 and SRM-2 specific impulse change (see (1) above) accounts for about 35 pounds. The current estimate of 3853 pounds will still accommodate all payload requirements aboard Titan 34D. New entries for Titan IV were added. The Titan IV is a new expendable launch vehicle compatible with the IUS. 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.

d. Current Change Explanations --

(Ch-1): The IUS performance estimate has decreased due to degradation of the Shuttle's park orbit.

(Ch-2): The IUS-Titan IV current performance estimate has decreasd due to a decrease in the Titan IV performance estimate.
(Ch-3): Reflects USD(A) baseline approval.

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: PMD R-S 5068(27), 22 February, 1983; R-S 7123(13) 19 December, 1983; R-S 7123(15), 3 December 1986; USD(A) memo, 9 Feb 1988.

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	$424.2	$+12.9	$437.1
Procurement	533.6	-241.0	292.6
Flyaway	(437.0)	(-238.3)	(198.7)
Other	(96.6)	(-2.7)	(93.9)
Initial Spares	(-)	(-)	(-)
Construction (MILCON)	5.2	-0.6	4.6
Total FY 75 Base-Year $	$963.0	$-228.7	$734.3
Escalation	1049.3	-428.0	621.3
Development (RDT&E)	(269.0)	(+11.0)	(280.0)
Procurement	(777.2)	(-438.6)	(338.6)
Construction (MILCON)	(3.1)	(-0.4)	(2.7)
Total Then-Year $	$2012.3	$-656.7	$1355.6
b. Quantities --			
Development (RDT&E)	1	-	1
Procurement	17	-10	7
Total	18	-10	8
c. Unit Cost --			
Procurement:			
FY 75 Base-Year $	$31.388	$+10.412	$41.800
Then-Year $	$77.106	$+13.065	$90.171
Program:			
FY 75 Base-Year $	$ 53.500	$+38.288	$ 91.788
Then-Year $	$111.794	$+57.656	$169.450

d. Approved Design to Cost Goal -- None

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

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

	Current Year		Budget Year
	SAR Current Estimate Dec 87 SAR	UCR Baseline Estimate Dec 86 SAR	UCR Baseline Estimate Dec 87 SAR
a. Program Acquisition --			
(1) Cost	1355.6	1280.9	1355.6
(2) Quantity	8	8	8
(3) Unit Cost	169.450	160.113	169.450
b. Current Procurement --	(FY 1988)	(FY 1988)*	(FY 1989)
(1) Cost	46.8	46.8	13.3
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	46.8	46.8	13.3
(2) Quantity	0	0	0
(3) Unit Cost	N/A	N/A	N/A

* Adjusted to reflect FY 88 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	-2.5	-15.0	-	-17.5
Quantity	-	-442.6	-	-442.6
Schedule	-	-	-	-
Engineering	+42.7	+3.6	-	+46.3
Estimating	-20.0	-20.1	-1.0	-41.1
Other	-	-	-	-
Support	+8.1	-10.7	-	-2.6
Subtotal	+28.3	-484.8	-1.0	-457.5
Current Changes:				
Economic	-0.4	+0.3	-	-0.1
Quantity	-	-232.9	-	-232.9
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-4.0	+37.8	-	+33.8
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-4.4	-194.8	-	-199.2
Total Changes	+23.9	-679.6	-1.0	-656.7
Current Estimate	717.1	631.2	7.3	1355.6

13. Cost Variance Analysis (Cont'd)

(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	-	-156.6	-	-156.6
Schedule	-	-	-	-
Engineering	+18.6	+1.5	-	+20.1
Estimating	-7.2	-10.7	-0.6	-18.5
Other	-	-	-	-
Support	+3.2	-2.7	-	+0.5
Subtotal	+14.6	-168.5	-0.6	-154.5
Current Changes:				
Quantity	-	-84.8	-	-84.8
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-1.7	+12.3	-	+10.6
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-1.7	-72.5	-	-74.2
Total Changes	+12.9	-241.0	-0.6	-228.7
Current Estimate	437.1	292.6	4.6	734.3

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.

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.

13. Cost Variance Analysis (Cont'd)

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 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.

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 Co. 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	-0.4
Adjustment for current and prior year escalation. (Estimating)	+0.2	+0.4
Under estimated IUS development costs due to standdown. (Estimating)	+1.6	+3.4
Over estimated IUS development costs associated with increased performance. (Estimating)	-3.5	-7.8

13. Cost Variance Analysis (Cont'd)

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

(Dollars in Millions)

	Base-Year $	Then-Year $
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+0.3
Deletion of four vehicles.	-74.6	-202.1
Decrease of four vehicles. (Quantity)	(-84.8)	(-232.9)
Estimating changes applicable to four vehicles since baseline. (Estimating)	(+10.2)	(+30.8)
Adjustment for current and prior year escalation. (Estimating)	+0.1	+0.1
Over estimated production costs associated with IUS-1 anomaly. (Estimating)	-7.1	-16.0
Under estimated costs associated with the follow-on IUS production contract. (Estimating)	+4.4	+10.2
Changes to reflect Congressional recissions based upon Shuttle launch slips. (Estimating)	-3.0	-7.3
FY 88 Space Launch Recovery Supplemental (Estimating)	+7.7	+20.0

(3) MILCON

No current changes.

d. References --

Development Estimate: FY 84 President's Budget.

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	Other	Spt	Total	
111.794	-2.200	+55.306	-	+5.788	-0.913	-	-0.325	+57.656	169.450

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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
347.2	366.2	6 1/	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	-1.3
Cumulative Variances To Date (12/31/87)	-2.6	-1.1
Net Change	0.0	+0.2

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 - The Thrust Vector Control (TVC) actuators continue to be behind schedule due to mechanical breakdown during acceptance testing, but Boeing's workaround plan has improved the situation. The last set of actuators is scheduled to be shipped in January, 1988.

No impact to program or contract.

+ = Favorable - = Unfavorable

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
650.6	706.4	8 1/	654.7	662.2

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.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	+1.8	-24.0
Cumulative Variances To Date (12/31/87)	-4.7	-27.9
Net Change	-6.5	-3.9

Explanation of Changes:

Cost Variance - The cost variance is attributed to producibility problems on the Signal Conditioner Unit (SCU) DC-DC converter, Printed Wire Assemblies (PWA), and magnetics at Boeing Electronics Co. (BECo), in addition to burden and material impacts.

Schedule Variance - Several sub-contractors are late delivering various procured parts. Hamilton Standard has not shipped three Redundant Inertial Measurement Units (RIMU's) and three flight computers, along with some associated long lead items. Chemical Systems Division (CSD) is behind their shipping schedule for Thrust Vector Control (TVC) actuators, potentiometers and controllers, and is behind schedule with their Aft Frame Tilt Actuators (AFTA) extended life testing. TRW's 20 watt power amps, Converter Regulator Units (CRU) and CIU wire harness set are all behind delivery schedule.

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: 76.5% (13 yrs/ 17 yrs)

(2) Percent Program Cost Appropriated: 93.9% ($ 1272.9/$ 1355.6)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY76-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93)	Total
RDT&E	679.9	16.6	20.6	-	717.1
Procurement	585.7	13.3	32.2	-	631.2
MILCON	7.3	-	-	-	7.3
Total	1272.9	29.9	52.8	0.0	1355.6

c. Annual Summary -- *

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1976				4.5			4.9	7.0
1977				21.9			25.7	7.4
1978				55.0			69.8	7.0
1979				74.7			103.3	8.4
1980				64.2			98.8	9.4
1981				63.4			108.0	11.9
1982				24.1			43.9	9.2
1983				60.8			115.9	4.9
1984				18.1			35.8	3.8
1985				15.5			31.4	3.4
1986				5.3			11.2	2.8
1987				4.5			9.5	2.7
1988				9.6			21.7	3.7
1989				7.1			16.6	3.8
1990				5.4			12.9	3.6
1991				1.5			3.8	3.3
1992				1.5			3.9	2.8
Subtotal	1			437.1			717.1	

* See next page.

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

c. Annual Summary -- *

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement								
1978			--	0.7			1.0	7.0
1979			14.4	35.6			54.6	8.7
1980			12.6	24.0			41.9	9.7
1981			--	8.8			16.8	11.9
1982	2		32.4	38.2			78.4	9.6
1983	2		33.9	38.8			84.1	9.0
1984			4.8	30.4			68.8	8.0
1985			34.2	38.7	72.4		90.0	3.4
1986	3		37.4	38.3		72.4	92.2	2.8
1987			4.5	4.5			11.1	2.7
1988			12.1	18.1			46.8	3.7
1989			3.1	5.0			13.3	3.8
1990			2.1	4.3			11.7	3.6
1991			3.7	3.7			10.3	3.3
1992			3.5	3.5			10.2	2.8
Subtotal	7		198.7	292.6	72.4	72.4	631.2	
Appropriation: MILCON								
1979				4.6			7.3	9.6
Subtotal				4.6			7.3	
Total	8			734.3	72.4	72.4	1355.6	

* FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional Action and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

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

d. Obligations and Expenditures —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated A/	Expended A/
Appropriation: RDT&E			
1976	4.9	4.9	4.9
1977	25.7	25.7	25.7
1978	69.8	69.8	69.8
1979	103.3	103.3	103.3
1980	98.8	98.8	98.8
1981	108.0	108.0	108.0
1982	43.9	43.9	43.9
1983	115.9	115.9	113.7
1984	35.8	35.8	31.2
1985	31.4	31.4	30.1
1986	11.2	11.2	10.8
1987	9.5	5.5	3.2
1988	21.7	2.4	0.0
To Complete	37.2	N/A	N/A
Total	717.1	656.6	643.4

A/ Obligated and expended amounts are based on program office records as of 31 Dec 87.

Appropriation: Procurement			
1978	1.0	1.0	1.0
1979	54.6	54.6	54.6
1980	41.9	41.9	34.7
1981	16.8	16.8	16.8
1982	78.4	77.9	77.6
1983	84.1	79.5	75.5
1984	68.8	62.4	33.1
1985	90.0	90.0	3.8
1986	92.2	62.1	3.2
1987	11.1	3.3	2.3
1988	46.8	0.0	0.0
To Complete	45.5	N/A	N/A
Total	631.2	489.5	302.6

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated A/	Expended A/
Appropriation: MILCON			
1979	7.3	7.3	7.3
To Complete	-	N/A	N/A
Total	7.3	7.3	7.3

A/ Obligated and expended amounts are based on program office records as of 31 Dec 87.

17. Production Rate Data:

No report. Production less than six per year.

18. Operating and Support Costs: N/A

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SAR-87-085

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

AF-22 LANTIRN PROGRAM: LANTIRN

AS OF DATE: December 31, 1987

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1. Designation/Nomenclature (Popular Name): Low Altitude Navigation and Targeting Infrared System for Night (LANTIRN)

2. DOD Component: U.S. Air Force

92-0114A-T

3. Responsible Office and Telephone Number:

LANTIRN System Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433

PM: Col T. Westover
Assigned: 30 Jun 87
AUTOVON: 785-7273
(513) 255-7273

4. Program Elements/Procurement Line Items:

RDT&E: (3600) PE 63249F
PE 64249F

PROCUREMENT: (3010) PE 27249F

ICN # - NONE

5. Related Programs: Infrared Maverick
F-16 Aircraft
F-15E Aircraft
Additional Aircraft TBD

[redacted]

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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 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 follow ing in June 1983. Direction was given in July 1984 to integrate the LANTIRN system on the F-15E aircraft.

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 success fully demonstrated a dual Maverick Missile launch capability. The production contract 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.

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

b. Significant Developments Since Last Report: The first flight of a development navigation pod on an F-15E took place in May 87. In Mar and Jun 87, the first and second production navigation pods were both delivered to the Air Force one month ahead of schedule. The LANTIRN system (navigation and target pods) underwent Follow-on Test and 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 have been 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 has been deferred until early FY89 to allow completion of the LANTIRN integration on the F-15E and weapons delivery testing on the F-16 aircraft.

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 Congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

The LANTIRN system is expected to satisfy the mission requirement.

c. Changes since AS OF Date: None.

8.(U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP threshold breaches.

9.(S) Schedule:

a. Milestones --	DEVELOPMENT EST./ APPROVED PROGRAM	CURRENT ESTIMATE
1. Program Initiation (PMD)	Dec 79/Dec 79	Dec 79
2. Contract Award (HUD)	Jul 80/ NA	Jul 80
3. Contract Award (FCS)	Sep 80/ NA	Sep 80
4. FCS Program Restructure	Sep 81/ NA	Sep 81
5. HUD F-16 Flight Test Complete	Dec 82/ NA	Dec 82
6. HUD A-10 Flight Test Complete	Dec 82/ NA	Dec 82
7. HUD F-16 Production Decision	Jan 83/ NA	Dec 84
8. HUD A-10 Production Decision	May 83/ NA	
9. First FSD Navigation Pod Delivery	Feb 83/ NA	Feb 83
10. First FSD Targeting Pod Delivery	Jul 83/ NA	Jul 83
11. Auto Target Recognizer		
12. Adv Dev Tech Eval	Oct 84/ NA	Oct 84
13. Competitive Targeting Pod Fly Off	Dec 84/ NA	N/A
14. FCS F-16 Flight Test Complete	Dec 84/Mar 86 (CH-3)	Mar 86
15. Navigation Pod		Sep 85
16. Targeting Pod		Mar 86
17. Production Decision	Feb 85/	
18. Navigation Pod	Mar 85 (CH-3)	Mar 85
19. Targeting Pod	May 86 (CH-3)	May 86
20. FCS F-15E Flight Test Complete	May 88/ NA	Mar 89(CH-1)
21. FCS A-10 Flight Test Complete	Sep 87/ NA	
22. First FCS Production Delivery	Aug 87/TBD	
23. Navigation Pod		Mar 87(CH-2)
24. Targeting Pod		Jul 88
25. IOC	TBD/	

(b)(1)

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9. Schedule (Cont'd):

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.

c. Current Change Explanations --

(CH-1) New date (Mar 89 vs Aug 88) now reflects completion of testing on F-15E aircraft by both contractor and Air Force.

(CH-2) Change made to reflect actual delivery of the Nav Pod one month early (Mar 87 vs Apr 87).

(CH-3) Reflects USD(A) baseleine approval.

d. References --

DEVELOPMENT ESTIMATE: Secretary of the Air Force Review, 18 Nov 82. Original PMD R-Q0023(1)/63249F, 21 Dec 79.

APPROVED PROGRAM ESTIMATE: Secretary of the Air Force, Review, 12 Dec 86. PMD R-P0023(13)/63249F/64249F/27249F, 14 Apr 86.

USD(A) Memo, 9 Feb 1988.

10. Technical/Operational Characteristics:

a. Technical --	DEV EST/ APPR PROG	DEM * PERF	CURR EST	
HUD				
Transmissivity (Percent)	70/65/ NA	70/65	70/65	
Display Contrast (Ratio)	1.20/ NA	1.38	1.38	
MTBF				
Mature Requirement				
A-10	250/ NA			(CH-1)
F-16	250/ NA		250	
Field Projections				
Interim Goal (End of DT&E/IOT&E)	31/ NA	40	40	
Mature Requirement (10,000 Hours)	125/ NA		125	
Weight (Lb)				
A-10	95/ NA	95		(CH-1)
F-16	82/ NA	80	80	

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

	DEV EST/ APPR PROG	DEM * PERF	CURR EST
FCS			
Maximum Total Weight (lbs)	985/990 (CH-4)	978	999(CH-2)
Maximum Total AC Power (kilovolt amperes)	10.8/10.8	14.8(CH-3)	14.8(CH-3)
MTBF			
FCS:			
Mature Requirement	50/ NA		50
Field Projection			
Interim Threshold (end DT&E/IOT&E)	9/ NA		9
Mature Requirement (10,000 hrs)	34/ NA		34
Navigation Pod:			
Lab Lower Test Limit-Mature Reqmt	73/ NA		73
Field Projection			
Interim Threshold (end DT&E/IOT&E)	13.2/ NA	11.2	11.2
Mature Requirement (10,000 hrs)	50/ NA		50
Targeting Pod:			
Lab Lower Test Limit-Mature Rqmt	159/ NA		159
Field Projection			
Interim Threshold (end DT&E/IOT&E)	28.5/ NA	40.1	40.1
Mature Threshold (10,000 hrs)	108/ NA		108
Terrain Following Altitude (ft manual)	200/200		200

* Average Values

b. Operational --

HUD			
Total Field of View (Degrees)			
Horizontal	25/25	30	30
Vertical	20/20	20	20
Instantaneous Field of View (Horizontal)	25/25	30	30
FCS			
Terrain Following Altitude (Ft Manual)	200/200	200	200
Automatic IR Maverick Handoffs per pass	1/1	2	2

c. Previous Change Explanations:

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 from 31 to 40 to reflect field projection. HUD weight revised from 82 to 80. HUD MTBF revised from 31 to 40 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. FCS Maximum Total Weight revised from 978 to 990 for additional weight allowed in specifications for F-15E integration. 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.

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

d. Current Change Explanations --

(CH-1) A-10 requirements deleted.

(CH-2) Weight changed from 990 to 999 as a result of minor redesign for compatability with F-15E flight environment.

(CH-3) Maximum power changed from 10.7 to 14.8 to provide additional power for the Environmental Control Unit to handle the F-15E flight environment.

(CH-4) Reflects USD(A) baseline approval.

e. References --

DEVELOPMENT ESTIMATE: Secretary of the Air Force Review, 18 Nov 82. Original PMD R-Q0023(1)/63249F, 21 Dec 79.

APPROVED PROGRAM ESTIMATE: Secretary of the Air Force Review, 12 Dec 86. PMD R-P0023(13)/63249F/64249F/27249F, 14 Apr 86. USD(A) Memo, 9 Feb 1988.

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	420.4	-16.5	403.9
Procurement	1681.7	+384.8	2066.5
Pod Sets	(1297.9)	(+311.8)	(1609.7)
Total Flyaway	(1297.9)	(+311.8)	(1609.7)
Other Weapon System Cost	(311.7)	(+61.5)	(373.2)
Initial Spares & Repair Parts	(72.1)	(+11.5)	(83.6)
Construction (MILCON)	--	--	--
Total FY80 Base-Year $	$2102.1	$+368.3	$2470.4
Escalation	1721.1	-68.8	1652.3
Development (RDT&E)	(128.5)	(-3.6)	(124.9)
Procurement	(1592.6)	(-65.2)	(1527.4)
Construction (MILCON)	--	--	--
Total Then-Year $	$3823.2	$+299.5	$4122.7
b. Quantities --			
Development (RDT&E)	12	—	12
Procurement	1316	+84	1400
Total	1328	+84	1412

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11. Program Acquisition Cost (Cont'd):

	Development Estimate	Changes	Current Estimate
c. Unit Cost --			
Procurement:			
FY80 Base-Year $	$1.278	$+.198	$1.476
Then-Year $	2.488	+.079	2.567
Program:			
FY80 Base-Year $	$1.583	+.167	$1.750
Then Year $	2.879	+.041	2.920

d. Approved Design to Cost Goal -- N/A.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

	CURRENT YEAR		BUDGET YEAR
	Current Estimate Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	4122.7	4108.6	4122.7
(2) Quantity	1412	1412	1412
(3) Unit Cost	2.920	2.910	2.920
b. Current Procurement --	(FY 1988)	(FY 1988)*	(FY 1989)
(1) Cost	801.9	801.9	724.7
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	801.9	801.9	724.7
(2) Quantity	250	250	471
(3) Unit Cost	3.208	3.208	1.539

* Adjusted to reflect the FY88 Appropriation Act in accordance with congressional change in the SAR law.

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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	-12.1	-340.3	--	-352.4
Quantity	--	+71.4	--	+71.4
Schedule	+28.5	+4.3	--	+32.8
Engineering	-67.7	+5.0	--	-62.7
Estimating	+14.2	+519.9	--	+534.1
Other	--	--	--	--
Support	+18.0	+44.2	--	+62.2
Subtotal	-19.1	+304.5	--	+285.4
Current Changes:				
Economic	-0.8	-6.4	--	-7.2
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	+35.7	--	+35.7
Estimating	-0.2	-99.5	--	-99.7
Other	--	--	--	--
Support	--	+85.3	--	+85.3
Subtotal	-1.0	+15.1	--	+14.1
Total Changes	-20.1	+319.6	--	+299.5
Current Estimate	528.8	3593.9	--	4122.7

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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	+3.0	--	-46.0
Estimating	+3.5	+306.7	--	+310.2
Other	--	--	--	--
Support	+9.3	+26.8	--	+36.1
Subtotal	-16.4	+371.9	--	+355.5
Current Changes:				--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	+17.1	--	+17.1
Estimating	-0.1	-50.4	--	-50.5
Other	--	--	--	--
Support	--	+46.2	--	+46.2
Subtotal	-0.1	+12.9	--	+12.8
Total Changes	-16.5	+384.8	--	+368.3
Current Estimate	403.9	2066.5	--	2470.4

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

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.
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.
Engineering:	Additional funds to initiate Eye Safe Laser.

MILCON - None.

c. Current Change Explanations

(1) RDT&E	BY 80	TY
Revised economic escalation indices (Economic)	N/A	-0.8
Adjustment for current and prior year escalation (Estimating)	+0.5	+0.8
FY87-88 Refinement of estimate (Estimating)	-0.6	-1.0

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13. Cost Variance Analysis (Cont'd):

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(2) Procurement	BY 80	TY
Revised economic escalation indices (Economic)	N/A	-6.4
Adjustment for current and prior year escalation (Estimating)	+4.9	+8.2
Adjustment for current and prior year escalation for Support Equipment (Support)	+1.4	+2.3
Adjustment for current and prior year escalation for Spares (Support)	+0.2	+0.3
Adjustment for FY89 and beyond escalation (Estimating)	-2.3	-4.2
Adjustment for FY89 and beyond escalation (Support)	-0.1	-0.2
Reestimate of Spares requirements (Support)	+4.8	+8.0
Follow-on effort to continue F-15E Compatibility/ Eye Safe Laser (Engineering)	+17.1	+35.7
Reestimate of PSE requirements (Support)	+39.9	+74.9
Reestimate of ECO requirements (Estimating)	-53.0	-103.5

d. References --

Development Estimate: President's FY84 Budget, Jan 83.

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

a. Initial SAR Estimate to Current Estimate --

PAUC Initial SAR Estimate	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.879	-.255	-.121	+.023	-.019	+.308	.000	+.105	+.041	2.920

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

a. RDT&E --

Pods:	Initial Contract Price Target	Ceiling	Qty
Martin-Marietta Corporation P.O. Box 5837 Orlando, FL 32855 Contract F33657-80-C-0441 Award: FFP, September 1980 (Fire Control System)	$94.0	N/A	12

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$426.4	N/A	12 Pods	$426.4	$426.4

b. Procurement --

Pods:	Initial Contract Price Target	Ceiling	Qty
Martin-Marietta Corporation P.O. Box 5837 Orlando, FL 32855 Contract F33657-84-C-0004 Award: FFP, April 1985 (Pod Prod & SE)	$ 87.3	N/A	2 Pods

Current Contract Price Target	Ceiling	Quantity	Estimated Price At Completion Contractor	Program Manager
$2006.1	N/A	411 Pods 22 SE	$2006.1	$2006.1

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

a. Program Status --

(1) Percent Program Completed: 76.9% (10 years/13 years)

(2) Percent Program Cost Appropriated: 64.1% ($2642.5/$4122.7)

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

Appn	Current & Prior Yrs (FY79-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Beyond FYDP (N/A)	Total
RDT&E	519.1	4.7	5.0	--	528.8
Procurement	2123.4	724.7	745.8	--	3593.9
MILCON	0.0	0.0	0.0	--	0.0
Total	2642.5	729.4	750.8	--	4122.7

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

c. Annual Summary -- *

Fiscal Year	Qty Nav/Tgt	FY80 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1979				11.2			10.6	8.4
1980				30.0			31.7	9.4
1981				35.4			41.4	11.9
1982				68.9			86.1	9.2
1983				76.4			99.8	4.9
1984				42.2			57.3	3.8
1985				69.8			97.7	3.4
1986				25.6			36.8	2.8
1987				25.6			37.9	2.7
1988				12.9			19.8	3.7
1989				2.9			4.7	3.8
1990				2.1			3.5	3.6
1991				.9			1.5	3.3
SUBTOTAL	6/6		**	403.9			528.8	

* NOTE: FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

** Total recurring for RDT&E - N/A

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

c. Annual Summary -- *

Fiscal Year	Qty Nav/Tgt	FY80 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement								
1981		.8		.8			1.0	11.9
1982		3.6		3.6			5.0	9.6
1983								
1984								
1985	2/0	31.5	24.5	57.4			90.0	3.4
1986	7/2	105.5	99.1	261.8			423.9	2.8
1987	143/7	113.8	230.7	477.7			801.6	2.7
1988	169/81	40.2	266.7	461.4			801.9	3.7
1989	240/231	8.2	315.7	403.5			724.7	3.8
1990	139/240	5.4	249.3	283.3			523.8	3.6
1991	0/139	2.2	112.5	117.0			222.0	3.3
SUBTOTAL	700/700	311.2	1298.5	2066.5			3593.9	
TOTAL	706/706	311.2	1298.5	2470.4			4122.7	

* NOTE: FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

Appropriation: MILCON — N/A

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

d. Obligations and Expenditures --

Appropriation: RDT&E

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated*	Expended*
1979	10.6	10.6	10.6
1980	31.7	31.7	31.7
1981	41.4	41.4	41.4
1982	86.1	86.1	86.1
1983	99.8	99.8	99.8
1984	57.3	57.3	57.1
1985	97.7	95.6	91.5
1986	36.8	36.1	33.7
1987	37.9	37.4	11.6
1988	19.8	6.3	.2
TO COMPLETE	9.7	N/A	N/A
TOTAL	528.8	502.3	463.7

* Reflect program office records as of 12 Feb 88.

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

d. Obligations and Expenditures --

Appropriation: Procurement

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated*	Expended*
1981	1.0	1.0	1.0
1982	5.0	5.0	5.0
1983	N/A	N/A	N/A
1984	N/A	N/A	N/A
1985	90.0	90.0	88.6
1986	423.9	423.4	248.2
1987	801.6	774.2	124.2
1988	801.9	728.1	0.0
TO COMPLETE	1470.5	N/A	N/A
TOTAL	3593.9	2021.7	467.0

* Reflect program office records as of 12 Feb 88.

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17. Production Rate Data: UNCLASSIFIED

a. Annual Production Rates (NAV/TGT) *

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum
1985	2/2	2/0	6/0	2/0
1986	14/14	7/2	7/6	7/2
1987	142/142	107/7	107/6	107/7
1988	376/376	203/81	203/81	203/81
1989	384/384	240/231	240/231	240/231
1990	522/522	238/240	238/240	238/240
1991	N/A	N/A /238	N/A /238	N/A /238

b. Cost Variance -- Dollars in Millions *

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
PAC (BY $)	2457.6	+12.8	2470.4	0	2470.4
(TY $)	4108.6	+14.1	4122.7	0	4122.7
PAUC(BY $)	1.741	+.009	1.750	0	1.750
(TY $)	2.910	+.010	2.920	0	2.920

* 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	16	14
88	10	12
89	12	12
90	7	12
91	0	7

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17. Production Rate (Cont'd):

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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	2/2	0/0

18. Operating and Support Costs -- N/A

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SAR-87-110

~~CONFIDENTIAL~~

AS OF DATE: 31 DECEMBER 1987

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

NH A-6E/A6 UPGRADE PROGRAM: A-6E/A-6 UPGRADE

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1. (U) DESIGNATION/NOMENCLATURE (POPULAR NAME):
A-6E/G LONG RANGE ALL-WEATHER (DAY/NIGHT) CARRIER ATTACK [redacted]
(INTRUDER)

2. (U) DOD COMPONENT: U.S. NAVY

(U) RESPONSIBLE OFFICE AND TELEPHONE NUMBER:
NAVAL AIR SYSTEMS COMMAND
WASHINGTON, DC 20361-1234
PROGRAM MANAGER: CAPT M.E. KEARNEY
ASSIGNED: 04 AUG 1987
TELEPHONE: (202) 692-8083

4. (U) PROGRAM ELEMENTS:
RDT&E: 0603257N, 0204134N, 0604708N
PROCUREMENT: 0204134N, 0206112M
APPN: 1506 ICN 011000
051001
MILCON: 0204696N

5. (U) RELATED PROGRAMS: EA-6, F-14, AV-8B, F/A-18 and E-2

6. (U) MISSION AND DESCRIPTION

(U) 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.

(U) 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. [redacted]dded capability, Target Recognition Attack Multisensor (TRAM),

[redacted]

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

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. Beginning in FY 1988 the A-6G will commence production. The A-6G will be an improved version of the A-6E which incorporates improvements in reliability, performance, and survivability through enhanced avionics, propulsion, and minor airframe changes. It will maintain or enhance all the capabilities of the A-6E, but incorporates 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. Limited production begins in FY 1988 with full production scheduled for FY 1990.

7. (U) PROGRAM HIGHLIGHTS:

a. (U) 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 incorporates improvements in reliability, performance, and survivability through improved avionics, propulsion, and airframe safety features. It retains or enhances all the operational capabilities of the A-6E, but incorporates 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. Based upon current projections, the A-6G is expected to fulfill all mission requirements.

(1) (U) 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 and A-6G 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 both FY 1985 and prior fiscal year aircraft procurement funding.

Delivery of prototype composite wings is scheduled to begin by April 1988 while production wings are scheduled for the April 1988 through the September 1992 timeframe.

b. (U) Significant Developments Since Last Report

(b)(1)

(2) (U) The A-6F program has been terminated and restructured as the A-6G.

(3) (U) A-6F "ECP-1" -- A block upgrade (ECP-1) to enhance the A-6F capabilities based on Libyan "lessons learned" was previously approved to provide the following additional operational capabilities: Night Attack Navigation Systems (NANS) to enhance passive night visual tactics; Integrated Defensive Avionics Program (IDAP) and upward firing chaff to improve electronic warfare and self protection; and Pilot's Target Designator Control and Forward Air Control - Target Data Communicator to increase crew interoperability and mission effectiveness. ECP-1 incorporation has subsequently been included in the A-6G statement of work and is planned as part of the A-6G remanufacture program.

c. (U) Changes since "As Of" Date: None

8. (U) DECISION COORDINATING PAPER (DCP) THRESHOLD BREACHES: None

9. (U) SCHEDULE:

a. (U) MILESTONES

	PRODUCTION ESTIMATE/ APPROVED PROGRAM	CURRENT ESTIMATE
(U) A-6E		
(U) Contract Executed (Prototype)	Aug 69/N/A	Aug 69
(U) First Flight (Prototype A/C)	Mar 70/N/A	Mar70
(U) NPE (begin/end)	Apr/May 71/ N/A	Apr/May 71
(U) First Production Contract Executed	Dec 70/N/A	Dec 70
(U) First Flight (Production A/C)	Jul 71/N/A	Jul 71
(U) Acceptance Flight Production A/C	Sep 71/N/A	Sep 71
(U) BIS (begin/end)	Sep 71/N/A Sep 71/N/A	Sep 71/Jan 72
(U) Fleet Introduction - LANT, CRAW	Dec 71/N/A	Dec 71
(U) Navy Support Date	Sep 71/N/A	Sep 71
(U) First Deployment	Sep 72/N/A	Sep 72
(U) A-6E TRAM		
(U) Development Contract	Jun 72/N/A	Jun 72
(U) Design Completion	May 73/N/A	May 73
(U) Pilot Production Deliveries (begin/end)	Apr 76/N/A	Apr 76
(U) IOT&E Completion	Jun 76/N/A	Jun 76
(U) Production Go-Ahead (Limited)	Jul 76/N/A	Jul 76
(U) Production Go-Ahead (Full)	Nov 79/N/A	Nov 79
(U) First Aircraft Delivery - Full TRAM	Sep 79/N/A	Sep 79
(U) IOC	Dec 79/N/A	Dec 79

1/ Three FY 1974 production aircraft.

MILESTONES (CONT'D)

		PRODUCTION ESTIMATE/ APPROVED PROGRAM	CURRENT ESTIMATE
A-6F			
(U)	Development Contract	Jul 84/.N/A	Jul 84
(U)	Limited Production	1988/NA	NA CH-1
(U)	Full Production	1990/NA	NA CH-1
(b)(1)			
A-6G			
(U)	Development Contract	NA/Sep 88	Sep 88 CH-1
(U)	Limited Production	NA/1988	1988 CH-1
(U)	Full Production	NA/1990	1990 CH-1
(b)(1)			

b. (U) Previous Change Explanation:
CH-1 The A-6F program has been restructured as the A-6G program because of fiscal constraints.

c. (U) Current Change Explanation: The A-6F program has been terminated and restructured as the A-6G program.

d. (U) References:
Production Estimate:

A-6E	OSD PBD of 1 Dec 1970	
A-6F	SECNAV memo of 6 Jul 1983	
A-6G Approved Program:	N/A	Amended FY 1988/89 President's Budget

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS:

a. (U) Technical/Operational

	PRODUCTION ESTIMATE/ APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE
A-6E			
Long Range Strike			
Store Delivery			
4-300 Gal Tanks			
+1 MK 43			

	PRODUCTION ESTIMATE/ APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE
Takeoff Weight lb.	53,863/ N/A	53,863	53,863
Length/Span	54'7"/53'0"/ N/A	54'7"/53'0"	54'7"/53'0"
Height/Height Folded	16'3"/21'11"/ N/A	16'3"/21'11"	16'3"/21'11"
Engine No./Type	2/J-52-P-8A/B/N/A	2/J-52-P-8A/B	2/J-52-P-8A/B
Crew	2/ N/A	2	2
Combat Speed/Alt	563 kts/SL/ N/A	563 kts/SL	563 kts/SL
Combat Ceiling	41,000'/ N/A	41,000'	41,000'
Rad/Mission Time	864 nm/ N/A	864 nm/4.82 hrs	864 nm/4.82 hrs
Spd Max @ SL Stores Retained	563 kts/ N/A	563 kts	563 kts
Mine Warfare			
4 MK 56 Mines			
+1-300 Gal Tank			
Takeoff Weight lb	54,759/ N/A	54,759	54,759
Length/Span	54'7"/53'0"/ N/A	54'7"/53'0"	54'7"/53'0"
Height/Height Folded	16'3"/21'11"/ N/A	16'3"/21'11"	16'3"/21'11"
Engine No./Type	2/J-52-P-8A/B/N/A	2/J-52-P-8A/B	2/J-52-P-8A/B
Crew	2/ N/A	2	2
Combat Speed/Alt	429 kts/15,000'/N/A	429 kts/15,000'	429 kts/15,000'
Combat Ceiling	26,000'/N/A	26,000'	26,000'
Rad/Mission Time	461 nm/3.1 hrs/N/A	461 nm/3.1 hrs	461 nm/3.1 hrs
Spd Max @ SL Stores Retained	407 kts/407 kts	407 kts	407 kts
Close Support			
28 MK-81 SNAKEYE BOMBS			
Takeoff Weight lb	52,520/N/A	52,520	52,520
Length/Span	54'7"/53'0"/N/A	54'7"/53'0"	54'7"/53'0"
Height/Height Folded	16'3"/21'11"/N/A	16'3"/21'11"	16'3"/21'11"
Engine No./Type	2/J-52-P-8A/B/N/A	2/J-52-P-8A/B	2/J-52-P-8A/B
Crew	2/N/A	2	2
Combat Speed/Alt	502 kts/5,000'/N/A	502 kts/5,000'	502 kts/5,000'
Combat Ceiling	37,500'/37,500'	37,500'	37,500'
Rad/Mission Time	383 nm/2.09 hrs/N/A	383 nm/2.09 hrs	383 nm/2.09 hrs
Spd Max @ SL Stores Retained	504 kts/N/A	504 kts	504 kts

	PRODUCTION ESTIMATE/ APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE
A-6F (CH-1)			
Long Range Strike 3-300 Gal Tanks 2 MK 84 LGDB 2 Sidewinders			
Takeoff Weight lb	58,260/NA	TBD	NA
Length/Span	54'7"/53'0"/NA	54'7"/53'0"	NA
Height/Height Folded	16'3"/21'11"/NA	16'3"/21'11"	NA
Engine No./Type	2/GE 404-400D/NA	2/GE 404-400D	NA
Crew	2/NA	2	NA
Combat Speed/Alt	563/SL/NA	TBD	NA
Combat Ceiling	38,740'/NA	TBD	NA
Mission Radius	610 nm/NA	TBD	NA
Spd Max @ SL Stores Retained	563 kts/NA	TBD	NA
Anti Ship Strike 1-300 Gal Tank 2 HARM 2 HARPOON 2 Sidewinders			
Takeoff Weight lb	53,899/NA	TBD	NA
Length/Span	54'7"/53'0"/NA	TBD	NA
Height/Height Folded	16'3"/21'11"/NA	TBD	NA
Engine No./Type	2/GE 404-400D/NA	2/GE 404-400D	NA
Crew	2/NA	2	NA
Combat Speed/Alt	563/SL/NA	TBD	NA
Combat Ceiling	36,750'/NA	TBD	NA
Mission Radius	655 nm/NA	TBD	NA
Spd Max @ SL Stores Retained	407 kts/NA	TBD	NA
Close Air Support (CAS) 22 MK 82 LGDB 2 Sidewinders			
Takeoff Weight lb	60,754/NA	TBD	NA
Length/Span	54'7"/53'0"/NA	TBD	NA
Height/Height Folded	16'3"/21'11"/NA	TBD	NA
Engine No./Type	2/GE 404-400D/NA	2/GE 404-400D	NA
Crew	2/NA	2	NA
Combat Speed/Alt	563/SL/NA	TBD	NA
Combat Ceiling	31,000'/NA	TBD	NA
Mission Radius	215 nm/NA	TBD	NA
Spd Max @ SL Stores Retained	504 kts/NA	TBD	NA

	PRODUCTION ESTIMATE/ APPROVED PROGRAM	DEMONSTRATED PERFORMANCE	CURRENT ESTIMATE
A-6G (CH-1)			
Long Range Strike 3-300 Gal Tanks 2 MK 84 LGB 2 Sidewinders			
Takeoff Weight lb	NA/58,305	TBD	58,305
Length/Span	NA/54'7"/53'0"	TBD	54'7"/53'0"
Height/Height Folded	NA/16'3"/21'11"	TBD	16'3"/21'11"
Engine No./Type	NA/2/PW J-52-P-408/408A	TBD	2/PW J-52-P-408/408A
Crew	NA/2	TBD	2
Combat Speed/Alt	NA/563/SL	TBD	563/SL
Combat Ceiling	NA/38,740'	TBD	38,740'
Mission Radius	NA/604 nm	TBD	604 nm
Spd Max @ SL Stores Retained	NA/555 kts	TBD	555 kts
Anti Ship Strike 1-300 Gal Tank 2 HARM 2 HARPOON 2 Sidewinders			
Takeoff Weight lb	NA/54,011	TBD	54,011
Length/Span	NA/54'7"/53'0"	TBD	54'7"/53'0"
Height/Height Folded	NA/16'3"/21'11"	TBD	16'3"/21'11"
Engine No./Type	NA/2/PW J52-P-408A	TBD	2/PW J52-P-408A
Crew	NA/2	TBD	2
Combat Speed/Alt	NA/563/SL	TBD	563/SL
Combat Ceiling	NA/36,750'	TBD	36,750'
Mission Radius	NA/653 nm	TBD	653 nm
Spd Max @ SL Stores Retained	NA/507 kts	TBD	507 kts
Close Air Support (CAS) 22 MK 82 LGDB 2 Sidewinders			
Takeoff Weight lb	NA/59,885	TBD	59,885
Length/Span	NA/54'7"/53'0"	TBD	54'7"/53'0"
Height/Height Folded	NA/16'3"/21'11"	TBD	16'3"/21'11"
Engine No./Type	NA/2/PW J52-P-408A	TBD	2/PW J52-P-408A
Crew	NA/2	TBD	2
Combat Speed/Alt	NA/563/SL	TBD	563/SL
Combat Ceiling	NA/31,000'	TBD	31,000'
Mission Radius	NA/240 nm	TBD	240 nm
Spd Max @ SL Stores Retained	NA/504 kts	TBD	504 kts

b. (U) Previous Changes Explanations - None.

c. (U) Change Explanations

(CH-1) The A-6F program has been terminated and restructured as the A-6G.

d. (U) References: Production Estimate:
OSDPBD of 1 December 1970
SECNAV Memo of 6 July 1983
Current Estimate: Amended FY1988/89 President's Budget

11. (U) PROGRAM ACQUISITION COST (Current Estimate in Millions of Dollars)

	PRODUCTION ESTIMATE	A-6 CHANGES	CURRENT ESTIMATE
a. (U) Cost --			
Development (RDT&E)	142.4	763.1	905.5
Procurement	2,957.3	4,852.9	7,810.2
Airframe	(1,205.0)	(2,325.6)	(3,530.6)
Engine	(208.0)	(318.5)	(526.5)
Avionics	(446.3)	(892.0)	(1,338.3)
Total Flyaway	(1,859.3)	(3,536.1)	(5,395.4)
Other Weapon System Cost	(838.7)	(1,084.4)	(1,923.1)
Initial Spares	(259.3)	(232.4)	(491.7)
Construction (MILCON)*	2.5	10.9	13.4
Total FY 1984 Base-Year $	3,102.2	5,626.9	8,729.1
Escalation	122.2	-386.7	-264.5
Development (RDT&E)	(6.6)	(+57.0)	(+63.6)
Procurement	(116.7)	(-447.0)	(-330.3)
Construction	(-1.1)	+ 3.3	+2.2
Total Then-Year $	3,224.4	5,240.2	8,464.6
b. (U) Quantities --			
Development (RDT&E)	0	(+5)*	(5)**
Procurement	173	+186	359
Total	173	+186	359

* Increased by $1.1M to reflect true base year dollars.
**Non Add; the Congressional Data Sheet does not include these five (5) R&D aircraft. These are test bed modified aircraft and not representative of fleet assets.

c. Unit Cost --			
Procurement:			
FY 1984 Base-Year $	17.094	+4.661	21.755
Then-Year $	17.769	+3.066	20.835
Program:			
FY 1984 Base-Year $	17.925	+6.39	24.315
Then-Year $	18.638	+4.940	23.578

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

e. (U) Foreign Military Sales -- N/A

f. (U) Nuclear Costs -- N/A

12. (U) PROGRAM ACQUISITION/CURRENT PROCUREMENT UNIT COST SUMMARY:
(Current (Then-Year) Dollars in Millions)

		CURRENT YEAR		BUDGET YEAR
		SAR CURRENT ESTIMATE	UCR BASELINE ESTIMATE	UCR BASELINE ESTIMATE
a. (U)	Program Acquisition --	(DEC 87 SAR)	(DEC 1986)	(DEC 1987)
(1)	Cost	8,464.6	10,659.4	8,464.6
(2)	Quantity	359	345	359
(3)	Unit Cost	23.578	30.897	23.578

		CURRENT YEAR		BUDGET YEAR
		SAR CURRENT ESTIMATE	UCR BASELINE ESTIMATE	UCR BASELINE ESTIMATE
		FY 1988 Appropriations Act		
b. (U)	Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1)	Cost	459.0	459.0	6.4
	Less CY ADV Proc.	-20.0	-20.0	0
	Plus PY ADV Proc.	+76.0	+76.0	0
	Net Total	515.0	515.0	6.4
(2)	Quantity	10	10	0
(3)	Unit Cost	51.5	51.5	0

13. (U) COST VARIANCE ANALYSIS:

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

	RDT&E	PROC	MILCON	TOTAL
PRODUCTION ESTIMATE	149.0	3,074.0	1.4	3,224.4
PREVIOUS CHANGES:				
ECONOMIC	-16.0	-1,176.1	+2.3	-1,192.1
QUANTITY	-	+3,056.3	-	+3,056.3
SCHEDULE	-	-	-	-
ENGINEERING	+741.7	+255.9	-	+997.6
ESTIMATING		+2,222.4	~~14.7~~ 17.0	+2,239.4
OTHER	-	-	-	-
SUPPORT	-	+2,333.8	-	+2,333.8
SUBTOTAL	+725.7	+6,692.3	+17.0	+7,435.0
CURRENT CHANGES:				
ECONOMIC	+1.1	+1,334.9	- .5	+1,335.5
QUANTITY	-	+370.5	-	+370.5
SCHEDULE	-	-	-	-
ENGINEERING	+93.2	-255.9	-	-162.7
ESTIMATING		-2,823.7	-2.3	-2,826.0
OTHER	-	-	-	-
SUPPORT	-	-912.1	-	-912.1
SUBTOTAL	+94.3	-2,286.3	-2.8	-2,194.8
TOTAL CHANGES	820.0	4,406.0	14.2	5,240.2
CURRENT ESTIMATES	969.0	7,480.0	15.6	8,464.6

13. (U) COST VARIANCE ANALYSIS (CONT'D):

(FY 84 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
PRODUCTION ESTIMATE	142.4	2,957.3	2.5*	3,102.2
PREVIOUS CHANGES:				
ECONOMIC	-	-	-	-
QUANTITY	-	+2,940.1	-	+2,940.1
SCHEDULE	-	-	-	-
ENGINEERING	+681.1	+191.4	-	+872.5
ESTIMATING		+2,204.4	+14.9	+2,219.3
OTHER	-	-	-	-
SUPPORT	-	+1,441.7	-	+1,441.7
SUBTOTAL	+681.1	+6,777.6	+14.9	+7,473.6
CURRENT CHANGES:				
ECONOMIC	-	-	-	-
QUANTITY	-	+178.6	-	+178.6
SCHEDULE	-	-	-	-
ENGINEERING	+82.0	-191.4	-	-109.4
ESTIMATING		-1,860.7	-4.0	-1,864.7
OTHER	-	-	-	-
SUPPORT	-	-51.2	-	-51.2
SUBTOTAL	+82.0	-1,924.7	-4.0	-1,846.7
TOTAL CHANGES	+763.1	4,852.9	10.9	5,626.9
CURRENT ESTIMATES	905.5	7,810.2	13.4	8,729.1

* Increased by $1.1M to reflect true base year dollars.

b. (U) 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 (See Para 7 Program Highlights).

Estimating: Refinement of estimates based upon approval of A-6F aircraft.

Procurement

Economic: Revised escalation indices. Reflects correction of previous economic computation.

Quantity: 22 additional A-6E and 150 A-6F aircraft approved for production.

Engineering: Addition of ECP-1 (See Para 7 Program Highlights).

Estimating: Refinement of estimates based upon approval of A-6F aircraft. Reflects correction of "Economic" (above).

Support: Primarily due to additional support added for new production aircraft (A-6F). Also includes refinement of A-6E support requirements. Reassessment of spares requirement.

Milcon: Refinement of estimates based upon approval of A-6F aircraft and addition of trainer facilities at NAS Whidbey Island, NAS Oceana and for the Marine Corps.

c. (U) Current Change Explanation

		BASE YEAR	THEN YEAR
RDT&E		+82.0	+94.4
Economic:	Revised economic indices	--	(+1.1)
Engineering:	Restructure of A-6F program to A-6G.	(+82.0)	(+93.2)
Procurement		-1,924.7	-2,286.3
Economic:		-0-	+1,334.9
	Deletes A-6F from FY-88/FY-93		(365.3)
	Economic delta prior to FY-88		(0.2)
	Correction of prior SARs		(969.4)
Quantity:		+177.7	+370.5
	Delete A-6F FY-88/FY-93 (150 acft)		(-2,551.6)
	Add A-6G for FY-88/ FY-96 (164 aircraft)		(2,922.1)
Engineering:	Delete A-6F FY-88/FY-93	-191.4	-255.9
Estimating:	Delete A-6F FY-88/FY-93 (150 a/c)	-1,849.3	-2,823.7
	Corrections of prior SARS		
	Prior estimate		(-2,222.4)
	Correction of FY84 SAR offset to Econ		(-723.8)
	Offset to economic		(173.9)
	Total adjustment prior		(-2,772.3)
	Less estimate for FY-86/FY-87		(-51.4)
Support:		-61.7	-912.1
	Delete A-6F FY-88/FY-93		(-1,154.5)
	Add A-6G for FY-88/FY-96		(1,007.7)
	Support changes prior to FY-88		(35.3)
	Correct prior SARs		(-800.6)
Milcon	Deletion of a trainer facility at NAS Whidbey IS, NAS Oceana, and funding for planned MARCORPS training facility. (ESTIMATING)	-4.0	-2.8

d. (U) References -- Production Estimate: Amended FY 1988/89 President's Budget.

14. (U) PROGRAM ACQUISITION UNIT COST (PAUC) HISTORY: (Millions of then-year dollars)

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

PAUC (INITIAL) SAR EST)	ECON	QTY	SCH	ENG	EST	SPT	OTHER	TOTAL	PAUC (CURRENT EST)
18.638	+.399	-.111	-	+2.326	-1.634	+3.960	-	+4.940	23.578

15. (U) CONTRACT INFORMATION: (Then-Year Dollars in Millions)

a. (U) RDT&E

A-6F Full Scale Development
Grumman Aerospace, Bethpage, NY
N00019-84-C-0098 (NTE/FFP)
Award: 31 July 1984

Initial Contract Price

Target	Ceiling	Qty
397.8	N/A	5

Current Contract Price

Target	Ceiling	Qty
497.8	N/A	5

Estimated Price at Completion

Contractor	Program Manager
497.8	497.8 (in 1989)

Explanation of Change: $100M was added to this contract for ECP-1. This is a not-to-exceed firm fixed price incrementally funded through FY-1989 R&D contract.

Previous Cumulative Variance -- N/A
Cumulative Variance to Date -- N/A

b. (U) Procurement

Airframe (FY 1986)
Grumman Aerospace, Bethpage, NY
N00019-84-C-0334 (FFP)
Award: 30 April 1985

Initial Contract Price

Target	Ceiling	Qty
142.8	N/A	11

Current Contract Price

Target	Ceiling	Qty
142.8	N/A	11

Estimated Price at Completion

Contractor	Program Manager
142.8	142.8

Previous Cumulative Variance -- N/A
Cumulative Variance to Date -- N/A

Airframe (FY 1987)
Grumman Aerospace, Bethpage, NY
N00019-85-C-0475 (FFP)
Award: June 1986

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
143.7	143.7

Previous Cumulative Variance -- N/A
Cumulative Variance to Date -- N/A

Common Wing
Boeing Military Airpane Company
Wichita, KS
N00019-85-C-0311 (FFP)
Award: 29 July 1985

Initial Contract Price

Target	Ceiling	Qty
1,221.6	N/A	Variable

Current Contract Price

Target	Ceiling	Qty
1,221.6	N/A	Variable

Estimated Price at Completion

Contractor	Program Manager
Unknown	1,031.1

Previous Cumulative Variance -- N/A
Cumulative Variance to Date -- N/A

Explanation of change: Reduction in wing quantity driven by merger of A-6G and SWIP programs, pursuant to OPNAV operational requirements. Current estimated price falls below FFP quantity base and is subject to renegotiations.

TRAM
Hughes Aircraft, Culver City, CA
N00019-84-C-0047 (FFP/MYP)
Award: February 1984

Initial Contract Price

Target	Ceiling	Qty
336.0	N/A	134

Current Contract Price

Target	Ceiling	Qty
336.0	N/A	134

Estimated Price at Completion

Contractor	Program Manager
336.0	134.0

Previous Cumulative Variance -- N/A
Cumulative Variance to Date -- N/A

16. (U) PROGRAM FUNDING SUMMARY: (Current Estimate in Millions of Dollars)

a. (U) Program Status
(1) Percent Program Completed: 67.9% (19 yrs/28 yrs)
(2) Percent Program Cost Appropriated: 55.5% ($4,697.9/$8,464.6)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY69-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93-FY96)	Total
RDT&E	796.7	1.4	170.9	2,010.7	969.0
Procurement	3,895.4	6.4	1,567.5		7,480.0
MILCON	5.8	4.2	5.6		15.6
Total	4,697.9	12.0	1,744.0	2,010.7	8,464.6

c. (U) Annual Summary --

Appropriation: APN/Procurement

Fiscal Year	Qty	FY84 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Flyaway Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
FY69	0	0.0	0.0	14.6	5.3		5.3	3.2%
FY70	12	0.0	163.4	227.4	2.2	5.3	82.8	3.9%
FY71	12	0.0	184.9	333.5	3.3	2.2	126.6	4.6%
FY72	12	0.0	167.8	262.9	3.5	3.3	104.7	3.8%
FY73	21	0.0	232.1	360.1	1.6	3.5	157.8	4.2%
FY74	13	0.0	183.9	293.3	3.4	1.6	134.9	5.8%
FY75	12	0.0	165.2	278.0	5.4	3.4	135.0	8.8%
FY76	11	14.7	193.5	324.4	12.4	5.4	168.9	6.6%
FY77	6	0.0	114.9	146.6	9.6	12.4	84.9	3.8%
FY78	12	0.0	192.5	284.7	20.3	9.6	181.1	6.8%
FY79	12	1.2	202.5	232.5	0.0	20.3	163.5	8.7%
FY80	6	0.0	127.5	195.8	0.0	0.0	153.6	11.8%
FY81	12	0.0	214.0	298.7	10.9	0.0	261.8	11.6%
FY82	12	2.5	221.9	288.5	6.8	10.9	274.1	14.3%
FY83	8	0.0	144.1	214.1	7.6	6.8	216.4	9.0%
FY84	6	22.8	18.9	225.4	10.1	7.6	237.1	8.0%
FY85	6	20.3	107.3	271.5	63.1	10.1	296.6	3.4%
FY86	11	14.8	164.7	260.5	23.5	8.1	292.8	2.8%
FY87	11	47.1	207.3	305.1	76.0	78.5	358.5	2.7%
FY88	* 10	102.3	135.0	381.4	20.0	76.0	459.0	3.7%
FY89	0	0.0	0.0	5.1	0.0	0.0	6.4	3.8%
FY90	* 15	28.1	187.4	362.6	90.0	20.0	465.9	3.6%
FY91	* 24	25.0	287.6	430.3	90.0	90.0	566.7	3.3%
FY92	* 24	22.4	279.7	396.8	90.0	90.0	534.9	2.8%
TO COMPLETE	91	74.3	1,024.1	1,416.4	228.8	318.8	2,010.7	2.3%
TOTAL	359	375.5	4,920.2	7,810.2	783.8	783.8	7,480.0	

*Remanufactured aircraft

16. (U) PROGRAM FUNDING SUMMARY (Cont'd): (Current Estimate in Millions of Dollars)

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

Appropriation: RDT&E

Fiscal Year	Qty	FY84 Base-Year Dollars Flyaway Nonrec	Rec	Total	Then-Year Dollars Advance Proc Debit	Credit	Total	Escl Rate (%)
1972				5.5			2.4	4.6
1973				12.0			5.6	4.4
1974				22.7			11.5	8.0
1975				21.8			12.0	10.9
1976				10.5			6.1	6.6
1977				3.0			1.9	2.6
1978				4.3			2.9	6.8
1979				9.9			7.3	8.4
1980				3.8			3.1	10.6
1981				-			-	10.6
1982				-			-	7.6
1983				8.3			8.2	4.9
1984				22.3			22.7	3.8
1985				50.0			52.4	3.4
1986				236.5			255.3	2.8
1987				170.4			189.7	2.7
1988				186.6			215.5	3.7
1989				1.2			1.4	3.8
1990				95.4			118.2	3.6
1991				39.2			50.1	3.3
1992				2.1			2.7	2.8
TOTAL				905.5			969.0	

Appropriation: MILCON

Fiscal Year	Qty	FY84 Base-Year Dollars Flyaway Nonrec	Rec	Total	Then-Year Dollars Advance Proc Debit	Credit	Total	Escl Rate (%)
1975				1.8			.5	16.1
1978				.5			.4	7.7
1979				.7			.5	9.3
1988				3.7			4.4	3.7
1989				3.4			4.2	3.8
1990				2.9			3.7	3.6
1992				1.4			1.9	2.8
Total				13.4			15.6	

d. (U) Obligations and Expenditures --

Appropriation: APN/Procurement

Then-Year Dollars (Current Estimate in Millions)

Fiscal Year	Total	Obligated	Expended
1969	5.3	5.3	5.3
1970	82.8	82.8	82.6
1971	126.6	126.7	126.7
1972	104.7	104.8	105.3
1973	157.8	157.9	155.4
1974	134.9	134.9	134.5
1975	135.0	135.0	134.3
1976	168.9	168.9	165.0
1977	84.9	84.9	84.9
1978	181.1	181.1	181.9
1979	163.5	163.5	165.3
1980	153.6	153.6	152.3
1981	261.8	261.8	257.4
1982	274.1	273.9	265.5
1983	216.4	216.3	212.6
1984	237.1	236.9	228.8
1985	296.6	295.4	236.7
1986	292.8	278.8	165.9
1987	358.5	326.3	123.9
1988	459.0	0	0
To Complete	3,584.6	N/A	N/A
Total	7,480.0	3,388.8	2,984.3

d. (U) Obligations and Expenditures (Cont'd)

Appropriation: RDT&E

Then-Year Dollars (Current Estimate in Millions)

Fiscal Year	Total	Obligated	Expended
1972	2.4	2.4	2.4
1973	5.6	5.6	5.6
1974	11.5	11.5	11.5
1975	12.0	12.0	12.0
1976	6.1	6.1	6.1
1977	1.9	1.9	1.9
1978	2.9	2.9	2.9
1979	7.3	7.3	7.3
1980	3.1	3.1	3.1
1981	-	-	-
1982	-	-	-
1983	8.2	8.2	8.0
1984	22.8	22.8	22.0
1985	89.8	89.8	81.5
1986	255.3	254.7	234.6
1987	189.7	170.9	126.4
1988	215.5	17.1	0
To Complete	172.5	N/A	N/A
Total	1,006.6	616.3	525.3

Appropriation: MILCON

Then-Year Dollars (Current Estimate in Millions)

Fiscal Year			
1975	.5	.5	.5
1978	.4	.4	.4
1979	.5	.5	.5
1988	4.4	0	0
To Complete	9.8	N/A	N/A
Total	15.6	1.4	1.4

17. (U) PRODUCTION RATE DATA:

a. (U) Annual Production Rates --

Production Rates (Quantity/Year)

Fiscal Year	Development Est	Production Est	Current Est	Maximum Economic
1984	-	6	6	72
1985	-	6	6	72
1986	-	0	11	72
1987	-	0	11	72
1988	-	0	1	72
1989	-	0	9	72
1990	-	0	15	72
1991	-	0	24	72
1992	-	0	24	72
To Complete	-	0	91	72

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 $)	3,101.1	5,628.0	8,729.1	-	8,729.1
	(TY $)	3,224.4	5,240.2	8,464.6	-	8,464.6
PAUC	(BY $)	17.925	6.390	24.315	-	24.315
	(TY $)	18.638	4.940	23.578	-	23.578

c. (U) Schedule Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max	Maximum
Start Date	Aug 72	N/A	Aug 72	N/A	Aug 72
Duration	180	132	312	1	313
End Date	Aug 87	N/A	Aug 98	N/A	Sep 98

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

	To Date
RDT&E	2/2
Procurement	176/176

18 (U) OPERATING AND SUPPORT (O&S) COSTS:

Not Applicable

87-021

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)
PROGRAM: Army Data Distribution System (ADDS)

A-1 ADDS

AS OF DATE: December 31, 1987

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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 OTTO J. GUENTHER
Assigned: December 15, 1987
AUTOVON: 992-4251
Commercial: (201) 532-4251

4. Program Elements/Procurement Line Items:

RDT&E: 63713A Project D370

Procurement: APPN 2035 - BU1400, T03200 (shared), T06200, T06300, T06400, T01600 (shared), BA960A (shared), BA970A (shared), BL5264 (shared)

MILCON: N/A

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FOR OPEN PUBLICATION
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AS AMENDED

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OASD(PA) DFOISR 88-T-0734

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's 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 ($ASD-C^3I$) 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 - Work on the JTIDS Class 2M development has been rebaselined to reflect support of the FAADC^{2}I program schedule. Deliveries of JTIDS Class 2M Engineering Development Model terminals will begin in Feb 88 rather than Sep 87 in order to meet the FAADC^{2}I testing and system integration milestones. On 8 Oct 87, The President of the Ground Systems Group, Hughes Aircraft Company (HAC), gave a comprehensive status briefing to the CG CECOM on the risk associated with the proposed award of an EPLRS Initial Production Contract. HAC presented a plan that would minimize the risk exposure of the government. The PEO/PM reviewed and approved the plan in coordination with the CG, CECOM. As of the end of December, approximately 13,900 hours of engineering reliability assessment time was completed and preparations are being made to start the EPUU Reliability Demonstration on 15 Jan 88. The Reliability Demonstration for the NCS-E was started in November and successfully completed in January 88. Contractor Technical Testing (Prototype Qualification Testing, Contractor (PQT-C)) was started in Jun 87 and is expected to be completed in March 1988. The Government portion of Technical Test (TT) will begin June 88. Program funding and quantities reflect the FY88-89 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions. The ADDS system is expected to satisfy the mission requirement.

c. Changes Since "As Of" Date - Negotiations for long lead software tasks to support the EPLRS P^{3}I culminated an award on 29 Feb 88. As of 4 Mar 88, 205 of 211 Enhanced PLRS User Units (EPUU) have been manufactured. Contractor is on schedule to deliver the balance of the 211 by 31 March 88 which will satisfy the requirements for technical testing in June 88. As of 23 Jan 88, the NCS-E reliability demonstration was successfully completed. The EPUU Reliability Demonstration started on 18 Jan 88 and is scheduled to run 3900 test hours to completion in Mar 88. The EPLRS Test & Evaluation Master Plan (TEMP) was approved by DA on 21 Jan 88.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP or SDDM (dated August 8, 1979) threshold breaches.

9. Schedule:

a. Milestones	Planning Estimate/ Approved Program	Current Estimate
PLRS		
PLRS/PJH ASARC	Sep 82/Sep 82	Sep 82
PLRS Production Contract Award	Jul 83/Jul 83	Jul 83
PLRS First Unit Equipped (FUE)	Sep 87/Sep 87	Sep 87
PLRS FOT&E Start	Feb 88/Feb 88	Feb 88
PLRS FOT&E End	Mar 88/Mar 88	Mar 88

9. Schedule (Cont'd):

	Planning Estimate/ Approved Program	Current Estimate
ADDS 1/		
Phase 1 Contract Completed	Dec 80/Aug 81	Aug 81
Phase 2 Contract Completed	Feb 82/Jul 82	Jul 82
Phase 3/4 Contract Completed	Dec 86/Feb 87	Feb 87
Phase 5 Contract Award	Sep 84/Apr 85	Apr 85
ROC Approval	Jul 84/Sep 86	Sep 86
O&O Plan Approval	Jul 84/Oct 86	Oct 86
DA Information Brief	Feb 86/Apr 87	Apr 87
Pre-Planned Product Improvement Initial Prod Contract	Sep 86/Feb 88-Aug 90	Feb 88-Aug 90 (Ch-1)
DT Start - End (TT)	Aug 87/Jun 88-Aug 88	Jun 88-Aug 88 (Ch-1)
OT Start - End (IOT&E)	Aug 87/Jan 89-Apr 89	Jan 89-Apr 89 (Ch-1)
Briefing to ASARC Principals	Sep 87/Apr 88	Apr 88 (Ch-2)
Type Class Approved (STD)	Sep 87/Jun 89	Jun 89 (Ch-3)
Full Scale Prod Award	Jul 88/Mar 90	Mar 90 (Ch-4)
First Unit Equipped (FUE)	Sep 88/Jun 91	Jun 91

1/ Definition of Phases:

Phase 1 - System definition and concept evaluation was completed in 1981.

Phase 2 - Verifies the interoperability of PLRS and JTIDS. Completed in 1982.

Phase 3/4 - Establishes an interface capability and the design of the Net Control Station (NCS), Enhanced PLRS User Unit (EPUU), EPUU Interface Unit. Provides a mini prototype system for contract or Engineering Development Tests. Completed in 1987.

Phase 5 - Completes the engineering development for developmental/operational testing.

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 has slipped from August 87 to February 88 due to a slip announced by Hughes Aircraft Company in the execution of the development contract. Revised award date is keyed to successful completion of Prototype Qualification Testing, Contractor (PQT-C). All other dates were revised due to this slip also. PLRS Milestones added as requested by OSD Memo, dated 4 August 87.

c. Current Change Explanations --

(Ch-1) The addition of key milestones start and completion dates are shown IAW DODI 7000.3 guidance.

(Ch-2) MDR IIIB has changed to a Briefing to ASARC Principals scheduled for Apr 88.

(Ch-3) Type Classification (LP) is no longer required and thereby is deleted. Only Standard Type Classification is required.

(Ch-4) Full Scale Production Award changed from Jun 89 to Mar 90 due to slips in EPLRS development and restructuring of TT/IOT&E test dates.

d. References:

Planning Estimate: SDDM, dated 8 Aug 79

Approved Program: FY89 President's Amended Budget

10. Technical/Operational Characteristics: 1/

a. Technical	Plan Estimate/ Approved Program	Demo Perf	Current Estimate
Size (Length x Width x Height)			
NCS-E (S-280C)	12'x7.3'x7'/12'x7.3'x7'		12'x7.3'x7'
Downsized NCS-E (S-250C)	7'x6.5'x6'/7'x6.5'x6'		7'x6.5'x6'
EPUU	10.1x10.7"x4"/14.7"x10.2"x5.1"		14.7"x10.2"x5.1"
JTIDS Class 2M Terminal	/20.5"x15"x7.8"		20.5"x15"x7.8"
Weight (lbs) - Upper Limit			
NCS-E (S-280C)	6200/6300		6300
Downsized NCS-E (S-250C)	2300/2300		2300
EPUU/Manpack	17/28		28
JTIDS Class 2M Terminal	/88		88
Power Requirements (NCS-E)			
Voltage (AC)	115-208/115-208		115-208 (Ch-1)
Frequency (HZ)	50-60/50-60		50-60 (Ch-1)
Power Requirements (EPUU)			
Voltage (DC)	20-28/20-28		20-28
Power Requirements (JTIDS)			
Voltage (DC)	22-28/22-28		22-28 (Ch-2)
Frequency Band (MHZ)			(Ch-3)
NCS-E	420-450/420-450		420-450
EPUU	420-450/420-450		420-450
JTIDS Class 2M	960-1215/960-1215		960-1215
b. Operational			
MTBF (Hrs)			
NCS-E	100/100		100
EPUU	500/500		500
Class 2M Terminal	120/450		450

1/ The Department of the Army made a decision not to procure any additional JTIDS Class 2 terminals. (Source: Msg, SARD-SMC, 072145Z May 87, Subj: Army Procurement of JTIDS Class 2 Terminals.)

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

	Plan Estimate/ Approved Program	Demo Perf	Current Est
MTTR (Min)			
NCS-E	30/30		30 (Ch-1)
EPUU	30/30		30 (Ch-1)
Class 2M Terminal	30/30		30
Time Slots/Sec			
EPUU	512/512		512
Class 2M Terminal	128/128		128
Bits/Slot			
EPUU	75/75		75
Class 2M Terminal	225/225		225
Data Rate (KBS)			
EPUU	1.2/1.2		1.2
Class 2M Terminal	238/238		238
Channels			
EPUU	8/8		8
Class 2M Terminal	128/128		128

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.

d. Current Change Explanations -

(Ch-1) Changed to reflect consistency with performance characteristics in the NCS-E System Segment Specification and the ADDS ROC.

(Ch-2) JTIDS Class 2M Voltage is DC versus AC. Phase applies to the JTIDS Class 2 terminal versus the Class 2M.

(Ch-3) Frequency requirements are grouped separately to more accurately reflect technical characteristics.

e. References --
Planning Estimate: SDDM, dated 8 August 1979.
Approved Program: ADDS ROC, dated 8 Sep 86.

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

	Planning Estimate	Changes	Current Estimate
a. Cost --			
Development(RDT&E) 1/	$175.3	+56.6	231.9
Procurement	1806.2	+432.2	2238.4
NCS	(229.7)	+83.1	(312.8)
Other Components	(1270.6)	+314.4	(1585.0)
Total Flyaway	(1500.3)	+397.5	(1897.8)
Other Wpn Sys Cost	(121.3)	-65.5	(55.8)
Initial Spares	(184.6)	+100.2	(284.8)
Construction(MILCON)	-	-	-
Total: Constant FY 1983 $	1981.5	+488.8	2470.3
Escalation	1056.7	-124.1	932.6
Development(RDT&E)	(13.7)	+11.0	(24.7)
Procurement	(1043.0)	-135.1	(907.9)
Construction	-	-	-
Total Program Cost (Then-Year)	3038.2	+364.7	3402.9
b. Quantities --			
Development(RDT&E)	3	-	3
Procurement	85	+52	137
Total	88	+52	140
c. Unit Cost --			
Procurement: 2/			
Constant FY 1983 $	21.2	-4.9	16.3
Current (Then-Year) $	33.5	-10.5	23.0
Program:			
Constant FY 1983 $	22.5	-4.9	17.6
Current (Then-Year) $	34.5	-10.2	24.3

d. Approved Design to Cost Goal --

(Average Unit Flyaway Cost)

Planning Estimate/ Approved Program	Current Estimate	Latest Approved Threshold
NA	NA	NA

e. Foreign Military Sales - - None

f. Nuclear Costs - - None

1/ R&D Planning Estimate was adjusted in Dec 84 SAR to reflect true FY83 base year dollars.

2/ Initial SAR did not show procurement unit cost for ADDS Representative Network.

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

	Current Year		Budget Year
	SAR Current Estimate	UCR Baseline Estimate	UCR Baseline Estimate
a. Program Acquisition --	(Dec 87 SAR)	(Dec 86 SAR)	(Dec 87 SAR)
(1) Cost	3402.9	3615.3	3402.9
(2) Quantity 1/	140	146	140
(3) Unit Cost 2/	24.3	24.8	24.3

b. Current Procurement: NA due to year to year changes in the mix of hardware components being purchased under this program.

1/ The quantity changed from 146 to 140 due to the change to the Revised O & O Plan for PJH, dated 16 Oct 86.

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.

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	-7.0	-408.6	-	-415.6
Quantity	-	+918.2	-	+918.2
Schedule	-	-	-	-
Engineering	+81.1	-339.2	-	-258.1
Estimating	-7.6	+340.2	-	+332.6
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+66.5	+510.6	-	+577.1
Current Changes:				
Economic	+1.1	+23.9	-	+25.0
Quantity	-	-202.1	-	-202.1
Schedule	-	-	-	-
Engineering	-	-179.3	-	-179.3
Estimating	-	+144.0	-	+144.0
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+1.1	-213.5	0	-212.4
Total Changes	+67.6	+297.1	-	+364.7
Current Estimate	256.6	3146.3	-	3402.9

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	-	+631.0	-	+631.0
Schedule	-	-	-	-
Engineering	+64.7	-244.9	-	-180.2
Estimating	-8.6	+220.7	-	+212.1
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+56.1	+606.8	-	+662.9
Current Changes:				
Quantity	-	-148.4	-	-148.4
Schedule	-	-	-	-
Engineering	-	-131.8	-	-131.8
Estimating	+.5	+105.6	-	+106.1
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+.5	-174.6	-	-174.1
Total Changes	+56.6	+432.2	-	+488.8
Current Estimate	231.9	2238.4	-	2470.3

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)

Estimating: Additional funds for Phase 5 contract award.

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.

Quantity: Change in NCS quantity from 4 per Division to 5 and from 6 per Corp to 8. Change in EPUU quantity from 24,875 in the previous SAR to 22,103 due to ROC changes. Increase in quantities to meet Army's decision for additional ADDS requirements. Adding Dedicated JTIDS Relay Unit (DJRU) and NCS-J.

Engineering: Change to NCS downsizing and to JTIDS Class 2M.

MILCON: NA

c. Current Change Explanations --

(1) RDT&E	(Dollars in Millions) Base-Year $	Then-Year $
Revised Feb 88 economic escalation indices. (Economic)	NA	+1.1
(2) Procurement		
Revised Feb 88 economic escalation indices (Economic)	NA	+23.9
Reduction in NCS QTY's from 146 to 140 Requirement adjusted as a result of revised O&O plan from TRADOC (Quantity)	-14.8	-20.2
Reduction in EPUU's QTY's from 24,875 to 22,103 Requirement adjusted as a result of revised O&O Plan from TRADOC (Quantity)	-110.1	-149.8
Reduction in other components QTY's. (Quantity)	-23.5	-32.1

	(Dollars in Millions) Base-Year $	Then-Year $
Army eliminated requirement for JTIDS Class 2 terminal. All Army requirements will be met with JTIDS Class 2M terminal (Engineering)	-10.9	-14.9
Army eliminated requirement for PLRS Steerable Null Antenna Processor (PSNAP). (Engineering)	-31.0	-42.1
JTIDS terminal and PSNAP were removed from NCS. (Engineering)	-89.9	-122.3
Change in acquisition strategy of EPUU's from two sources to single source (Estimating)	-82.9	-112.8
Increase in Initial Spares cost due to increase in operating tempo from 300 Hrs to 1300 Hrs for EPUU's (Estimating)	189.0	256.8
(3) MILCON	NA	NA

d. References -- SDDM, dated 8 Aug 79.

14. Program Acquisition Unit Cost (PAUC) History:

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	
34.525	-2.790	-7.709	-	-3.124	+3.404	-	-	-10.219	24.306

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

a. RDT&E

EPLRS System:
Hughes Aircraft Co.
Ground Systems Group
Fullerton, CA
DAAB07-82-C-J096, CPFF
Award: March 31, 1982
Definitized: March 31, 1982

Initial Contract Price		
Target	Ceiling	Qty
$36.6	NA	3

Current Contract Price		
Target	Ceiling	Qty
$135.7	NA	3

Estimated Price At Completion

Contractor Project Manager

(b)(1)

15. Contract Information (Cont'd):

	Cost Variance	Schedule Variance
Previous Cumulative Variances	- 9.0	-6.4
Cumulative Variances To Date	-10.1	-5.4
Net Change	-1.1	1.0

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; delays in delivery of Phase 5 hardware 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 modifications. System integration and PQT-C continued to make progress but experienced delays due to resolution of system problem reports and non-availability of the TACFIRE Host Interface Unit for environmental testing. The remainder of the variance is due to the Secure Data Unit (SDU) Development and Prototype Development tasks. The Project Manager is forecasting a $8-14M cost overrun on the contract.

b. Procurement - NA.

c. MILCON - NA.

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

a. Program Status --

(1) Percent Program Completed: 53.3% (8 yrs/15 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 12.6% ($430.3/$3402.9)
(Funds Appropriated To Date in Millions/
Total Program Funding in Millions)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY81-88)	Budget Year (FY89)	Balance FYDP (FY90-93)	To Complete Beyond FYDP (FY94-95)	Total
RDT&E	214.7	20.0	21.9	-	256.6
Procurement	215.6	83.2	1826.4	1021.1	3146.3
MILCON	-	-	-	-	-
Total	430.3	103.2	1848.3	1021.1	3402.9

16. PROGRAM FUNDING SUMMARY (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- 1/

Fiscal Year	Qty (2/)	FY83 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
APPROPRIATION: RDT&E								
1981				17.8			15.8	N/A
1982				18.1			17.3	N/A
1983				33.3			34.1	N/A
1984				21.6			22.9	N/A
1985				21.7			23.9	N/A
1986				29.6			33.4	2.8
1987				33.8			39.3	2.7
1988				23.2			28.0	3.7
1989				16.0			20.0	3.8
1990				10.1			13.0	3.6
1991				6.7			8.9	3.3
Subtotal	3			231.9			256.6	N/A
APPROPRIATION: Procurement (OPA)								
1986				21.5			25.2	2.8
1987				69.0			83.6	2.7
1988				85.1			106.8	3.7
1989				64.2			83.2	3.8
1990				175.2			233.7	3.6
1991				281.5			385.0	3.3
1992				378.5			529.9	2.8
1993				473.3			677.8	2.3
1994				394.8			578.5	2.3
1995				295.3			442.6	2.3
Subtotal	137			2238.4			3146.3	N/A
Total	140			2470.3			3402.9	

1/ Program funding and quantities reflect the FY88-89 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions.

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 unit procurement of ADDS components

d. Obligations and Expenditures--

Fiscal Year	Then-Year Dollars (Current Estimate In Millions)		
	Total	Obligated	Expended
APPROPRIATION: RDT&E			
1981	15.8	15.8	15.8
1982	17.3	17.3	17.3
1983	34.1	34.1	34.1
1984	22.9	22.9	22.9
1985	23.9	23.9	23.9
1986	33.4	33.4	33.4
1987	39.3	39.3	28.0
1988	28.0	4.1	0.1
1989	20.0		
1990	13.0		
1991	8.9		
Subtotal	256.6	190.8	175.5
APPROPRIATION: Procurement (OPA)			
1986	25.2	13.4	5.6
1987	83.6	12.8	1.9
1988	106.8		
1989	83.2		
1990	233.7		
1991	385.0		
1992	529.9		
1993	677.8		
1994	578.5		
1995	442.6		
Subtotal	3146.3	26.2	7.5
Total	3402.9	217.0	183.0

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: NA

SAR-87-051

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MK 50 Torpedo, December 31, 1987

SELECTED ACQUISITION REPORT (RCS: DD-COMP (O&A) 823)
PROGRAM: MK 50 TORPEDO

N-28 MK-50 TORPEDO

AS OF DATE: December 31, 1987

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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,
Naval Sea Systems Command
Washington, D.C. 20362

CAPT Ned Mayo USN
Assigned: June 1986
AV 222-0710; COMM (202) 692-0710

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

RDT&E: PE 0603610N Project S0199 (Prior Years Only)
PE 0604610N Project S0199
PE 0603610N Project S1873

PROCUREMENT: APPN 1507 ICN 3118

MILCON: PE 72096N

~~AS AMENDED~~

~~APR 7 1988~~

[redacted]

5. (U) Related Programs: Vertical Launch ASROC; ASW Standoff Weapon; LAMPS MK III; P-3C; SH-2F; SH-3; ASW Ship In-Service Programs.

[redacted]

~~Classified by: OPNAVINST [illegible]~~
~~I.D. 86A-71~~
~~Declassify on: OADR~~

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OASD(PA) DFOISR 88-T-0879

(b)(1)

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 --

(b)(1)

8. (U) Decision Coordinating Paper (DCP) 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 are currently under review.

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 (Ch-1)	Aug 79
(U) DT/OT-I Completed	N/A /Jul 83 (Ch-1)	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 (Ch-1)	May 88
(U) Milestone IIIA (NPDM/DAB)	Oct 86/Feb 89 (Ch-1)	Feb 89
(U) LRIP 2nd Year Approval	N/A /Feb 90 (Ch-1)	Feb 90
(U) OT II Completed	Dec 88/Jul 90 (Ch-1)	Jul 90
(U) Milestone IIIB (NPDM/DAB)	Apr 89/Jan 91 (Ch-1)	Jan 91

(b)(1)

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 program 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.

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

c. (U) Current Change Explanations -- Ch-1. Two historical milestones added and approved program dates changed to reflect DAE Baseline of 16 February 1988.

d. (U) References --

Development Estimate: SDDM, dated March 15, 1984, subject "MK 50 Torpedo (Full-Scale Development Approval)."

Approved Program: FY 1988/1989 Amended Biennial Budget. DAE Baseline, 16 February 1988.

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

10. (U) Technical/Operational Characteristics: Thresholds 1/ 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 Estimate/ Appr Program	Demonstrated Performance	Current Estimate
1. (U) Acoustic Acquisition Range (yds) 50% Probability of Acquisition			
(a) (S) Active Mode, Long Pulse			
Water Depth / Target Depth			
Countermeasure deployed	(b)(1)		
(b) (S) Active Mode, frequency modulated pulse			
Countermeasure deployed	(b)(1)		
(c) (S) Passive Mode			
	(b)(1)		

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

2. (S) Terminal Homing (Short and/or medium pulse)

(S) Conditions of Performance Measurement	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate	
(b)(1)				

6. (U) Dimensions*

(a) Maximum length (in.)	111.5/111.5	111.5	111.5 *	CH-1
(b) Maximum weight (lb.)	798/ 771.2	755	755	CH-1
(c) Maximum diameter (in.)	12.75/12.75	12.75	12.75	

* Without Air Launch Accessories

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

b. (U) Operational --

1. (U) Probability of Hit

Scenarios	Dev Estimate/ Appr Program Search Undir.	Dir.	Demonstrated Performance	Current Estimate Search Undir.	Dir.
(b)(1)					

2. (U) Reliability

(b)(1)					
(c)	(U)	Acceptance rate for storage breakout	.90/.95	TBD	.95
(d)	(U)	Auxiliary equipment (MTBF) (Hrs)	175/175	TBD	175

3. (U) Maintainability

(a)	(U)	Organizational	No internal access Assembly & disassembly of accessories only.	TBD	No internal access Assembly & disassembly of accessories only.
(b)	(U)	IMA Torpedo turn-around time max.	16 hrs with 100 man-hours	TBD	16 hrs with 100 man-hours

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

Note: 1/ (U) It is the policy of the Department of the Navy to specify performance values in terms of thresholds only.

c. (U) Previous Change Explanations --

(b)(1)

d. (U) Current Change Explanations -- CH-1 Previously reported data for approved program and demonstrated performance was based on 100S series developmental hardware data. New data is based on actual performance by 200A Series prototype hardware.

e. (U) References --

Development Estimate: SDDM, dated March 15, 1984, subject "MK 50 Torpedo (Full-Scale Development Approval)."

Approved Program: FY 1988/1989 Amended Biennial Budget. DAE Baseline, 16 February 1988.

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

a. (U)

Cost --	Development Estimate	Changes	Current Estimate
Development (RDT&E)	$1,117.7	$+304.9	$1,422.6
Procurement	3,609.1	+63.4	3,672.5
Swimaway	(2,976.6)	(-79.5)	(2,897.1)
Other Weapon System Cost	(386.8)	(+261.6)	(648.4)
Initial Spares	(245.7)	(-118.7)	(127.0)
Construction (MILCON)	8.9	+3.0	11.9
Total FY 84 Base-Year $	$4,735.7	$+371.3	$5,107.0
Escalation	1,918.0	-378.5	1,539.5
Development (RDT&E)	(49.2)	(-39.7)	(9.5)
Procurement	(1,868.8)	(-339.2)	(1,529.6)
Construction (MILCON)	-	(+.4)	(.4)
Total Then-Year $	$6,653.7	$-7.2	$6,646.5

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

b. (U) Quantities --

	Development Estimate	Changes	Current Estimate
(b)(1)			

c. (U) Unit Cost --

Procurement:			
FY 84 Base-Year $	$.466	$+.008	$.474
Then-Year $	.707	-.035	.672
Program:			
FY 84 Base-Year $	.603	+.047	.650
Then-Year $	$.847	$ -	$.847

* of this amount 5 RDT&E and 500 production torpedoes are allocated for ASW Standoff Weapon (SEA LANCE). When the final inventory objective for the SEA LANCE MK 50 variant is determined, procurement quantities and estimates will be appropriately adjusted.

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

	(Average Unit Swimaway Cost) Dev Estimate/ Appr Program	Current Estimate (FY 93)	Latest Appr Threshold
@ Qty:	1000/1000	800	1000
@ Peak Rate:	83/mo	67/mo	83/mo
FY 84 Base-Year $	.378/.378	.351	.378
Then-Year $	.490/.490	.483	.490

e. (U) Foreign Military Sales -- None

f. (U) Nuclear Costs -- None

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

	Current Year		Budget Year
	Current Est DEC 87 SAR	UCR Baseline DEC 86 SAR	UCR Baseline DEC 87 SAR
a. Program Acquisition --			
(b)(1)			

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

		(Current SAR DEC 1987)	(FY 88 Approp. Act)	(FY 89 Dec 87 SAR)
b. (U)	Current Procurement --			
(1)	Cost	108.8	108.8	198.5
	Less CY Adv Proc	-	-	(36.5)
	Plus PY Adv Proc	-	-	-
	Net Total	108.8	108.8	162.0
(2)	Quantity	16	16	140
(3)	Unit Cost	6.800	6.800	1.157

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	-7.7	-710.4	-	-718.1
Quantity	-26.5	-	-	+26.5
Schedule	+162.9	+770.1	-	+933.0
Engineering	+28.1	-	-	+28.1
Estimating	+357.1	-263.0	-	+94.1
Other	-	-	-	-
Support	+68.8	-157.4	+3.4	- 85.2
Subtotal	+635.7	-360.7	+3.4	+278.4
Current Changes:				
Economic	+.3	+60.8	-	+61.1
Quantity	-	-	-	-
Schedule	-	+19.2	-	+19.2
Engineering	-	-	-	-
Estimating	-370.8	-	-	-370.8
Other	-	-	-	-
Support	-	+4.9	-	+4.9
Subtotal	-370.5	+84.9	-	-285.6
Total Changes	+265.2	-275.8	+3.4	-7.2
Current Estimate	1,432.1	5,202.1	12.3	6,646.5

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

(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	+391.5	-	+530.3
Engineering	+25.7	-	-	+25.7
Estimating	+329.9	-234.8	+.2	+95.3
Other	-	-	-	-
Support	+55.1	-113.2	+2.8	-55.3
Subtotal	+572.6	+43.5	+3.0	+619.1
	RDT&E	PROC	MILCON	TOTAL
Current Change:				
Quantity	-	-	-	-
Schedule	-	+15.6	-	+15.6
Engineering	-	-	-	-
Estimating	-267.7	-	-	-267.7
Other	-	-	-	-
Support	-	+4.3	-	+4.3
Subtotal	-267.7	+19.9	-	-247.8
Total Changes	+304.9	+63.4	+3.0	+371.3
Current Estimate	1,422.6	3,672.5	11.9	5,107.0

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^3I program for Advanced Warhead.
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 date from Prime Contractor and proposed date from Second Source.
Estimating:	Started competition earlier resulting in more torpedoes produced under full competition with resultant savings.

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Support: Navy Industrial Fund/CSS Reduction and reduction of initial spares requirements based on required initial outfitting requirements for INA.

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			
Economic:	Revised Escalation Rates.	-	+.3
Estimating:	Elimination of P^3I program until evidence of increased threat is defined.	-260.6	-360.4
Estimating:	FY 88 Appropriation Act Reductions.	-7.1	-10.4
(2) Procurement			
Economic:	Revised Escalation Rates.	-	+60.8
Schedule:	Slip of 176 torpedoes from FY 92 to FY 99.	+15.6	+19.2
Support:	Shift of Spares requirements from FY 88/89 to out years.	+4.3	+4.9
(3) MILCON			
None			

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

d. References --

Development Estimate: SDDM, dated 15 March 1984, subject "MK 50 Torpedo" (Full-Scale Development Approval).

Current Estimate: MK 50 Torpedo Program Restructure.

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

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

b. Current Baseline Estimate to Current Estimate

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.847	-.083	+.003	+.121	+.004	-.035	-	-.010	.0	.847

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
672.0	672.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0	0
Cumulative Variances to Date (12/30/87)	+2.6	-6.2
Net Change	+2.6	-6.2

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.

b. Changes since "As of" Date -- None

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

a. (U) Program Status --

(1) Percent Program Completed: 50.0% (15 yrs/28 yrs)
(2) Percent Program Cost Appropriated: 21.4% ($1,419.7/$6,646.5M).

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Prior Years (FY 75-88)	Budget Year (FY 89)	Balance to Complete (FY 90-02)	Total
RDT&E	1,236.6	134.7	60.8	1,432.1
Procurement	174.2	198.5	4,829.4	5,202.1
MILCON	8.9	3.4	-	12.3
Total	1,419.7	336.6	4,890.2	6,646.5

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

c. (U) Annual Summary --

Fiscal Year	Qty	FY 84 Base-Year Dollars Swimaway Non rec	Swimaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escalation Rate %
Appropriation: RDT&E								
1975	-	-	-	3.3	-	-	1.8	8.8
1976	-	-	-	16.3	-	-	9.5	5.9
197T	-	-	-	5.1	-	-	3.1	4.1
1977	-	-	-	28.5	-	-	17.8	2.8
1978	-	-	-	36.2	-	-	24.3	6.8
1979	-	-	-	59.7	-	-	44.3	8.4
1980	-	-	-	73.2	-	-	60.0	10.6
1981	-	-	-	110.6	-	-	98.9	10.6
1982	-	-	-	110.7	-	-	104.2	7.6
1983	18	-	-	117.1	-	-	115.1	4.9
1984	-	-	-	141.0	-	-	143.5	3.8
1985	-	-	-	141.5	-	-	148.5	3.4
1986	3	-	-	140.8	-	-	152.0	2.8
1987	10	-	-	155.4	-	-	173.0	2.7
1988	9	-	-	121.7	-	-	140.6	3.7
1989	44	-	-	112.5	-	-	134.7	3.8
1990	24	-	-	45.9	-	-	56.8	3.6
1991	-	-	-	3.1	-	-	4.0	3.3
Subtotal	108			1,422.6			1,432.1	-
Appropriation: WPN								
1987	0	-	-	56.3	-	-	65.4	2.7
1988	16*	6.0	28.7	90.4	-	-	108.8	3.7
1989	140	14.7	129.5	159.6	36.5	-	198.5	3.8
1990	260	33.0	176.8	288.8	-	36.5	369.9	3.6
1991	550	37.2	256.0	362.5	-	-	476.1	3.3
1992	600	17.7	229.0	302.4	-	-	406.5	2.8
1993	800	11.6	281.1	363.3	-	-	499.5	2.3
1994	800	8.0	267.9	338.2	-	-	475.8	2.3
1995	800	3.4	255.2	321.5	-	-	462.7	2.3
1996	800	-	248.0	302.6	-	-	445.5	2.3
1997	800	-	237.2	293.1	-	-	441.5	2.3
1998	800	-	232.4	277.2	-	-	427.0	2.3
1999	800	-	228.3	272.5	-	-	429.5	2.3
2000	577	-	176.8	211.8	-	-	341.5	2.3
2001		-	9.3	15.8	-	-	26.0	2.3
2002	(b)(1)	-	9.3	16.5	-	-	27.9	2.3
Subtot		131.6	2,765.5	3,672.5	36.5	36.5	5,202.1	-

*Westinghouse Production Qualification Units

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

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

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escalation Rate %
		Swimaway			Advance Proc			
		Non rec	Rec	Total	Debit	Credit	Total	
		Appropriation: MILCON						
1982	-	-	-	9.1	-	-	8.9	5.8
1989	-	-	-	2.8	-	-	3.4	3.8
Subtotal	-	-	-	11.9	-	-	12.3	-
TOTAL				5,107.0			6,646.5	

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollar (Current Estimate in Millions) Total	Obligated	Expended
		Appropriation: RDT&E	
1975-82	363.9	363.9	363.9
1983	115.1	115.1	115.1
1984	143.5	143.5	143.5
1985	148.5	148.5	147.4
1986	152.0	152.0	147.8
1987	173.0	172.6	134.9
1988	140.6	107.6	4.6
To Complete	195.5	N/A	N/A
Total	1,432.1	1,029.0	975.8
		Appropriation: WPN	
1987	65.4	7.6	.5
1988	108.8	0	0
To Complete	5,027.9	N/A	N/A
Total	5,202.1	7.6	.5
		Appropriation: MILCON	
1982	8.9	8.9	8.9
To Complete	3.4	N/A	N/A
Total	12.3	8.9	8.9

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.)

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

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	32	N/A
1989	504	N/A	140	N/A
1990	1,260	N/A	260	N/A
1991	1,260	N/A	550	N/A
1992	1,260	N/A	600	N/A
1993	1,260	N/A	800	N/A
1994	1,260	N/A	800	N/A
1995	503	N/A	800	N/A
1996	N/A	N/A	800	N/A
1997	N/A	N/A	800	N/A
1998	N/A	N/A	800	N/A
1999	N/A	N/A	800	N/A
2000	N/A	N/A	577	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$)	N/A	N/A	5,107.0	N/A	N/A
	(TY$)	N/A	N/A	6,646.5	N/A	N/A
PAUC	(BY$)	N/A	N/A	.7	N/A	N/A
	(TY$)	N/A	N/A	.8	N/A	N/A

c. Schedule Variance --

Start Date (Mo/Yr)	N/A	N/A	5/88	N/A	N/A
Duration (in Months)	N/A	N/A	173	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	9/02	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	32/31
Procurement	0/0

18. (U) Operating and Support Costs:

N/A.

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: SPACE DEFENSE AND OPERATIONS (ASAT)

AS OF DATE: December 31, 1987

AF-2 ASAT

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SAF/PAS
88-0160-T

1. (U) Designation and Nomenclature (Popular Name): Air-Launched Antisatellite System (ASAT)

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

3. (U) Responsible Office and Telephone Number:

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

PM: Col Harry H. Carothers
Assigned: December 24, 1987
AUTOVON: 833-0234
Commercial: (213)643-0234

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

RDT&E: PE 64406F/12450F

PROCUREMENT: APPN 3010 ICN F01500
APPN 3020 ICN MSLWIR
APPN 3080 ICN 833160

MILCON: PE 12450F

5. (U) Related Programs: North American Air Defense Command Cheyenne Mountain Complex Space Defense System; SPACETRACK; F-15 Multistage Improvement Program.

[redacted]

[redacted]

OASD(PA) DFOISR 88-T-0621

6. Mission and Description: The mission of the air-launched miniature vehicle (MV) antisatellite (ASAT) system is two-fold: (1) to deter the Soviets from using their operational co-orbital antisatellite weapon system, or other weapon systems which have inherent antisatellite capability, against U.S. or Allied satellites. (2) If necessary, to destroy low altitude Soviet satellites which can provide data used to develop targeting information for Soviet combat forces. This targeting information could place U.S. and Allied ground, air, and sea forces at grave risk during armed conflict. The MV ASAT system consists of three segments: (1) surveillance, (2) command and control, and (3) weapon. The existing Space Surveillance Network provides the information necessary to determine the orbit of target satellites. The command and control segment, known as the ASAT Control System, uses the orbital information provided by the surveillance system and generates intercept profiles for an F-15 aircraft. The MV, which is mounted atop the second stage, acquires the target satellite using the satellite's infrared (heat) emission. After acquisition, the MV is deployed from the second stage and continues to track the oncoming satellite. Maneuver motors on the MV are fired at the appropriate time to effect a direct collision with the satellite. The satellite is destroyed by the collision with the MV. This system will not replace any existing system.

7. Program Highlights:

a. Significant Historical Development - The President directed the initiation of a space defense program in 1978 in response to the threat posed by the Soviet Co-orbital ASAT and low altitude Soviet satellites used to develop targeting information against U.S. and Allied sea, land, and air forces. A program office was established in 1978 to address these threats. After considering a number of different options, the MV ASAT was chosen as the antisatellite system to meet the threat posed by low altitude Soviet satellites. Contracts for the current development phase were signed in Jun 1980. In Jan 1984, the first live launch was conducted; a very successful point-in-space test which demonstrated mission planning and missile performance. The second live launch, an infrared probe, was conducted in Nov 1984 and demonstrated mission planning, missile performance, and sensor performance. The first intercept was conducted in Sep 1985 against an Air Force aging scientific satellite. The flight was "flawless," demonstrating all aspects of the system: missile performance, mission planning, miniature vehicle performance, and lethality. In Dec 1985, the first two Instrumented Test Vehicles (ITV's) were launched. Two successful point-in-space flight tests were conducted, one in Aug 86 at a medium altitude and one in Sep 86 at a low altitude. These tests further demonstrated mission planning, as well as missile and miniature vehicle performance. The ITV was successfully characterized, the test verified operability and confirmed signature. As a result of Congressional action, the program was restructured. The FY86 appropriation cut over $60M from planned funding, prohibited intercept testing, and prohibited work on the Mission Control Center (MCC). The FY87 appropriation bill cut an additional $90M, continued the moratorium on intercept testing, and prohibited production verification work which had begun in Dec 85. These Congressional actions resulted in major cost and schedule impacts and a

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

restructured program. Development of an enhanced altitude capability was added.

b. (U) Significant Developments Since Last Report - Since the 31 Dec 86 SAR, three flight test missiles were delivered for a total of nine missiles, two Instrumented Test Vehicles were delivered for a total of four, and new operational software was developed.

Due to continuing legislation moratorium on ASAT testing, the program is being terminated. Therefore, this will be the last SAR submission.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: N/A

9. (U) Schedule

a. (U) Milestones	Development Estimate/ Approved Program	Current Estimate
(U) Concept Definition Contracts	Sep 75/NA	Sep 75
(U) MV Development/Ground Test Contract	Sep 77/NA	Sep 77
(U) Prototype Decision	Feb 80/Feb 80	Feb 80
(U) ASAT Development Contract Award	Jun 80/NA	Jun 80
(U) Critical Design Review	Dec 81/NA	Dec 81
(U) First Captive Flight Test	Dec 82/Dec 82	Dec 82
(U) First Live Launch	Jan 84/Jan 84	Jan 84
(U) AFSARC IIIA (Limited Production Decision)	Nov 84/N/A	N/A
(U) First Successful Intercept	Sep 85/Sep 85	Sep 85
(b)(1)		
(U) Full Production Decision	Sep 86/N/A (Ch-1)	N/A (Ch-1)
(b)(1)		

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

b. (U) Previous Change Explanations -

(b)(1)

c. (U) Current Change Explanations -

(Ch-1) (U) Program being cancelled.

d. (U) References -

Development Estimate: FY85 President's Budget.
Approved Program: FY89 President's Budget; USD(A) memo, 9 Feb 1988.

ASAT, December 31, 1987

10. (U) Technical/Operational Characteristics:

a. (U) Technical	Dev Estimate/ Appr Program	Demonstrated Performance *	Current Estimate
(U) Missile Length (Ft)	17.8/17.8	17.8	17.8
(U) Missile Diameter (Ft)			
Upper Stage	1.7/ NA	1.7	1.7
Lower Stage	1.5/ NA	1.5	1.5
(U) Missile Weight (Lbs) (Launch Weight)	2706/2651	2716	2651
Upper Stage (Including Dispenser)	983/961	1007	961
Lower Stage	1723/1690	1709	1690
(b)(1)			
(b)(1)			
(U) Mean Time to Repair (Hours)			
Organizational Level	4/4		4
Intermediate Level	12/12		12
(b)(1)			

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

(b)(1)

2/(U)Changes of sufficient missiles being available at start of war to meet system negation requirements.
3/(U)The period the ASAT system can stand ready to negate required targets.

* (U) Based on latest flight test results.

c. (U) Previous Change Explanations -

(b)(1)

d. (U) Current Change Explanations -

(Ch-1) (U) No production quantity - program being cancelled.

e. (U) References -

Development Estimate: FY85 President's Budget.
Approved Program: FY89 President's Budget; USD(A) memo, 9 Feb 1988.

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

	Development Estimate	Changes	Current Estimate
a. (U) Cost -			
Development (RDT&E)	851.9	+120.8	972.7
Procurement	1001.9	-942.4	59.5
(3010) CAE Flyaway	(65.9)	(-49.5)	(16.4)
Other Weapon System Costs	(12.4)	(-6.6)	(5.8)
Spares	(5.6)	(-5.6)	-
(3020) Missile Flyaway	(720.5)	(-704.2)	(16.3)
Other Weapon System Costs	(93.9)	(-72.9)	(21.0)
Spares	(103.6)	(-103.6)	-
(3080) Other Flyaway	-	-	-
Other Weapon System Costs	-	-	-
Spares	-	-	-
Total Flyaway	(786.4)	(-753.7)	(32.7)
Construction (MILCON)	18.7	-18.7	-
Total FY77 Base-Year $	1872.5	-840.3	1032.2
Escalation	2014.9	-1371.6	643.3
Development (RDT&E)	(498.2)	(+85.9)	(584.1)
Procurement	(1496.3)	(-1437.1)	(59.2)
Construction (MILCON)	(20.4)	(-20.4)	-
Total Then-Year $	3887.4	-2211.9	1675.5
b. (U) Quantities -			
(U) Development (RDT&E)	15	-4	11

(b)(1)

[redacted]

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

e. (U) Foreign Military Sales - None.

f. (U) Nuclear Costs - None.

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

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. (~~S~~) Program Acquisition--			
(1) (U) Cost	1675.5	4211.5	1675.5
(b)(1)			
b. (U) Current Procurement--			
(1) (U) Cost	0	0	0
(U) Less CY Adv Proc	0	0	0
(U) Plus PY Adv Proc	0	0	0
(U) Net Total	0	0	0
(2) (U) Quantity	0	0	0
(3) (U) Unit Cost	N/A	N/A	N/A

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1350.1	2498.2	39.1	3887.4
Previous Changes:				
Economic	-24.5	-252.9	-1.6	-279.0
Quantity	+304.0	-1132.4	-20.9	-849.3
Schedule	+180.0	+480.0	+0.5	+660.5
Engineering	+243.1	+68.3	-	+311.4
Estimating	+395.4	+157.8	-1.1	+552.1
Other	-	-	-	-
Support	+80.8	-152.4	-	-71.6
Subtotal	+1178.8	-831.6	-23.1	+324.1
Current Changes:				
Economic	-	-	-	-
Quantity	-	-1260.5	-	-1260.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-972.1	-	-16.0	-988.1
Support	-	-287.4	-	-287.4
Subtotal	-972.1	-1547.9	-16.0	-2536.0
Total Changes	+206.7	-2379.5	-39.1	-2211.9
Current Estimate	1556.8	118.7	-	1675.5

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

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	851.9	1001.9	18.7	1872.5
Previous Changes:				
Quantity	+158.0	-440.8	-10.1	-292.9
Schedule	+88.7	+121.2	-	+209.9
Engineering	+124.7	+28.1	-	+152.8
Estimating	+182.7	+77.6	-0.8	+259.5
Other	-	-	-	-
Support	+42.7	-67.0	-	-24.3
Subtotal	+596.8	-280.9	-10.9	+305.0
Current Changes:				
Quantity	-	-539.7	-	-539.7
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-476.0		-7.8	-483.8
Support	-	-121.8	-	-121.8
Subtotal	-476.0	-661.5	-7.8	-1145.3
Total Changes	+120.8	-942.4	-18.7	-840.3
Current Estimate	972.7	59.5	-	1032.2

b. Previous Change Explanations -

RDT&E

Economic: Revised economic escalation indices.

Quantity: In Dec 85 SAR six flight test missiles were added.

Schedule: In Dec 83 and Dec 84 SARs flight test schedule was extended due to Congressional withhold of advanced procurement funds and Congressional testing restrictions. In Dec 85 SAR flight test extended to FY90 due to production verification - addition of six missiles/flights and engineering upgrades. In Dec 86 SAR production verification effort was replanned due to FY87 budget cuts and program was rescheduled due to Congressional restrictions.

Engineering: Configuration changes in Mod Blocks 1 and 2 in Dec 85 SAR. Addition of enhanced altitude capability development in Dec 86 SAR.

Estimating: Reprogramming in Dec 83 SAR, addition of Mission Control support funds in Dec 85 SAR, change in production verification costs between RDT&E and procurement in Dec 86 SAR, and impact of revised economic escalation indices on prior years.

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

(U) RDT&E

(U) Support: Addition of production verification tasks to include: support equipment development, first article, logistic planning, and training in Dec 85 SAR. Transfer of support equipment costs to procurement funding in Dec 86 SAR.

(U) Procurement

(U) Economic: Revised economic escalation indices.

(b)(1)

(U) Schedule: In Dec 83 and Dec 84 SARs funding constraints slipped procurement of missiles and program level support build-up in manyears increased. In Dec 85 SAR production was delayed by three years due to incorporation of production verification effort with corresponding program support for 900 manyears. In Dec 86 SAR due to new direction profile change (4 vs 5 year buy) changed procurement schedule and reduced program sustaining engineering/program management by 300 manyears for one year and production was delayed one year.

(U) Engineering: In Dec 85 and Dec 86 SARs engineering change orders dollars were added to allow for uncertainties of concurrency.

(U) Estimating: Cost improvement curve changed to reflect directed program in Dec 85 SAR. A change from block buy advanced procurement to conventional advanced procurement and change in distribution of production verification costs between procurement and RDT&E in Dec 86 SAR. Impact of revised economic escalation indices on prior years.

(U) Support: In Dec 83 SAR and Dec 84 SAR support items slipped in conjunction with the change in procurement schedule and program level support build-up in manyears increased. In Dec 85 SAR implementation of the production verification phase and quantity reduction resulted in changes to support equipment and deletion of rate tooling. In Dec 86 SAR transfer of support equipment costs from RDT&E funding and decrease in factory spares and factory support/test equipment requirement due to updated requirements analysis.

13. Cost Variance Analysis (Cont'd):

MILCON
Economic: Revised economic escalation indices.
Quantity: Decreased from two bases to one base in Dec 85 SAR.
Schedule: One year slip due to program restructure in Dec 86 SAR.
Estimating: Revised facility cost based on 35% in Dec 83 SAR, 60% in Dec 84 SAR design reviews, and cost increase due to revised estimate in Dec 86 SAR. Impact of revised economic escalation indices on prior years.

c. Current Change Explanation--

	(Dollars in Millions) Base Year	Then-Year
(1) RDT&E		
Cancellation of program. (Other)	-476.0	-972.1
(2) Procurement		
Cancellation of program.	-661.5	-1547.9
(Quantity)	(-539.7)	(-1260.5)
(Support)	(-121.8)	(-287.4)
(3) MILCON		
Cancellation of program. (Other)	-7.8	-16.0

d. References

Development Estimate: FY85 President's Budget

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14. [redacted] Program Acquisiton Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

(b)(1)

[redacted]

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

a. RDT&E

Miniature Vehicle and Upper Stage:
LTV Aerospace and Defense Co.,
Dallas, TX
F04701-80-C-0041, CPIF/AF,
Award: June 15, 1980
Definitized: December 15, 1980

Initial Contract Price		
Target	Ceiling	Qty
$268.2M	N/A	15

Current Contract Price		
Target	Ceiling	Qty
$523.2M	N/A	15

Estimated Price at Completion	
Contractor	Program Manager
$787.8M	$780.7M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-$23.9M	-$23.7M
Cumulative Variances to Date (12/31/87)	-$60.4M	-$10.2M
Net Change	-$36.5M	+$13.5M

\+ = favorable - = unfavorable

(U) Explanation of Changes: Cumulative cost and schedule variances are primarily due to subcontractors' initial design problems and resulting technical difficulties in the assembly of the Miniature Vehicle/Dispenser. Key difficulties which have led to cost growths and program slips include the rupture of two Maneuver Propulsion motors during qualification testing and recovery program and continuous rework of Flight Sensor Assemblies. These difficulties resulted in specific improvement programs by the Program Office and then weekly contractor reviews with the Space Division Commander. Each estimate of increased overrun is briefed to the Deputy Commander and the Commander before

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

it is accepted. Additionally, Congressional testing restrictions, prohibiting testing against objects in space; and budget cuts caused further program restructure leading to schedule extensions, cost growths, and an increase in the estimate at completion.

F-15, Lower Stage and Mission Control
The Boeing Company,
Seattle, WA,
F04701-80-C-0040, CPIF/AF
Award: June 15, 1980
Definitized: December 30, 1980

Initial Contract Price		
Target	Ceiling	Qty
$150.9M	N/A	15 L/S

Current Contract Price		
Target	Ceiling	Qty
$319.4M	N/A	2 CAE 15 L/S

Estimated Price at Completion	
Contractor	Program Manager
$358.6M	$345.7M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	+$2.5M	$0M
Cumulative Variances to Date (12/31/87)	+$3.5M	-$1.0M
Net Change	+1.0M	-$1.0M

Explanation of Change: Total cost of the Boeing effort has steadily increased primarily as a result of the Congressional ban which has forced the test program schedule to be extended along with the Vought late hardware deliveries. Schedule variance deteriorated because of engineering labor delays in software specification design and missed mission planning milestones due to the elimination of free flights in FY88.

Instrumented Test Vehicle
TEXTRON Defense Systems
Wilmington, MA
F04701-78-C-0125, FPIF,
Award: August 31, 1978
Definitized: November 20, 1978

Initial Contract Price		
Target	Ceiling	Qty
$36.9M	$40.4M	10

Current Contract Price		
Target	Ceiling	Qty
$52.8M	$58.0M	10

Estimated Price at Completion	
Contractor	Program Manager
$64.7M	$64.7M

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

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-$14.2M	-$1.8M
Cumulative Variances to Date (01/03/88)	-$16.2M	-$1.2M
Net Change	-$ 2.0M	+$0.6M

Explanation of Change: The cost and schedule variances are a result of problems encountered by TEXTRON's subcontractors for the Space Ground Link System (SGLS) and Miss Distance Indicator (MDI). The delay in delivery has been the result of problems during acceptance testing plus late delivery of critical electronic piece parts resulting from delays in completing screening. TEXTRON brought the production of MDI's in-house from their subcontractor last year and the first MDI has completed acceptance testing. LORAL is the only subcontractor remaining on the program. Additional SGLS units could not be delivered until the overage piece parts problem was resolved. AFPRO and Space Division quality personnel conducted an audit of TEXTRON's corrective action plan for control of overage piece parts and final inspection will be completed in Jan 88. Subsequent units will be delivered at 4 week intervals, provided MDI and SGLS are available. Costs to complete ITV deliveries are capped by the Fixed Price Ceiling which has already been exceeded. Currently, TEXTRON is over two years delinquent in delivery of ITV's 5-8. TEXTRON is now committed to complete delivery of all ten units by the end of CY88. Progress payments of $3.6M have been withheld since Dec 84. Contractor's estimate at completion is over ceiling.

b. Procurement - No procurement contracts.

c. MILCON - No military construction contracts.

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

a. Program Status -

(1) Percent Program Completed: 100.0% (17 yrs/17yrs)

(2) Percent Program Cost Appropriated: 100.0% ($1675.5/$1675.5)

ASAT, December 31, 1987

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

b. Appropriation Summary -

Appropriation	Current & Prior Yrs (FY72-88)	(Then-Year Dollars in Millions) Budget Year	Balance to Complete FYDP	Beyond FYDP	Total
RDT&E	1556.8	-	-	-	1556.8
Procurement-CAE	45.3	-	-	-	45.3
Procurement-Missile	73.4	-	-	-	73.4
Procurement-Other	-	-	-	-	-
MILCON	-	-	-	-	-
Total	1675.5	-	-	-	1675.5

c. Annual Summary -

Fiscal Year	Qty	FY77 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E								
1972	-	-	-	3.8	-	-	2.7	-
1973	-	-	-	0.3	-	-	0.2	4.1
1974	-	-	-	0.1	-	-	0.1	7.9
1975	-	-	-	3.0	-	-	2.7	10.8
1976	-	-	-	4.0	-	-	3.8	7.0
197T	-	-	-	2.2	-	-	2.2	3.3
1977	-	-	-	10.2	-	-	10.4	6.8
1978	-	-	-	36.7	-	-	39.7	6.1
1979	-	-	-	66.0	-	-	78.8	8.4
1980	-	-	-	61.7	-	-	81.9	9.4
1981	-	-	-	100.0	-	-	146.5	11.9
1982	-	-	-	116.0	-	-	182.3	9.2
1983	-	-	-	130.4	-	-	214.5	4.9
1984	-	-	-	118.5	-	-	202.2	3.8
1985	-	-	-	76.8	-	-	135.3	3.4
1986	-	-	-	82.6	-	-	149.3	2.8
1987	-	-	-	90.7	-	-	169.2	2.7
1988	-	-	-	69.7	-	-	135.0	3.7
Subtotal	11	-	-	972.7	-	-	1556.8	

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

Fiscal Year	Qty	FY77 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: Procurement (Carrier Aircraft Equipment)								
1985	-	1.7	1.3	4.3	-	-	8.6	3.4
1986	2	2.5	10.9	17.9	-	-	36.7	2.8
Subtotal	2	4.2	12.2	22.2	-	-	45.3	
Appropriation: Procurement (Missile)								
1984	-	5.5	8.3	9.9	19.1	-	19.1	8.0
1985	-	0.9	1.6	27.4	9.0	-	54.3	3.4
Subtotal	-	6.4	9.9	37.3	28.1	-	73.4	
Total	11	-	-	1032.2	-	-	1675.5	

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures -

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated [1]	Expended [1]
Appropriation: RDT&E			
1972	2.7	2.7	2.7
1973	0.2	0.2	0.2
1974	0.1	0.1	0.1
1975	2.7	2.7	2.7
1976	3.8	3.8	3.8
197T	2.2	2.2	2.2
1977	10.4	10.4	10.4
1978	39.7	39.7	39.7
1979	78.8	78.8	78.8
1980	81.9	81.9	81.9
1981	146.5	146.5	146.5
1982	182.3	182.3	182.3
1983	214.5	214.5	214.5
1984	202.2	202.2	202.2
1985	135.3	135.3	135.3
1986	149.3	149.3	143.2
1987	169.2	167.3	128.2
1988	135.0	72.1	0.9
To Complete	N/A	N/A	N/A
Total	1556.8	1492.0	1375.6
Appropriation: Procurement (Carrier Aircraft Equipment)			
1985	8.6	5.7	1.5
1986	36.7	30.2	0.6
To Complete	N/A	N/A	N/A
Total	45.3	35.9	2.1
Appropriation: Procurement (Missile)			
1984	19.1	19.1	18.8
1985	54.3	54.3	13.9
To Complete	N/A	N/A	N/A
Total	73.4	73.4	32.7

1/Reflects Program Office record as of 19 Feb 88.

17. (S) Production Rate Date:

a. (S) Annual Production Rates -

(b)(1)

[redacted]

c. (U) Schedule Variance -

	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less PdE)	Maximum
Start Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration (in Months)	N/A	N/A	N/A	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

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

	To Date
RDT&E	9/9
Procurement	N/A

18. (U) Operating and Support Costs: N/A

1/(U) Development Estimate was based on a 45 month delivery period.

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SAR-87-012

(3) SECRET

SECRET

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

PROGRAM: AIRBORNE SELF PROTECTION JAMMER (ASPJ)

N-5 ASPJ

AS OF DATED 31 DECEMBER 1987

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1. (U) Designation/Nomenclature (Popular Name): AN/ALQ-165(V)/Defensive Electronic Countermeasures System, Airborne (Airborne Self Protection Jammer (ASPJ))

2. (U) DOD Component: U.S. Navy, U.S. Air For[redacted]

3. (U) Responsible Office and Telephone Numbers:

APR 13 AS AMENDED

PMA-272
Naval Air Systems Command
Washington, DC 20361

PMA: CAPT A. E. Victor
Assigned: August 29, 1984
(202) 692-5225 AV 222-5225

4. (U) Program Elements:

RDT&E: 64226N; 64737F; 0604270,(Includes P.U. WO619 and WO638); 0642410
Procurement: Included in host aircraft.

5. (U) Related Programs: None

[redacted]

OASD(PA) DFOISR 88-T-0938

SECRET

SECRET

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 terminal threat weapons from the mid 1980's through the remainder of the 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 counter measure 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-74 radar warning receivers (RWR). The system will be installed in the F/A-18, F-14, 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 a 100 percent common Navy and Air Force system. All twelve ASPJ full Scale Development (FSD) prototype models have been delivered and fielded for testing. F-16 and F/A-18 integration is complete.

b. Recent Accomplishments: The ASPJ program has nearly completed Phase II of Full-Scale Development (FSD). Integration into the A-6E has been completed and flight testing was satisfactory. Additional integration is ongoing with the F-14D, the F-16C Block 40 and the A-6E weapons system. The AV-8B integration with the pod version of ASPJ is scheduled to complete 3rd Quarter FY88. Environmental Qualification Testing (EQT), consisting of temperature, altitude, vibration, shock and thermal overload testing, was successfully completed. ASPJ performance in a dense environment was validated at AFEWS in October 1987. On 30 September 1987 four contracts to four vendors for production of Traveling Wave Tubes (TWT) for ASPJ were awarded under Title III of the Defense Production Act. The Under Secretary of Defense for Acquisition Joint Requirements and Management Board (JRMB) of 10 November 1986 was held to review ASPJ program progress to date. The USDA decision memorandum dated 10 December 1986 approved the ASPJ a Acquisition to include a Production Verfication (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.

c. Change Since "As of" Date: None

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (dated 19 Jan 81) threshold breaches.

9. (U) Schedule:

Development

a. Milestones	Development/Approved Estimate/Program	Current Estimate
(U) Complete Phase I	Aug 81/Feb 81	Feb 81
(U) Contract Award, Phase II	Dec 81/Aug 81	Aug 81
(U) Combined TECHEVAL/OPEVAL(Start)	Apr 86/Mar 88	Mar 88 Ch-1
(U) Combined TECHEVAL/OPEVAL(Comp)	N/A/May 88	May 88
(U) DAB III (A)	Aug 86/Aug 88	Nov 88 Ch-2
(U) Limited Production Contract	Nov 86/Aug 88	Nov 88 Ch-2

(b)(1)

* IOC is defined as equipage of first operational F/A-18 squardon with ASPJ and logistics support.

b. Previous Change Explanations:

Low reliability of Power Supplies caused delays in the development test program. Power supply fixes have been identified. Delays necessitated program changes which were approved by the Joint Resources Management Board (JRMB) November 1986.

c. Current Change Explanations:

Ch-1 Combined TECHEVAL/OPEVAL is a Joint Resources Management Board (JRMB) November 1986 directed requirement for preliminary flight testing to validate system performance prior to beginning initial operational testing for DAB IIIA.

Ch-2 DAB IIIA was re-scheduled from Aug 88 to Nov 88 to accomodate improvements in the final flight test software.

d. References - Development Estimate: Deputy Secretary Defense Decision Memorandum (DSDDM), 24 February 1982 and Under Secretary of Defense (USD) (C3I) Decision Memorandum (DM), 20 March 1984.
Approved Program : FY 1988/1989 Ammended Biennial Budget and DAE Baseline Approved 17 FEB 88.

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ASPJ: 31 DECEMBER 1987

10. (U) Technical/Operational Characteristics:

a. Technical	Development/Approved Estimate/Program	Demonstrated Performance	Current Estimate
(b)(1)			
(U) Maintenance Demand Hours (MFHBMA)	8.6/6.8	N/A	6.8
(U) DMMH/MA (Basic/Augumented)	0.95/1.2/2.18/2.65	N/A	2.18/2.65

c. Previous Change Explanations: None

d. Current Change Explanations:

(b)(1)

e. References -- Same as section 9d

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

a. Cost --	Development Estimate	Changes	Current Estimate
Development (RDT&E)	227.7	* +310.7	538.4
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total FY 84 Base Year $	227.7	+310.7	538.4
Escalation	8.7	+ 24.6	33.3
Development (RDT&E)	(8.7)	(+ 24.6)	(33.3)
Procurement	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total Then - Year $	236.4	335.3	571.7
b. Quantities --			
Development RDT&E	12	--	12
Procurement 1/	N/A	N/A	N/A
Total	12	--	12

c. Unit Cost -- N/A

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

* Change from Navy only to Joint Navy/Air Force SAR.

1/ Procurement costs are included in the host aircraft procurement budgets. Estimate for procurement is 2,478 systems plus spares.

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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
BASELINE ESTIMATE DE	236.4			236.4
Previous Changes:				
Economic	- 1.6	--	--	- 1.6
Quantity	--	--	--	--
Schedule	+ 25.4	--	--	+ 25.4
Engineering	+ 52.1	--	--	+ 52.1
Estimating	+265.1	--	--	+265.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+341.0			+341.0
Current Changes:				
Economic	+ 0.1	--	--	+ 0.1
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	- 5.8	--	--	- 5.8
Other	--	--	--	--
Support	--	--	--	--
Subtotal	- 5.7			- 5.7
Total Changes	+335.3			+335.3
Current Estimate	+571.7			+571.7

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13. Cost Variance Analysis (Continued):
(FY 1984 Constant Dollars [Base Year] in Millions)

	RDT&E	PROC	MILCON	TOTAL
BASELINE ESTIMATE DE	227.7			227.7
Previous Changes:				
Quantity	--	--	--	--
Schedule	+ 21.8	--	--	+ 21.8
Engineering	+ 40.8	--	--	+ 40.8
Estimating	+252.7	--	--	+252.7
Other	--	--	--	--
Support	--	--	--	--
Subtotal	315.3			315.3
Current Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	- 4.6	--	--	- 4.6
Other	--	--	--	--
Support	--	--	--	--
Subtotal	- 4.6	--	--	- 4.6
Total Changes	+310.7			+310.7
Current Estimates	538.4			538.4

b. Previous Change Explanations

(1) RDT&E
Revised Jan 87 escalation rates (Economic)
Changes per JRMB directed test plan (Schedule)
Re-assessment of the Pre-planned Program Improvement requirements (Engineering)
Addition of Air Force RDT&E funds in previous Navy only SAR (Estimating)

(2) Procurement - None

(3) MILCON - None

c. Current Change Explanations:

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Revised Jan 88 Escalation Rates (Economic)		+ 0.1
Allocation Adjustments (FY85 & Prior)(-2.2)		
APB FY88/89 Adjustment(AF) (-1.5)		
NOV 86 JRMB Directed Change (FY-86) (+2.6)		
Dissapproved ATR (FY-87) (-6.7)		
JRMB Directed Operational Test (FY-89) (+2.0)		
	-4.6	-5.8

(2) Procurement - None

(3) MILCON - None

d. References
Development Estimate: Approved program per DSDDM, 24 February 1982.
Approved Program: FY 1989 President's Budget.

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

15. (U) Contract Information: (Dollars in Millions)

a. ASPJ
RDT&E
Joint Venture, ITT/WEC
Nutley NJ/Baltimore MD
N00019-81-C-0369, CPAF
27 Aug 1981

Initial Contract Price		
Target	Ceiling	Quantity
80.8	N/A	12

Current Contract Price		
Target	Ceiling	Quantity
176.6	140.0 1/	12

Estimated Price at Completion	
Contractor	Program Manager
176.6	258.0

b. Procurement - None

c. MILCON - None

1/ Navy and Air Force funded contract capped on 9 Nov 1984, maximum Government liability is $140M. Last CPR was submitted February 1985. Joint Venture stopped submitting CPRs when contract reached its capped value.

Previous Cumulative Variances - Contract cap negotiated in Nov 1984 which established a maximum Government liability of $140M.

Cumulative Variances to Date - Schedule delays due to late deliveries of Full Scale Development (FSD) Systems, caused by multiple hybrid redesigns and late vendor deliveries.

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

a. Program Status -- (for R&D only)
(1) Percent Program Completed: 73.3% (11 years/15 years)
(2) Percent Program Cost Appropriated: 83.5% (477.6/571.7)
(3) Principal RDT&E task remaining is the Pre-planned Program Improvement requirements.

b. Appropriation Summary --

(Then Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY78-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP	Total
RDT&E	477.6	16.3	77.8	--	571.7

c. Annual Summary -- (Navy and Air Force Total)

FISCAL YEAR	QTY ASPJ	ADV PROC (NONADD)	BASE-YEAR DOLLARS FLYAWAY (NONADD) NONREC	FLYAWAY (NONADD) REC	TOTAL	Then-Year Dollars ADV PROC (NONADD)	Then-Year Dollars TOTAL	ESCALATION RATE
APPROPRIATION: RDT&E 1/								
FY	#		$		$	$		#
78			2.6		2.6	2.6		
79			20.4		20.4	20.4		
80			22.3		22.3	22.3		
81			40.3		40.3	40.3		
82			78.4		78.4	78.4		
83	2		82.6		82.6	82.6		
84	3		82.1		82.1	83.7		3.80
85	5		55.4		55.4	58.2		3.40
86	2		28.5		28.5	30.9		2.80
87			19.6		19.6	21.8		2.70
88			31.5		31.5	36.4		3.70
89			13.6		13.6	16.3		3.80
90			20.8		20.8	25.8		3.60
91			25.3		25.3	32.3		3.30
92			15.0		15.0	19.7		2.80
TOTAL	12		538.4		538.4	571.7		

1/ Procurement costs are included in host aircraft lines as ancillary equipment.

UNCLASSIFIED ASPJ: 31 DECEMBER 1987

FISCAL YEAR	QTY ASPJ	ADV PROC (NONADD)	BASE-YEAR DOLLARS FLYAWAY NONREC	BASE-YEAR DOLLARS (NONADD) REC	BASE-YEAR DOLLARS TOTAL	Then-Year Dollars ADV PROC (NONADD)	Then-Year Dollars TOTAL	ESCALATION RATE %
APPROPRIATION: RDT&E NAVY								
FY	#		$		$		$	
78			2.6		2.6		2.6	
79			15.6		15.6		15.6	
80			13.2		13.2		13.2	
81			28.1		28.1		28.1	
82			24.0		24.0		24.0	
83			32.8		32.8		32.8	
84			41.2		41.2		42.0	3.80
85			32.3		32.3		33.9	3.40
86			20.7		20.7		22.4	2.80
87			8.9		8.9		9.9	2.70
88			14.2		14.2		16.4	3.70
89			6.9		6.9		8.3	3.80
90			15.6		15.6		19.4	3.60
91			20.3		20.3		25.9	3.30
92			10.4		10.4		13.6	2.80
TOTAL			286.8		286.8		308.1	

FISCAL YEAR	QTY ASPJ	ADV PROC (NONADD)	BASE-YEAR DOLLARS FLYAWAY NONREC	BASE-YEAR DOLLARS (NONADD) REC	BASE-YEAR DOLLARS TOTAL	Then-Year Dollars ADV PROC (NONADD)	Then-Year Dollars TOTAL	ESCALATION RATE
APPROPRIATION: RDT&E AIR FORCE								
FY	#		$		$		$	
79			4.8		4.8		4.8	
80			9.1		9.1		9.1	
81			12.2		12.2		12.2	
82			54.4		54.4		54.4	
83			49.8		49.8		49.8	
84			40.9		40.9		41.7	3.80
85			23.1		23.1		24.3	3.40
86			7.8		7.8		8.5	2.80
87			10.7		10.7		11.9	2.70
88			17.3		17.3		20.0	3.70
89			6.7		6.7		8.0	3.80
90			5.2		5.2		6.4	3.60
91			5.0		5.0		6.4	3.30
92			4.6		4.6		6.1	2.80
TOTAL			251.6		251.6		263.6	

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d. Obligation and Expenditures

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
APPROPRIATION: RDT&E (Navy and Air Force)			
1978	2.6	2.6	2.6
1979	20.4	20.4	20.4
1980	22.3	22.3	22.3
1981	40.3	40.3	40.3
1982	78.4	78.4	78.4
1983	82.6	82.6	82.6
1984	83.7	83.7	80.1
1985	58.2	57.5	47.6
1986	30.9	30.7	20.6
1987	21.8	19.9	11.1
1988	36.4	5.6	.2
To Complete	94.1	N/A	N/A
TOTAL	571.7	444.0	406.2

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
APPROPRIATION: RDT&E NAVY			
1978	2.6	2.6	2.6
1979	15.6	15.6	15.6
1980	13.2	13.2	13.2
1981	28.1	28.1	28.1
1982	24.0	24.0	24.0
1983	32.8	32.8	32.8
1984	42.0	42.0	38.4
1985	33.9	33.9	30.8
1986	22.4	22.4	14.6
1987	9.9	9.7	5.5
1988	16.4	5.2	.2
To Complete	67.2	N/A	N/A
TOTAL	308.1	229.5	205.8

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Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	APPROPRIATION: RDT&E AIR FORCE		
1979	4.8	4.8	4.8
1980	9.1	9.1	9.1
1981	12.2	12.2	12.2
1982	54.4	54.4	54.4
1983	49.8	49.8	49.8
1984	41.7	41.7	41.7
1985	24.3	23.6	16.8
1986	8.5	8.3	6.0
1987	11.9	10.0	5.6
1988	20.0	.4	0
To Complete	26.9	N/A	N/A
TOTAL	263.6	214.3	200.4

17. (U) Production Rate Data

a. Annual Production Rate - N/A

b. Cost Variance - N/A

c. Schedule Variance - N/A

d. Deliveries (Plan/Actual) --

	TO DATE
RDT&E	12/12
Procurement	0/0

18. Operating and Support Cost -- N/A

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SAR-87-056

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

PROGRAM: Sea Lance (ASW Standoff Weapon)

N-32 SEA LANCE

AS OF DATE: December 31, 1987

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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 John T. Regan
Assigned: January 3, 1983
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

5. (U) Related Programs: MK 50 Advanced Lightweight Torpedo; CCS MK 1 Fire Control System.

[redacted]

AS AMENDED

APR 7 1988

[redacted]

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OASD(PA) DFOISR 88-T-0878

6. (U) Mission and Description: To provide a long-range, quick reaction antisubmarine weapon which is compatible with existing and planned submarine sensor 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 launched ASW standoff weapon capability. Sea Lance is being designed for the SSN 637, 688 and 21 attack class submarines to replace the existing SUBROC missile. Current plans provide for the retirement of SUBROC beginning in the 1990's. Sea Lance will be configured to deliver a conventional Torpedo MK 50 payload. In addition, a Nuclear Depth Bomb (NDB) payload may be integrated into the missile in the future.

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. Studies of missile airframe, propulsion, guidance and control retardation system, capsule and subsystem technologies applicable to Sea Lance were conducted. Subsystem prime item and critical item development specifications were prepared and approved. Subsystem Preliminary Design Reviews were conducted, which ended with the System Preliminary Design Review and the commencement of detailed design. Validation of missile flyout from the capsule during a simulated broach condition and static rocket motor firings were conducted and developmental testing was initiated. Developmental testing progressed on schedule. Two body wind tunnel tests were performed to gather flight stability data on the missile system through separation. A full scale Structural Development Model of the complete missile was fabricated and assembled. The guidance and control systems in an Operational Mockup of the missile were installed and laboratory dynamic fly-downs of the missile were conducted. Torpedo MK 50 protective shell assembly and side parachute deceleration configurations were selected. Preliminary Stowage Rack Shock Test and missile system transition tests were conducted. These included submarine mechanical interface achievement in strikedown, stowage and torpedo tube loading, and launch at maximum expected depth and speed underway. Eight static rocket motor firings were successfully conducted. 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. Commenced Critical Design Reviews of system components. On 26 August 1986, the Secretary of the Navy changed the Sea Lance Program to develop the conventional variant first, deferring the Milestone II decision on the Nuclear Depth Bomb (NDB) variant until Milestone III of the Sea Lance conventional variant.

b. Significant Developments Since Last Report — This program was revised during development of the amended FY88/89 biennial budget to provide for continued development of Sea Lance through initial missile tests. Decisions regarding further development of Sea Lance for submarine or surface ship application will be made during POM 90 deliberations.

c. Changes Since "As Of" Date — None.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: The following thresholds established in the Secretary of Defense Decision Memorandum (SDDM) dated 28 May 1986 are likely to be breached:

Milestones IIIA and IIIB - Budget reduction in FY89 will delay Milestones IIIA and Milestone IIIB beyond the SDDM schedule thresholds.

9. (U) Schedules:

a. Milestones —

Milestones —	Development Estimate/ Approved Program	Current Estimate	
Milestone I (DSARC I)	Dec 82/Dec 82	Dec 82	
Milestone II (DSARC II)	Apr 86/Apr 86	Apr 86	
FSD Contract Award	Jun 86/Jul 86	Jul 86	
Start Technical Evaluation (NDB)	Jul 89/ N/A	N/A	
Milestone IIIA	Jul 89/Aug 92	Aug 92	(Ch-1)
Production Contract Award	Oct 89/Apr 92	Apr 92	(Ch-1)
Start Operational Evaluation (NDB)	Jan 90/ N/A	N/A	
Milestone IIIB (Full Rate Prod.)	Jul 90/Jul 93	Jul 93	(Ch-1)
(b)(1)			
Start Technical Evaluation (MK 50)	Oct 91/Jun 92	Jun 92	(Ch-1)
Start Operation Evaluation (MK 50)	Jan 92/Sep 92	Sep 92	(Ch-1)
Milestone IIIC (MK 50)	Jul 92/ N/A	N/A	
(b)(1)			

b. Previous Change Explanations --

The FSD contract was delayed one month from June 1986 to July 1986. The milestones following FSD contract award were changed to reflect 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 Milestone III approval of the Sea Lance conventional variant.

c. Current Change Explanations —

(Ch-1) Schedule delay due to program restructuring as reflected in the amended FY89 biennial budget.

	From	To
Milestone IIIA	Dec 90	Aug 92
Production Contract Award	Jan 91	Apr 92
Milestone IIIB (Full Rate Prod.)	Oct 91	Jul 93
Start Technical Evaluation (MK 50)	Oct 90	Jun 92
Start Operational Evaluation (MK 50)	Jan 91	Sep 92
(b)(1)		

d. References —
Development Estimate: SDDM, dated 28 May 1986, subject "SEA LANCE Antisubmarine Warfare Standoff Weapon Milestone II Decision Memorandum."

Approved Program: Amended FY89 approved biennial budget.
DAE Baseline, 17 Feb 1988.

10. (U) Technical/Operational Characteristics:

a. Technical —

	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
Max Loading/ Handling Wt (Lbs)	3100/3100	N/A	3100
Shock Resistance (Grade/Shock Factor)	(b)(1)		
Weapon Accuracy (CEP)	(b)(1)		
Time Launch to Splash (secs)	(b)(1)		
	(b)(1)		
Maintenance Cycle (yrs)	5 / 5	N/A	5

b. Operational —

c. Previous Change Explanations — None

d. Current Change Explanations — None

e. References —
Development Estimate: SDDM, dated 28 May 1986, subject "SEA LANCE Antisubmarine Warfare Standoff Weapon Milestone II Decision Memorandum."

Approved Program: Amended FY89 approved biennial budget.
DAE Baseline, 17 Feb 1988.

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	733.7	+51.1	784.8
Procurement	1,132.0	+20.1	1,152.1
Total Flyaway	(964.6)	(-4.4)	(960.2)
Other Weapon System Cost	(129.7)	(+14.0)	(143.7)
Initial Spares	(37.7)	(+10.5)	(48.2)
Construction (MILCON)	17.5	+0.8	18.3
Total FY85 Base-Year $	1,883.2	+72.0	1,955.2
Escalation	457.8	+59.7	517.5
Development (RDT&E)	(77.4)	(+18.0)	(95.4)
Procurement	(376.6)	(+40.8)	(417.4)
Construction (MILCON)	(3.8)	(+0.9)	(4.7)
Total Then-Year $	2,341.0	+131.7	2,472.7

b. Quantities --

(b)(1)

c. Unit Cost --

Procurement:

FY85 Base-Year $	0.843	+0.015	0.858
Then-Year $	1.123	+0.046	1.169

Program:

FY85 Base-Year $	1.349	+0.063	1.412

(b)(1)

d. Approved Design to Cost Goal -- None

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

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

		Current Year		Budget Year
		Current Est (DEC 87 SAR)	UCR Baseline (DEC 86 SAR)	UCR Baseline (DEC 87 SAR)
a.	Program Acquisition --			
	(1) Cost	~~2,472.7~~	2,450.9	2,472.7
(b)(1)				
b.	Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
	(1) Cost	N/A	N/A	N/A
	Less CY Adv Proc	N/A	N/A	N/A
	Plus PY Adv Proc	N/A	N/A	N/A
	Net Total	N/A	N/A	N/A
	(2) Quantity	N/A	N/A	N/A
	(3) Unit Cost	N/A	N/A	N/A

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	811.1	1,508.6	21.3	2,341.0
Previous Changes:				
Economic	-7.5	-20.0	-0.2	(27.7)
Quantity	-18.4			(18.4)
Schedule	+73.2	+80.9	+1.9	+156.0
Engineering				
Estimating				
Other				
Support				
Subtotal	+47.3	+60.9	+1.7	+109.9
Current Changes:				
Economic	+0.7	+14.4	-0.2	+14.9
Quantity				0.0
Schedule	+98.0			+98.0
Engineering				0.0
Estimating	-76.9	-14.4	+0.2	-91.1
Other				0.0
Support				0.0
Subtotal	+21.8	0.0	0.0	21.8
Total Changes	+69.1	+60.9	+1.7	+131.7
Current Estimate	880.2	1,569.5	23.0	2472.7

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	+59.4	+30.8	+1.0	+91.2
Engineering				0.0
Estimating				0.0
Other				0.0
Support				0.0
Subtotal	+42.9	+30.8	+1.0	+74.7
Current Changes:				
Quantity				0.0
Schedule	75.1			+75.1
Engineering				0.0
Estimating	-66.9	-10.7	-0.2	-77.8
Other				0.0
Support				0.0
Subtotal	+8.2	-10.7	-0.2	-2.7
Total Changes	+51.1	+20.1	+0.8	+72.0
Current Estimate	784.8	1152.1	18.3	1,955.2

b. Previous Change Explanations -- All previous schedule and quantity changes reflect Secretary of the Navy decision to accelerate development of the MK 50 conventional variant and defer further development of the NDB variant until the Sea Lance MK 50 milestone IIIA review. Economic changes reflect revised escalation indices.

c. Current Change Explanations --

	(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E		
Revised economic escalation indices (Economic)	N/A	+0.7
Reflects schedule delays resulting from restructuring of the program. (Schedule)	+75.1	+98.0
Reflects miscellaneous shared budget reductions. (Estimating)	-12.0	-13.4

13. (U) Cost Variance Analysis (Cont'd):	(Dollars in Millions) Base Year $	Then Year $
Reflects amended FY89 biennial budget which restructured the Sea Lance program. (Estimating)	-54.9	-63.5
(2) Procurement		
Revised economic escalation indices (Economic)	N/A	+14.4
The revised economic escalation indices are offset due to the then-year estimates remaining unchanged while the indices changed. (Estimating)	-10.7	-14.4
(3) MILCON		
Revised economic escalation indices (Economic)	N/A	-0.2
The revised economic escalation indices are offset due to the then-year estimates remaining unchanged while the indices changed. (Estimating)	+0.2	+0.2

d. References -- Development Planning Estimate; SDDM, dated 28 May 1986, subject "SEA LANCE Antisubmarine Warfare Standoff Weapon Milestone II Decision Memorandum."

Approved Program: Amended FY89 approved biennial budget

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

a. Initial SAR Esitimate to Current Baseline Estimate --

PAUC (Initia SAR Es	Changes (Then Year Dollars in Millions) Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC (Dev Est)
(b)(1)									

b. Current Baseline Estimate to Current Estimate --

PAUC (Dev Est)	Changes (Then Year Dollars in Millions) Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC (Cur Est)
(b)(1)									

Sea Lance (ASW Standoff Weapon), December 31, 1987

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

a. RDT&E --

Missile:

Initial Contract Price

	Target	Ceiling	Qty
Boeing Aerospace Co., Kent, WA N00024-86-C-6053, CPAF, Work start date: 30 June 1986 Definitized: 31 July 1986	$380.0	N/A	N/A

Current Contract Price

Target	Ceiling	Qty
$380.3	N/A	N/A

Estimated Price at Completion

Contractor	Program Manager
$380.3	$380.3

	Cost Variance	Schedule Varianc
Previous Cumulative Variances	-0.6	0.
Cumulative Variances To Date (12/31/1987)	-3.1	-8.
Net Change	-3.7	-8.

CPR data as of 31 December 1987

Explanation of Change: Cost and schedule variances are unfavorable since the previous SAR. The majority of the unfavorable cost and schedule variances are attributable to a major subcontractor. The schedule variance being experience by this subcontractor is the result of design changes, late release of drawings, and increased hardware delivery lead times which have resulted in late delivery of hardware. The cost variance is attributable to indirect (overhead rates and to labor and material overruns in the manufacturing, engineering, fabrication, and certification of test hardware items. Current cost and schedule variances do not effect the program manager's estimate at completion.

(b)(1)

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

c. Annual Summary (Cont'd) --

Fiscal Year	Qty	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement*								
1990	(b)(1)			11.3			14.0	3.6%
1991		10.3	77.2	115.7			146.9	3.3%
1992		10.3	154.4	188.6			245.2	2.8%
1993		10.3	164.4	192.0			255.3	2.3%
1994			144.5	167.0			227.2	2.3%
1995			138.4	158.2			220.2	2.3%
1996			133.0	150.7			214.5	2.3%
1997			131.6	147.1			214.2	2.3%
1998			16.7	21.5			32.0	2.3%
Subtotal		30.9	960.2	1,152.1			1,569.5	

PROCUREMENT COSTS FOR (b)(1) MK 50 TORPEDOES WHICH ARE REPORTED IN THE MK 50 PROGRAM SAR WILL BE ADDRESSED DURING POM 90 AND A SEPARATE FUNDING LINE WILL BE ESTABLISHED UNDER OP-02 CONTROL TO REFLECT FUNDING FOR MK 50 TORPEDOES USED BY THE SEA LANCE WEAPON SYSTEM.

Appropriation: MILCON								
1990				8.2			10.1	3.6%
1991				5.4			6.8	3.3%
1992				4.7			6.1	2.8%
Subtotal				18.3			23.0	
Total				1,955.2			2,472.7	

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1980	7.0	7.0	7.0
1981	19.1	19.1	19.1
1982	35.5	35.5	35.5
1983	22.5	22.5	22.5
1984	27.4	27.4	27.4
1985	50.6	50.6	50.6
1986	67.1	67.1	65.5
1987	105.6	105.4	100.1
1988	105.0	70.0	7.9
To Complete	440.4	N/A	N/A
Total	880.2	404.6	335.6

. ~~(U)~~ Production Rate Data:

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	(b)(1)	N/A	(b)(1)	N/A
1992		N/A		N/A
1993		N/A		N/A
1994		N/A		N/A
1995		N/A		N/A
1996		N/A		N/A
1997		N/A		N/A
1998		N/A		N/A

(b)(1)

18. (U) Operating and Support Costs:

Not Applicable

SAR-87-076

(4)

(UNCLASSIFIED)

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

PROGRAM: C-17A

AF-7 C-17A

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name):

C-17A/Direct Delivery Airlift Aircraft

SAF/PAS
88-0152-T

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

C-17A Systems Program Office Program Dir: B/Gen Michael J. Butchko Jr.
Aeronautical Systems Division Assigned: August 10, 1987
Wright-Patterson AFB, OH 45433 AV: 785-1545 COMM: (513) 255-1545

4. Program Elements/Procurement Line Items:

RDT&E: PE 64231F, PE 64227F (shared funding), PE 64609F (shared funding)
PROCUREMENT: PE 41130F APPN 3010 ICN C017AD
MILCON: PE 41130F

5. Related Programs: None

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OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE (PUBLIC AFFAIRS)

(UNCLASSIFIED)

OASD(PA) DFOISR 88-T-0720

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 exhausted thrust reverser system that provides backup capability, reduces the aircraft ramp space requirements, and minimizes the interference of dust and debris on ground personnel activities; cargo door, ramp design 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.

b. Significant Developments Since Last Report —
Long lead funds for the first two production aircraft were released in Jan 87. Also, the Test & Evaluation Master Plan was approved by OSD in Feb 87. Douglas Aircraft Company's (DAC) wing competition resulted in a May 87 award to Lockheed-California Co. Additionally, the second C-17 Production Readiness Review was conducted Jul 87 which assessed the C-17 as "Ready for Production". The C-17 structure (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 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.

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

The C-17 is expected to satisify mission requirements.

7. Program Highlights (Cont'd):

c. Changes since as of date: In January 1988, the first competitively priced option was exercised for two aircraft, and a long lead option for four aircraft was exercised.

8. Decision Coordinating Paper (DCP) Threshold Breaches: DCP 12 Oct 84. No breaches since last SAR.

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/ NA	Feb 85
(4) Milestone II	Nov 87/Feb 85	Feb 85
(5) First Full Funded Production Lot	Dec 87/ NA	Jan 88(Ch-1)
(6) Milestone III	Feb 91/ NA	N/A
(7) Milestone III A	Nov 87/Oct 88 (CH-3)	Oct 88*
(8) Milestone III B	Feb 91/Sep 92(CH-3)	Oct 92(Ch-2)
(9) IOC (Delivery of 12th acft)	Jan 92/Sep 92	Sep 92*
(10) First Flight	-/Aug 90(Ch-3)	Aug 90(Ch-3)
(11) FOC	- /TBD (CH-3)	TBD (CH-3)

* The execution of this program can only be accomplished with adjustments in the RDT&E profile.

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 abeyance pending completion of a "bottoms up" cost estimate. The estimate was completed and briefed to OSD CAIG on January 31, 1985. SEC DEF signed FSED approval memo on February 15, 1985.

Milestone III (DAB) was separated into a low-rate production decision (IIIA) and a full-rate production decision (IIIB). IOC delayed to April 1992 due to revised initial production rate buys.

Start of FSED was delayed by DSARC request for RDT&E independent cost estimate (From: Oct 84; To: Feb 85).

Milestone II (JRMB) was delayed by DSARC request for RDT&E independent cost estimate (From: Nov 84; To: Feb 85).

9. Schedule (Cont'd):

b. Previous Change Explanations (Cont'd) —

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.

c. Current Change Explanations —

(Ch-1) Reflects date of accomplishment. Changed from Dec 87 to Jan 88.

(Ch-2) Current estimate was incorrectly shown as Jul 92 in previous SAR.

(Ch-3) To reflect USD(A) baseline approval, 9 Feb 1988.

d. References —

Planning Estimate: PMD 0020(14) dated 25 Jul 83.

Approved Program: DCP dated 12 Oct 84; SDDM dated 15 Feb 85; PMD 0020(17)/64231F/41130F dated 2 Oct 85, amended by PMD 0020(18) dated 20 Dec 85, PMD 0020(19) dated 5 Mar 86; USD(A) Memo, 9 Feb 1988.

10. Technical/Operational Characteristics:

a. Technical —	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(1) Mission Completion Success Probability 1/	.93/ NA	N/A	.93
(2) Maintenance Manhours Per Flying Hour (Air Vehicle) 1/	18.6/18.6	N/A	18.6

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

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. Technical-- Additional characteristics per USD(A) baseline approval:			
(3) Maximum TOGW (LBS)	-/580,000 (CH-1)		580,000 (CH-1)
(4) Mean time between maintenance inherent (MTBMI)	-/1.61 (CH-1)		1.61 (CH-1)
(5) Mean Time between Maintenance corrective (MTBMC)	-/.78 (CH-1)		.78 (CH-1)
(6) Mean Time between removal (MTBR)	-/2.80 (CH-1)		2.80 (CH-1)
(7) Mean labor hours to repair	-/7.35 (CH-1)		7.35 (CH-1)

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

b. Operational —	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(1) Payload/Range (LBS/NM) 2/	172,200/2400//172,200/2400 (CH-1)	N/A	166,965/2400
(2) Landing Distance (Ft) 3/	1550/2650	N/A	2650
(3) Takeoff Distance (Ft) 4/	6510/7600	N/A	7600
(4) Cruise Speed 5/ KTAS	450/450	N/A	450 .77
(5) Backup Capability (Percent Grade) 6/	2/2	N/A	2

1/ Reliability and maintainability based on 100,000 fleet flying hours.

2/ Unrefueled, 2.25G maneuver load factor, standard day which includes C-17 reserve fuel requirements (enroute, alternate, holding approach and landing reserves).

3/ Maximum Effort Landing Field Length, with 3 engine idle reverse, 123,977 lb payload, fuel to fly a 500 NM mission with zero payload, sea level, 90 degree F day.

4/ Takeoff critical field length at gross weight to carry a payload of 166,965 lbs for a range of 2400 NM, sea level, 90 degree F day.

5/ Cruise Speed of 450 KTAS is equivalent to 0.77 MACH.

6/ Backup capability with a 166,965 lb payload and fuel to fly 1000 NM, sea level, 90 degree F day.

a. Previous Change Explanations — Program office current estimate of payload and takeoff/landing distance was adjusted as a result of the DSARC II (JRMB) 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.

10. Technical/Operational Characteristics (Cont'd):
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 (3/ and 4/)above.

d. Current Change Explanations —(CH-1) To reflect USD(A) baseline approval, 9 Feb 1988.
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: DCP dated 12 Oct 84: SDDM dated 15 Feb 85; and PMD 0020(17)/64231F/41130F dated 2 Oct 85, amended by PMD 0020(18) dated 20 Dec 85, PMD 0020(19) dated 5 March 1986; USD(A) Memo, 9 Feb 1988.

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

a. Cost —	Planning Estimate	Changes	Current Estimate
Development (RDT&E)	2704.1	+814.9	3519.0
Procurement	16793.2	+228.8	17022.0
Airframe	(11229.3)	-985.6	(10243.7)
Engine	(2371.6)	+825.4	(3197.0)
Avionics	(687.1)	-293.0	(394.1)
Total Flyaway	(14288.0)	-453.2	(13834.8)
Peculiar Support	(314.2)	+1259.6	(1573.8)
Other Weapon System Cost	(1139.4)	-1091.8	(47.6)
Initial Spares	(1051.6)	+514.2	(1565.8)
Construction (MILCON)	47.3	+ 44.9	92.2
Total FY 81 Base-Year $	19544.6	+1088.6	20633.2
Escalation	20209.2	-5147.3	15061.9
Development (RDT&E)	(1242.9)	+ 185.8	(1428.7)
Procurement	(18939.6)	-5369.5	(13570.1)
Construction (MILCON)	(26.7)	+ 36.4	(63.1)
Total Then-Year $	39753.8	-4058.7	35695.1

b. Quantities —

Development (RDT&E)	1	---	1
Procurement	210	---	210
Total	211	---	211

c. Unit cost --

Procurement:			
FY81 Base-Year $	79.968	+ 1.089	81.057
Then-Year $	170.156	-24.479	145.677
Program:			
FY81 Base-Year $	92.628	+5.160	97.788
Then-Year	188.407	-19.235	169.172

d. Approved Design to Cost Goal — N/A

e. Foreign Military Sales — None

f. Nuclear Costs — None

12. Program Acquisition/Current Procurement Unit Cost Summary:

a. Program Acquisition Current (Then-Year) Dollars in Millions --

	Current Year		Budget Year
	SAR Current Estimate (Dec 87 SAR)	UCR Baseline Estimate (Dec 86 SAR)	UCR Baseline Estimate (Dec 87 SAR)
(1) Cost	35695.1	35411.2	35695.1
(2) Quantity	211	211	211
(3) Unit Cost	169.172	167.826	169.172

b. Current Procurement: --	(FY1988)	(FY1988)*	(FY1989)
(1) Cost	667.3	667.3	1107.7
Less CY Adv Proc	66.3	66.3	99.9
Plus PY Adv Proc	34.8	34.8	66.3
Net Total	635.8	635.8	1074.1
(2) Quantity	2	2	4
(3) Unit Cost	317.900	317.900	268.525

*Adjusted to reflect FY88 Appropriation Act in accordance with Congressional change to SAR law.

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	3947.0	35732.8	74.0	39753.8
Previous Changes:				
Economic	-184.2	-5724.0	- 11.7	-5919.9
Quantity	0.0	0.0	0.0	0.0
Schedule	+306.9	+ 189.3	0.0	+ 496.2
Engineering	+ 14.1	+ 214.5	0.0	+ 228.6
Estimating	+422.7	-1476.8	+ 92.9	- 961.2
Other	0.0	0.0	0.0	0.0
Support	+401.0	+1412.7	0.0	+1813.7
Subtotal	+960.5	-5384.3	+ 81.2	-4342.6
Current Changes:				
Economic	- 9.2	+ 80.8	+7.5	+ 79.1
Quantity	0.0	0.0	0.0	0.0
Schedule	+ 28.0	+ 22.7	0.0	+ 50.7
Engineering	+ 18.1	0.0	0.0	+18.1
Estimating	+ 9.7	+332.8	- 7.4	+335.1
Other	0.0	0.0	0.0	0.0
Support	- 6.4	-192.7	0.0	-199.1
Subtotal	+40.2	+243.6	+ .1	+283.9
Total Changes	+1000.7	-5140.7	+ 81.3	-4058.7
Current Estimate	4947.7	30592.1	155.3	35695.1

13. Cost Variance Analysis (Cont'd):
(FY81 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	+ 172.3	0.0	0.0	+ 172.3
Engineering	+ 8.9	+ 115.0	0.0	+ 123.9
Estimating	+ 331.3	- 731.7	+ 44.9	- 355.5
Other	0.0	0.0	0.0	0.0
Support	+ 282.5	+ 770.1	0.0	+1052.6
Subtotal	+ 795.0	+ 153.4	+ 44.9	+ 993.3
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	+3.5	+10.8	0.0	+14.3
Engineering	+13.6	0.0	0.0	+13.6
Estimating	+7.6	+152.7	0.0	+160.3
Other	0.0	0.0	0.0	0.0
Support	-4.8	- 88.1	0.0	- 92.9
Subtotal	+19.9	+ 75.4	0.0	+95.3
Total Changes	+814.9	+ 228.8	+ 44.9	+1088.6
Current Estimate	3519.0	17022.0	92.2	20633.2

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 for RDT&E.

Support: Reestimate of support requirement based on ICA.

Engineering: Addition of DOD standard avionics racks.

13. Cost Variance Analysis (Cont'd)

b. Previous Changes Explanations (Cont'd) —

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.

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 engineers higher cost weight. Congressional direction to move initial tooling from procurement to RDT&E. Adjustment for flyaway current and prior year escalation change.

Support: Deletion of initial spares for FY 88 and FY 89 based on decision to use interim contractor support for the first two years of operation; restructure of support requirements based on 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.

MILCON

Economic: Revised economic escalation indices.

Estimating: Improved definition of support facility requirements during bottoms-up exercise.

c. Current Change Explanation —

	(Dollars in Millions)	
RDT&E	Base Year $	Then Year $
Revised economic escalation indices. (Economic)	N/A	-9.2
Cost increased due to rephasing of budget for FY88 and FY89 and does not include full recovery of fixed overhead costs due to contract restructure. (Schedule)	+3.5	+28.0
Adjustments for current and prior year escalation change. (Estimating)	+10.6	+14.3
Redifinition of requirements due to decrease in simulators. (Support)	- 4.8	- 6.4
Adjustment for FY 90 through FY 92 escalation. (Estimating)	- 3.0	- 4.6

13. Cost Variance Analysis (Con'd):

c. Current Change Explanations(Con'd)--

On Board Inert Gas Generating System added to system. (Engineering)	+13.6	+18.1

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations (Cont'd) —

PROCUREMENT		
Revised economic escalation indices. (Economic)	N/A	+80.8
Increased cost based upon revised schedule due to budget cuts/constraints. Industrial Modernization Improvement Program (IMIP) and ECO were rephased. (Schedule)	+10.8	+22.7
Correcting erroneous categorization in Dec 86 SAR (Estimating)	-6.4	N/A
Adjustment for current and prior year recurring flyaway escalation change. (Estimating)	+ 1.2	+ 1.8
Adjustment for FY90-92 to recurring flyaway for escalation changes. (Estimating)	-17.7	- 30.1
Realignment of requirements between support and flyaway based on Annual Estimate.(Estimating)	+175.6	+361.1
Adjustment for current and prior year support escalation change. (Support)	+ .1	+ .1
Adjustment for FY90-92 Support Escalation.(Support)	- 7.9	- 13.9
Correcting erroneous categorization in Dec 86 SAR (Support)	+ 6.4	N/A
Adjustment in Spares estimating to include Auxiliary Power Unit and Quick Engine Change Kits. (Support)	+88.9	+179.4
Realignment of requirements between support and flyaway based on Annual Estimate (Support)	-175.6	-361.1
Increased cost in spares based upon revised schedule due to budget cuts/constraints. (Support)	N/A	+ 2.8
MILCON		
Revised economic escalation indices. (Economic)	N/A	+ .1
Correcting entry of erroneous computation of economic change in Dec 86 SAR. (Economic)	N/A	+ 7.4
Correcting entry of erroneous computation of economic change in Dec 86 SAR. (Estimating)	N/A	- 7.4

13. Cost Variance Analysis (Cont'd):

d. References —

Planning Estimate: FY85 President's Budget, January 1984

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

a. Initial SAR/Planning Estimate to Current Estimate —

PAUC (Plan. Estimate)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
188.407	-27.681	0	+2.592	+1.168	-2.967	+7.653	0	-19.235	169.172

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

Target	Ceiling	Qty
4147.9	4787.6	1

Estimated Price at Completion

Contractor	Program Manager
4271.8	4550.0

Variance	Cost Variance	Schedule
Previous Cumulative Variances	$ + 5.7	$ -58.4
Cumulative Variances to Date (27 Dec 87)	$ -24.5	$ -49.1
Net Change	$ -30.2	$ + 9.3

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

Explanation of Change:

Cost Variance: The net change in the cost variance is due to inexperienced design engineers and effort associated with design changes. These changes have been required for weight management and revised loads and stress analysis data.

Schedule Variance: This positive net schedule variance change is due to the contract being restructured in April 1987, realigning the program within the current program budget.

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 (Years Funds Appropriated/Total Program Years):

42.1% (8 yrs/19yrs)

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

8.6% (3067.3/35695.1)

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

Appropriation	Current & Prior Yrs (FY81-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93-99)	Total
RDT&E	2350.9	1001.6	1158.2	437.0	4947.7
Procurement	716.4	1107.7	8474.6	20293.4	30592.1
MILCON	—	5.0	16.9	133.4	155.3
Total	3067.3	2114.3	9649.7	20863.8	35695.1

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

c. *Annual Summary:

APPROPRIATION - RDT&E

Fiscal Year	Qty	Base Year 81 Dollars			Then Year Dollars			Escl Rate
		Flyaway			Advance Proc			
		Non Rec	Rec	Total	Debit	Credit	Total	%
1981				32.0			33.4	11.9
1982				0.0			0.0	9.2
1983				51.0			59.6	4.9
1984				22.1			26.8	3.8
1985				96.7			121.0	3.4
1986				273.2			350.6	2.8
1987				474.4			628.6	2.7
1988				822.4			1130.9	3.7
1989				702.4			1001.6	3.8
1990				444.5			655.3	3.6
1991				216.3			328.5	3.3
1992				112.0			174.4	2.8
1993				178.6			285.2	2.3
1994				93.2			151.8	2.3
Subtotal	1	N/A	N/A	3519.0	N/A	N/A	4947.7	N/A

APPROPRIATION - PROCUREMENT

Fiscal Year	Qty	Base Year 81 Dollars			Then Year Dollars			Escl Rate
		Flyaway			Advance Proc			
		Non Rec	Rec	Total	Debit	Credit	Total	%
1987	0	9.5		32.7	34.8	0.0	49.1	2.7
1988	2	56.3	345.5	429.7	66.3	34.8	667.3	3.7
1989	4	18.1	514.0	690.2	99.9	66.3	1107.7	3.8
1990	6	23.3	670.3	1265.0	166.6	99.9	2089.7	3.6
1991	10	103.2	1010.1	1589.2	335.0	166.6	2693.5	3.3
1992	20	51.5	1572.6	2127.7	489.1	335.0	3691.4	2.8
1993	29		1979.3	2412.6	496.7	489.1	4279.7	2.3
1994	29		1687.3	2074.9	507.7	496.7	3766.1	2.3
1995	29		1594.1	1869.2	520.3	507.7	3471.2	2.3
1996	29		1536.1	1789.2	534.8	520.3	3399.8	2.3
1997	29		1504.1	1641.1	437.2	534.8	3188.7	2.3
1998	23		1159.5	1100.5	0.0	437.2	2187.9	2.3
Subtotal	210	261.9	13572.9	17022.0	3688.4	3688.4	30592.1	

* FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

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

APPROPRIATION - MILCON

Fiscal Year	Qty	FY81 Base Year Dollars			Then Year Dollars			Esc Rate
		Flyaway			Advance Proc			
		Non Rec	Rec	Total	Debit	Credit	Total	%
1989				3.5			5.0	3.8
1990				1.8			2.7	3.6
1991				4.5			7.0	3.3
1992				4.5			7.2	2.8
1993				26.0			42.4	2.3
1994				7.6			12.7	2.3
1995				13.5			23.0	2.3
1996				6.6			11.5	2.3
1997				13.2			23.5	2.3
1998				5.6			10.2	2.3
1999				5.4			10.1	2.3
Subtotal				92.2			155.3	
Total	211	261.9	13572.9	20633.2	3688.4	3688.4	35695.1	

* FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

d. Obligations and Expenditures:

RDT&E Then Year Dollars (Current Estimate in Millions)

APPROPRIATION: RDT&E

Fiscal Year	Total	Obligated**	Expended**
1981	33.4	33.4	33.4
1982	0.0	0.0	0.0
1983	59.6	59.6	59.6
1984	26.8	26.8	26.8
1985	121.0	121.0	120.9
1986	350.6	350.4	349.4
1987	628.6	624.3	372.7
1988	1130.9	295.0	.4
To Complete	2596.8	N/A	N/A
Total	4947.7	1510.5	963.2

C-17A, December 31, 1987

APPROPRIATION: PROCUREMENT

Fiscal Year	Total	Obligated**	Expended**
1987	49.1	48.9	1.5
1988	667.3	620.7	0
To Complete	29875.7	N/A	N/A
Total	30592.1	669.6	1.5

** Reflects program office records as of February 15, 1988.

17. Production Rate Data:

a. Annual Production Rates — The equivalent annual production rates shown below differ from the annual funded quantities because the funded delivery period is as follows:FY88-3, FY89-6, FY90-9, FY91-8, FY92-9, FY93-11, FY94-12, FY95-12, FY96-12, FY97-12, FY98-9.

Production Rates (Quantity/Year)				
Fiscal Year	Development Estimate	Production Estimate	Current Estimate	Maximum
1988	2	N/A	8.0	N/A
1989	4	N/A	8.0	N/A
1990	10	N/A	8.0	N/A
1991	20	N/A	15.0	N/A
1992	25	N/A	26.7	N/A
1993	25	N/A	31.6	N/A
1994	25	N/A	29.0	N/A
1995	25	N/A	29.0	N/A
1996	25	N/A	29.0	N/A
1997	25	N/A	29.0	N/A
1998	24	N/A	30.7	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$)	N/A	N/A	20633.2	N/A	N/A
(TY$)	N/A	N/A	35695.1	N/A	N/A
PAUC (BY$)	N/A	N/A	97.788	N/A	N/A
(TY$)	N/A	N/A	169.172	N/A	N/A

c. Schedule Variance —

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	N/A	N/A	10/90	N/A	N/A
Duration (in Months)	N/A	N/A	111	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	12/99	N/A	N/A

d. Deliveries (Plan/Actual) —

	To Date
RDT&E	0/0
Procurement	0/0

18. Operating and Support Costs: N/A

SAF 87-116

SELECTED ACQUISITION REPORT(RCS:DD-COMP(QA)823)

PROGRAM: C-5B

AF-6 C-5B

AS OF: December 31, 1987

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SAF/PAS
88-0122-T

1. Designation and Nomenclature (Popular Name): C-5B (GALAXY)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

C-5B Program Office PM: MR FRANCIS C. LYMBURNER
Aeronautical Systems Division Assigned: 21 SEPTEMBER 1987
Wright-Patterson AFB, OH 45433 AV 785-7300; COMM (513) 255-7300

4. Program Elements/Procurement Line Items:

PROCUREMENT: APPN 3010 PE 41119F ICN C005BO
MILCON: APPN 3300 PE 41896 (Shared funding)

5. Related Programs: C-5A Wing Modification

CLEARED
MAR 14 1988 18

OASD(PA) DFOISR 88-T-0556

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, 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).

b. Significant Developments Since Last Report. Program is on schedule with 22 aircraft delivered. Renegotiation of the FY 87 option (Option Four) for the final 21 aircraft was completed and the option exercised in January 1987. The renegotiated option resulted in a $273M savings. Program Management Responsibility Transfer from Systems Command to Logistics Command is tentatively set at March 1989, after delivery of the 50th C-5B.

The C-5B program is expected to meet mission requirements.

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

8. Decision Coordinating Paper (DCP) Threshold Breaches: No DCP

9. Schedule:

a. Milestones —	Production Estimate/ Approved Program	Current Estimate
Award Initial Contract	Oct 82/ NA	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/ NA	Aug 87(CH-1)
50th Aircraft Delivery	Mar 89/ Feb 89(CH-2)	Feb 89
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.

c. Current Change Explanations — (CH-1) 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. (CH-2) To reflect USD(A) baseline approval, 9 Feb 1988.

d. References — Production Estimate: PMD 2072 (5), 5 April 1983.
Approved Program: PMD 2072 (5), 5 April 1983; USD(A) Memo, 9 Feb 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 —	Production Estimate/ Approved Program	Demonstrated Performance	Current Estimate
Maintainability MMH/FH	N/A/N/A	N/A	40.0 (CH-1)
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	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

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

c. Previous Change 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.

d. Current Changes — (CH-1) Program structured with a goal of 40 MMH/FH.

e. References — Production Estimate: PMD 2072 (5), 5 April 1983.
Approved Program: PMD 2072 (5), 5 April 1983; USD(A) Memo, 9 Feb 1988.

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

a. Cost —	Production Estimate	Changes	Current Estimate
Development (RDT&E)	—	—	—
Procurement	5723.9	-1297.0	4426.9
Flyaway	(5105.2)	(-888.2)	(4217.0)
Other Wpn Sys Cost	(268.9)	(-145.4)	(123.5)
Initial Spares	(349.8)	(-263.4)	(86.4)
Construction (MILCON)	121.8	-113.1	8.7
Total Base-Year $	5845.7	-1410.1	4435.6
Escalation	3821.6	-1236.1	2585.5
Development	—	—	—
Procurement	(3750.2)	(-1169.3)	(2580.9)
Construction (MILCON)	(71.4)	(-66.8)	(4.6)
Total Then-Year $	9667.3	-2646.2	7021.1
b. Quantities —			
Development (RDT&E)	—	—	—
Procurement	50	—	50
Total	50	—	50
c. Unit Cost —			
Procurement:			
FY 80 Base-Year $	114.478	-25.940	88.538
Then-Year $	189.482	-49.326	140.156
Program:			
FY 80 Base-Year $	116.914	-28.202	88.712
Then-Year $	193.346	-52.924	140.422

d. Approved Design to Cost Goal — N/A

e. Foreign Military Sales — None.

f. Nuclear Costs — None.

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

	Current Year		Budget Year
	Current Estimate DEC 87 SAR	UCR Baseline DEC 86 SAR	UCR Baseline DEC 87 SAR
a. Program Acquisition			
(1) Cost	7021.1	7427.7	7021.1
(2) Quantity	50	50	50
(3) Unit Cost	140.422	148.554	140.422
b. Current Procurement	(FY 1988)	(FY 1988)	(FY 1989)
(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)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	—	9474.1	193.2	9667.3
Previous Changes				
Economic	—	-224.5	-6.7	-231.2
Quantity	—	—	—	—
Schedule	—	+36.0	—	+36.0
Engineering	—	—	—	—
Estimating	—	-1272.7	-173.2	-1445.9
Other	—	—	—	—
Support	—	-598.5	—	-598.5
Subtotal	—	-2059.7	-179.9	-2239.6
Current Changes				
Economic	—	-49.4	-.1	-49.5
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	—	-305.3	+.1	-305.2
Other	—	—	—	—
Support	—	-51.9	—	-51.9
Subtotal	—	-406.6	0.0	-406.6
Total Changes	—	-2466.3	-179.9	-2646.2
Current Estimate	—	7007.8	13.3	7021.1

13. Cost Variance Analysis (Cont'd):
(FY 1980 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	—	5723.9	121.8	5845.7
Previous Changes				
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	—	-703.6	-113.2	-816.8
Other	—	—	—	—
Support	—	-375.9	—	-375.9
Subtotal	—	-1079.5	-113.2	-1192.7
Current Changes				
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	—	-184.6	+.1	-184.5
Other	—	—	—	—
Support	—	-32.9	—	-32.9
Subtotal	—	-217.5	+.1	-217.4
Total Changes	—	-1297.0	-113.1	-1410.1
Current Estimate	—	4426.9	8.7	4435.6

b. Previous Change Explanations —

RDT&E None.

Procurement
Economic: Revised escalation indices.
Schedule: Slip of two aircraft from FY85 to FY87.
Estimating: Reduction for ECO and EPA adjustments; re-estimate for prior year escalation; one-time change in advance procurement inflation methodology.
Support: Reduction of spares requirements and other peculiar equipment.

MILCON
Economic: Revised escalation indices.
Estimating: 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 hanger and parking ramp extension at Altus AFB, re-estimate for prior year escalation and reduction in MILCON requirements.

13. Cost Variance Analysis (Cont'd):
c. Current Change Explanations —

(Dollars in Millions)

	Base-Year	Then-Year
(1) RDT&E		
N/A		
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	-49.4
Adjustment for current and prior year escalation. (Estimating)	+29.2	+46.9
Adjustment for current and prior year escalation. (Support)	+1.7	+2.5
Reduction for re-negotiation of FY87 option. (Estimating)	-162.7	-273.0
Reduction for Defective Pricing. (Estimating)	-34.0	-52.1
Reduction in ECO requirement. (Estimating)	-6.9	-11.3
Reduction for Economic Price Adjustments. (Estimating)	-10.2	-15.8
Reduction of provisioning spares due to definitization of actual spare requirements. (Support)	-7.4	-11.8
Reduction of peculiar support equipment through the Support Equipment Recommendation Data (SERD) process. (Support)	-27.2	-42.6
(3) MILCON		
Revised economic escalation indices. (Economic)	N/A	-.1
Adjustment for current and prior year escalation. (Estimating)	+.1	+.1

d. References —
Production Estimate: FY1984 President's Budget, January 1983

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

Initial SAR/Production Estimate (PdE) to Current Estimate (CE)

PAUC	Changes (Then-Year Dollars in Millions)								PAUC
(Initial SAR/PdE)	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	(Current Estimate)
193.346	-5.614	-	+.720	-	-35.022	-13.008	-	-52.924	140.422

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

a. RDT&E — N/A

b. Procurement —

Aircraft
Lockheed-Georgia Co.
Marietta GA
F33657-82-C-2117 FFP
Award: Oct 22, 1982

Initial Contract Price

Target	Ceiling	Qty
$50.0	N/A	0

Definitized: Oct 22, 1982

Current Contract Price

Target	Ceiling	Qty
$6615.3	N/A	50

Estimated Price at Completion

Contractor	Program Manager
$6615.3	$6615.3

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

Target	Ceiling	Qty
$121.1	N/A	1

Estimated Price at Completion

Contractor	Program Manager
$121.1	$121.1

c. MILCON — N/A

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

a. Program Status --

(1) Percent Completed: 100.0% (6/6)

(2) Percent Program Cost Appropriated: 100.0% ($7021.1/$7021.1)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current Prior Yrs (FY 83-88)	Budget Year (FY89)	FYDP (FY90-92)	Balance to Complete Beyond FYDP	Total
RDT&E	--	--	--	--	--
Procurement	7007.8	--	--	--	7007.8
MILCON	13.3	--	--	--	13.3
Total	7021.1	--	--	--	7021.1

16. c. Annual Summary --

Fiscal Year	Qty	FY 80 Base Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate(%)
Appropriation: Procurement								
1983	1	189.9	204.2	528.5	80.7	0.0	770.0	9.1
1984	4	182.8	506.7	828.1	240.3	69.8	1257.0	8.0
1985	8	67.2	720.2	887.2	277.1	236.3	1389.6	3.4
1986	16	2.2	1167.6	1215.8	305.3	255.5	1968.4	2.8
1987	21	2.8	1173.5	967.2	0.0	341.8	1662.8	2.7
Subtotal	50	444.8	3772.2	4426.9	903.4	903.4	7007.8	
Appropriation: MILCON								
1986				4.6			6.8	2.8
1987				--			--	2.7
1988				4.1			6.5	3.7
Subtotal				8.7			13.3	
Total	50	444.8	3772.2	4435.6	903.4	903.4	7021.1	

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended*
Appropriation: Procurement			
1983	770.0	769.8	769.3
1984	1257.0	1256.4	1244.6
1985	1389.6	1388.5	1240.3
1986	1968.4	1890.8	1586.0
1987	1622.8	1608.5	557.0
Subtotal	7007.8	6914.0	5397.2
Appropriation: MILCON			
1986	6.8	0.0	0.0
1987	--	--	--
1988	6.5	0.0	0.0
Subtotal	13.3	0.0	0.0
Total	7021.1	6914.0	5397.2

*Reflects program office records as of 31 January 1988. The difference between the Appropriation and Obligation amounts (FY 85/P) are funds for contingient liabilities.

17. Production Rate Data:

a. Annual Production Rates -- (Note: The production rates shown differ from the annual funded quantities because the funded delivery period is 7 mos for FY84, 9 mos for FY85, 13 mos for FY86, and 10 mos for FY87.)

Production Rates (Quantity/Year)			
Fiscal Year	Production Estimate	Current Estimate	Maximum Economic
1983	12.0	12.0	1
1984	7.2	6.9	4
1985	10.7	10.7	10
1986	17.2	14.8	16
1987	20.0	25.2	21

17. Production Rate Data (Cont'd):

b. Cost Variance -- Dollars in Millions

Item	Production Estimate	Change (CE - Pde)	Current Estimate	Change (CE - MAX)	Maximum Economic
Prog Acq Cost (BY)	5845.7	-1410.1	4435.6	--	4435.6
Prog Acq Cost (TY)	9667.3	-2646.2	7021.1	--	7021.1
PAUC (BY)	116.914	-28.202	88.712	--	88.712
PAUC (TY)	193.346	-52.924	140.422	--	140.422

c. Schedule Variance --

Item	Production Estimate	Change (CE - Pde)	Current Estimate	Change (CE - MAX)	Maximum Economic
Start Date	12/82	--	12/82	--	12/82
Duration in Months	39	--	39	--	39
End Date	2/89	--	2/89	--	2/89

d. Deliveries (Plan/Actual) --

	To Date
Procurement	21/22*

18. Operating and Support Costs: N/A

*Actual deliveries of 22 aircraft exceeded the planned total of 21 due to stepped up schedule by Lockheed Corporation.

18.c Contractor Support Costs

SAR-87-082

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: DMSP BLOCK 5D-2 IMPROVED/5D-3

AF-10 DMSP

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name): DMSP Block 5D-2 Improved/ 5D-3/Defense Meteorological Satellite Program (DMSP)

2. DoD Component: U.S. Air Force

3. 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. Program Elements/Procurement Line Items:

RDT&E: PE 35160F

PROCUREMENT: APPN 3020 PE 35160F ICN MS0554
APPN 3080 PE 35160F ICN 833340

MILCON: PE 35160F

SAF/PAS
88-0120-T

5. Related Programs: None.

[redacted]

[redacted]

6. 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 dataare 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. Program Highlights:

a. 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. 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. The first two of 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.

b. Significant Developments Since Last Report -- A successful Preliminary Design Review for spacecraft S-15 was held in Apr 87. A Critical Design Review for this spacecraft was completed in Dec 87, a month ahead of the originally scheduled date. P^3I improvements of the Satellite Data Handling System (SDHS) continued. A successful Critical Design Review for Fairchild Satellite Operations Center was held in Feb 87. Acceptance of the last four Air Force vans from Harris Corp was completed in Dec 87. C^3 Sites I, II, and V were turned over to AFSPACECOM. Program Management Responsibility Transfer of Mark IIa and IIIs occurred Jul 87. A new contract was competed and awarded in Feb 87 for flight software independent validation and verification (IV&V). FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

The DMSP expects to meet its diretted operational force structure and all mission requirements.

7. Program Highlights (Cont"d):

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

8. Decision Coordinating Paper (DCP) Threshold Breaches: None. DMSP does not have SDDMs, DCPs or SCPs.

9. Schedule:

a. Milestones--

	Production Estimate/ Approved Program	Current Estimate
Spacecraft (S11-14) Production Contract Awd	Sep 83/Sep 83	Sep 83
Primary Sensor (S11-14) Prod Contract Awd	Jan 84/	Jan 84
S11 Delivery	Jul 87/Nov 87(Ch-3)	Oct 88 (Ch-1)
IOC - Block 5D-2 Improved (F-11) 1/	TBD/TBD	TBD
Spacecraft (S15) Design Contract Awd	Nov 85/	Jul 86
IOC - Block 5D-3 (F-15) 1/	TBD/TBD	TBD
Primary Sensor (S15) Design Contract Awd	Sep 82/	Sep 82
Fairchild Satellite Operations Center (FSOC) Operational	Sep 87/	Jan 89
Thule Command Readout Station (CRS)		
(1) Operational	Sep 87/	Feb 88 (Ch-2)
(2) Deactivate Loring CRS	Sep 88/	Sep 88

1/ IOC will occur 30 days after launch (completion of on-orbit checkout). As DMSP launches on demand, no firm estimate is currently available.

b. 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 (S15) design contract award slipped from May 86 to Jul 86 when additional technical evaluation of the proposal was required. S-11 delivery slipped from Jul 87 to Nov 87 due to materials problems and late delivery of Government furnished equipment.

c. Current Change Explanations --

(Ch-1) Slipped from Nov 87 to Oct 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-2) Slipped from Sep 87 to Feb 88 due to S-Band Downlink Capability modification extending the contract period of performance.

(Ch-3) Reflects USD(A) baseline approval.

d. References --

Production Estimate:
PMD R-S 3015 (20), dated 31 May 1983, subject "DMSP"

Approved Program: PMD R-S 3015 (25), dated 1 Aug 1987, subject "DMSP"; USD(A) memo, 9 Feb 1988.

10. Technical/Operational Characteristics:

a. Technical	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
Altitude (Nautical miles)1/	450/450		450 3/
Inclination (Degrees)2/	98.7/98.7		98.7 3/
b. Operational			
Mean Mission Duration (Months):			
5D-2 Improved	33/33		33 3/
5D-3	42/42		42 3/
Early Orbit Checkout (Days):			
5D-2 Improved	30/30		30
5D-3	30-120/30 (Ch-1)		30
Primary Sensor:			
Global Resolution (Km)	2.78/2.78		2.78 3/
Theater Resolution (Km)	0.56/0.56		0.56 3/
Mark IV Transportable Tactical Terminals:			
Set Up (Hours)	8/8	4 4/	6
MTBF (Hours)	2000/2000	2000 5/	2000
MTBF (Power Generation) (Hours)	3000/3000	3000 5/	3000
Availability	0.995/0.995	0.995 5/	0.995

1/ With a difference between apogee and perigee of no more than ± 20 nautical miles
2/ ± .15°
3/ Anticipated (based on current on-orbit satellite performance)
4/ Best case
5/ Mean of all deployed vans

c. 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.

d. Current Change Explanations --

(Ch-1) Reflects USD(A) baseline approval.

e. References:

Production Estimate:
PMD R-S 3015 (20), dated 31 May 1983, subject "DMSP"

Approved Program: PMD R-S 3015 (25) dated 1 Aug 1987, subject "DMSP"; USD(A) memo, 9 Feb 1988.

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

	Production Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	$ 224.5	$ - 0.7	$ 223.8
Procurement	491.6	+27.9	519.5
Launch Vehicle	(26.0)	(-18.8)	(7.2)
Spacecraft	(201.3)	(+ 9.5)	(210.8)
Primary Sensor	(79.6)	(+ 7.4)	(87.0)
Mission Sensors	(57.1)	(+ 2.4)	(59.5)
Support	(48.9)	(+ 8.3)	(57.2)
Total Flyaway	(412.9)	(+ 8.8)	(421.7)
Ground System	(58.0)	(+13.2)	(71.2)
Field Level Support	(19.8)	(-19.8)	(0.0)*
Initial Spares	(0.9)	(+25.7)	(26.6)
Total Non-Flyaway	(78.7)	(+19.1)	(97.8)
Construction (MILCON)	2.6	+ 0.4	3.0
Total FY75 Base-Year $	718.7	+27.6	746.3
Escalation	1160.3	-34.2	1126.1
Development (RDT&E)	(318.1)	(-19.3)	(298.8)
Procurement	(839.1)	(-15.1)	(824.0)
Construction (MILCON)	(3.1)	(+ 0.2)	(3.3)
Total Then-Year $	$1879.0	$ - 6.6	$1872.4

* Current Estimate now included in Initial Spares Line.

b. Quantities --			
Development (RDT&E)	1	-	1
Procurement	8	+1	9
Total	9	+1	10

	Production Estimate	Changes	Current Estimate
c. Unit Cost --			
Procurement:			
FY75 Base-Year $	$ 61.450	$-3.728	$ 57.722
Then-Year $	166.338	-17.060	149.278
Program:			
FY75 Base-Year $	79.856	-5.226	74.630
Then-Year $	$208.778	$-21.538	$187.240

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

		Current Year		Budget Year
		Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a.	Program Acquisition--			
	(1) Cost	1872.4	1931.1	1872.4
	(2) Quantity	10	10	10
	(3) Unit Cost	187.240	193.110	187.240
b.	Current Procurement--	(FY 1988)	(FY 1988)*	(FY 1989)
	(1) Cost	80.9	80.9	176.3
	Less CY Adv Proc	-65.9	-65.9	-69.3
	Plus PY Adv Proc	-	-	35.4
	Net Total	15.0	15.0	142.4
	(2) Quantity	-	-	1
	(3) Unit Cost	N/A	N/A	142.400

* Differs from the December 1986 SAR to reflect the FY 1988 Appropriations Act.

13. Cost Variance Analysis:

a. 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	-31.0	-139.5	-0.1	-170.6
Quantity	-	+190.2	-	+190.2
Schedule	-	-	-	-
Engineering	+27.6	-23.5	-	+4.1
Estimating	+23.2	-88.6	-	-65.4
Other	-	-	-	-
Support	+10.8	+82.3	+0.7	+93.8
Subtotal	+30.6	+20.9	+0.6	+52.1
Current Changes:				
Economic	-0.1	+6.7	-0.1	+6.5
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-41.2	-28.5	-	-69.7
Estimating	-23.8	+31.0	-	+7.2
Other	-	-	-	-
Support	+14.5	-17.3	+0.1	-2.7
Subtotal	-50.6	- 8.1	0.0	-58.7
Total Changes	-20.0	+12.8	+0.6	- 6.6
Current Estimate	522.6	1343.5	6.3	1872.4

(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	+11.4	-8.2	-	+3.2
Estimating	+5.1	-43.4	-	-38.3
Other	-	-	-	-
Support	+4.2	+25.8	+0.3	+30.3
Subtotal	+20.7	+35.4	+0.3	+56.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-16.6	-10.2	-	-26.8
Estimating	-10.4	+9.4	-	-1.0
Other	-	-	-	-
Support	+5.6	-6.7	+0.1	-1.0
Subtotal	-21.4	- 7.5	+0.1	-28.8
Total Changes	- 0.7	+27.9	+0.4	+27.6
Current Estimate	223.8	519.5	3.0	746.3

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

RDT&E

Economic: revised escalation indices.

Engineering: developed satellite autonomy capability: added new wind sensor technology effort: 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.

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.

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.

Estimating: adjustments to correct current and prior year escalation; adjustments to current & prior years to reflect actuals; funding reallocated to complete spacecrafts S8-10, which are not included in SAR; extension of 5D-3 program; transition to Titan II ELV as 5D-3 booster; funding for Titan II launch vehicles refurbishment for DMSP S16-20 transferred to Space Boosters Program (PE 35119F); fully funded buy of S16-20 and associated primary sensors restructured as a multiyear procurement; revised estimate of OLS and spacecraft (for S16-20) using Jun 85 cost data; upgraded production/test equipment model for primary sensor (OLS13-21); integration funding for this added in FY 87; descoped merger of two mission sensors and reestimated mission sensor mix in Jun 85 for S16-20; acceleration of water vapor profiling capability.

13. Cost Variance Analysis (Cont'd):

Procurement (Cont'd)
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.

MILCON:
Economic: revised escalation indices.
Support: adjustments to correct current and prior year escalation; increase to backup satellite operations facility at Fairchild AFB.

c. Current Change Explanations--

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	-0.1
Deletion of requirements for wind measuring sensor. (Engineering)	-16.6	-41.2
Adjustments to current and prior years escalation. (Estimating)	+ 0.5	+ 1.2
Congressional reduction resulting in delay of spacecraft (S15), primary and mission sensor efforts and decrease in technical support in current and prior years. (Estimating)	- 7.1	-15.7
Additional funding for Block 5D-2 Improved and 5D-3/Titan II launch vehicle integration. (Estimating)	+ 0.6	+ 1.5
Re-estimate of 5D-3 development (S-15) effort. (Estimating)	- 1.1	- 2.4
Increased costs for spacecraft, primary sensor, and mission sensor support and service effort. (Estimating)	+ 4.3	+11.1

13. Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E (Cont'd)		
Revised estimate of program management and technical support. (Estimating)	- 7.6	-19.5
Increase to command, control, and communications (C^3) requirements. (Support)	+ 2.7	+ 7.1
Increased DMSP tactical terminal upgrade requirements. (Support)	+ 4.7	+11.5
Reduction in development of new combat tactical terminal. (Support)	- 2.8	- 6.8
Increased costs for launch and on-orbit checkout for spacecraft S15 and related launch and on-orbit costs added. (Support)	+ 1.0	+ 2.7
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+ 6.7
Deletion of upgrade of production units and test model for primary sensor (OLS13-21). (Engineering)	-16.8	-46.9
Requirement for a solar x-ray imager sensor (SXI). (Engineering)	+ 6.6	+18.4
Adjustments to current & prior year escalation. (Estimating)	+ 0.1	+ 0.1
Loss of advance material buy funding for the primary sensor due to Congressional disapproval of the multiyear procurement. (Estimating)	-11.0	-28.4
Restructure of the buy of primary sensors OLS17-21 from a multiyear procurement to a fully funded buy resulting from Congressional action. (Estimating)	+20.9	+59.4
Refinement of estimate for restructuring the multiyear procurement of Block 5D-3 spacecraft S16-20. (Estimating)	- 1.6	- 2.8
Adjustments to technical support and mission sensors contingency. (Estimating)	+ 1.0	+ 2.7

	(Dollars in Millions) Base-Year	Then-Year
13. Cost Variance Analysis (Cont'd):		
(2) Procurement (Cont'd)		
Adjustments to current & prior year escalation. (Support)	0	- 0.1
Adjustments to current and prior years for ground system and initial spares procurement to reflect actuals. (Support)	+ 0.3	+ 0.8
Refinement of Multi-Purpose Satellite Operations Center upgrade requirement. (Support)	- 5.9	-15.5
Increased deployed DMSP tactical terminal upgrade requirements. (Support)	+10.7	+29.2
Reduction in production of new combat tactical terminals. (Support)	- 3.5	- 9.7
Revised estimate of initial spares allocation due to better analysis of future requirements. (Support)	- 8.3	-22.0
(3) MILCON		
Revised economic escalation indices. (Economic)	N/A	- 0.1
Adjustments to current & prior year escalation. (Support)	+ 0.1	+ 0.1

d. References --

Production Estimate:
PMD R-S 3015 (20), dated 31 May 1983, subject "DMSP"

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

a. Initial SAR/Production Estimate to Current Estimate

PAUC (Initial SAR/Pd Estimate)	Changes								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
208.778	-16.410	-1.858	--	-6.560	-5.820	--	+9.110	-21.538	187.240

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

a. RDT&E--

5D-3 Spacecraft

RCA Corp, 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	$70.9	$70.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +0.2	$ -0.7
Cumulative Variances To Date (12/27/87)	$ +1.4	$ -2.3
Net Change	$ +1.2	$ -1.6

Explanation of Change: Schedule variance due to delay in choice of Apogee Kick Motor (AKM), unavailability of subcontractor interface support, noncompletion of milestones, and late application of resources. Cost variance due to planned labor and computer related expenditures being lower than anticipated. Contractor has revised estimated price at completion to reflect anticipation of changing engineering costs. Program Manager projects underrun. No impact to spacecraft or contract.

b. Procurement

5D-2 Improved Spacecraft

RCA Corp., Princeton, NJ,
F04701-83-C-0030, FPIF, 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
$171.8	$182.7	4	$179.0	$182.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ +1.9	$- 2.5
Cumulative Variances To Date (12/27/87)	$ +5.8	$-14.4
Net Change	$ +3.9	$-11.9

Explanation of Change: Schedule variance due to late material deliveries and government furnished equipment. Work arounds in process. Cost variance due to RCA's inability to hire systems engineers early in the program and a decrease in the required CDRLs currently in the baseline. Contractor's and Program Manager's estimates at completion reflect the underrun in systems engineer and data. No program impact is anticipated.

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

b. Procurement (Cont'd)

5D-3 Operational Linescan System

Westinghouse Corp., Baltimore, MD.
F04701-83-C-0048, FPIF, PI
Award: January 19, 1984
Definitized: December 2, 1983

Initial Contract Price		
Target	Ceiling	Qty
$51.5	$54.8	4

Current Contract Price		
Target	Ceiling	Qty
$64.8	$67.0	4

Estimated Price At Completion	
Contractor	Program Manager
$64.3	$64.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -0.2	$ +0.1
Cumulative Variances To Date (12/31/87)	$ -0.7	$ -3.9
Net Change	$ -0.5	$ -4.0

Explanation of Change: Schedule variance due to problems with subcontract parts impacting delivery of OLS 14 and 15, and vendor not performing as anticipated in revised progress payment plan. Cost variance due to unanticipated costs in Purchase Material and Subcontracts, design and processing problems with the Specialty Devices, Flight Hardware redesign. Contractor's and Program Manager's estimates at completion reflect parts problem impacting delivery of OLS and design problems with Specialty Devices and Flight Hardware. No program impact is anticipated.

c. MILCON - No military construction contracts.

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

a. Program Status --

(1) Percent Program Completed: 41.2% (7 yrs/17 yrs)

(2) Percent Program Cost Appropriated: 40.9% ($765.0/$1872.4)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-88)	Budget Year (FY89)	Balance to Complete FYDP (FY 90-92)	Balance to Complete Beyond FYDP (FY93-98)	Total
RDT&E	237.3	48.9	110.3	126.1	522.6
Procurement - Missile	447.0	159.3	390.4	98.5	1095.2
Procurement - Other	74.4	17.0	52.6	104.3	248.3
MILCON	6.3	-	-	-	6.3
Total	765.0	225.2	553.3	328.9	1872.4

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

c. Annual Summary -- 1/

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1982				8.4			15.5	9.2
1983				8.7			16.8	4.9
1984				9.8			19.6	3.8
1985				18.4			37.9	3.4
1986				23.9			50.4	2.8
1987				26.9			58.7	2.7
1988				17.0			38.4	3.7
1989				20.8			48.9	3.8
1990				19.7			47.9	3.6
1991				15.1			37.8	3.3
1992				9.6			24.6	2.8
1993				7.7			20.2	2.3
1994				9.3			24.9	2.3
1995				7.0			19.2	2.3
1996				7.1			19.9	2.3
1997				7.2			20.6	2.3
1998				7.2			21.3	2.3
Subtotal	1		*	223.8			522.6	

* Not Available

1/ Funding does not match the budget documentation because the SAR is limited to DMSP Blocks 5D-2 Improved and 5D-3. FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

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

c. Annual Summary -- 1/

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement - Missile								
1982			0.0	6.9			14.2	9.6
1983	2	58.7	3.8	69.2	29.8		151.2	9.0
1984			3.7	12.2			27.8	8.0
1985	2	73.5	4.9	54.6		29.8	127.9	3.4
1986		11.8*	4.1	15.2			36.8	2.8
1987			3.6	7.0			17.5	2.7
1988			2.7	27.5	65.9		71.6	3.7
1989	1	43.6	2.7	59.2	69.3	35.4	159.3	3.8
1990	1	41.6	2.7	49.5	75.4	58.5	137.0	3.6
1991	3	127.8	2.7	86.6		116.7	245.8	3.3
1992			2.6	2.6			7.6	2.8
1993			4.9	4.9			14.6	2.3
1994			5.0	5.0			15.2	2.3
1995			5.2	5.2			16.1	2.3
1996			5.2	5.2			16.8	2.3
1997			5.4	5.4			17.5	2.3
1998			5.5	5.5			18.3	2.3
Subtotal	9	357.0	64.7	421.7	240.4	240.4	1095.2	

* Primary and mission sensors for development spacecraft (S15).

1/ Funding does not match the budget documentation because the SAR is limited to DMSP Blocks 5D-2 Improved and 5D-3. FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

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

c. Annual Summary (Cont'd) -- 1/

Fiscal Year	Qty	FY 75 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement - Other								
1983				3.7			7.5	4.9
1984				6.3			13.1	3.8
1985				13.3			28.7	3.4
1986				4.2			9.4	2.8
1987				2.9			6.4	2.7
1988				3.9			9.3	3.7
1989				6.9			17.0	3.8
1990				12.6			32.0	3.6
1991				6.2			16.2	3.3
1992				1.7			4.4	2.8
1993				3.9			10.6	2.3
1994				7.4			20.7	2.3
1995				5.9			16.8	2.3
1996				6.1			17.7	2.3
1997				6.3			18.6	2.3
1998				6.5			19.9	2.3
Subtotal				97.8			248.3	
Appropriation: MILCON								
1985				3.0			6.3	3.4
Subtotal				3.0			6.3	
Total	10	357.0	64.7	746.3	240.4	240.4	1872.4	

1/ Funding does not match the budget documentation because the SAR is limited to DMSP Blocks 5D-2 Improved and 5D-3. FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated 2/	Expended 2/
Appropriation: RDT&E			
1982	15.5	15.5	15.3
1983	16.8	16.8	16.1
1984	19.6	19.6	19.3
1985	37.9	37.9	36.2
1986	50.4	50.4	37.1
1987	58.7	54.9	26.7
1988	38.4	3.2	0.1
To Complete	285.3	N/A	N/A
Total	522.6	198.3	150.8
Appropriation: Procurement - Missile			
1982	14.2	14.2	15.7
1983	151.2	151.2	99.4
1984	27.8	27.8	21.3
1985	127.9	126.3	50.6
1986	36.8	21.3	11.2
1987	17.5	9.0	8.7
1988	71.6	3.4	1.4
To Complete	648.2	N/A	N/A
Total	1095.2	353.2	208.3

2/ Obligation and Expenditure information reflects program office records as of 31 December 1987.

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

d. Obligations and Expenditures (Cont'd)--

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated 2/	Expended 2/
Appropriation: Procurement - Other			
1983	7.5	7.5	7.1
1984	13.1*	13.1**	12.4**
1985	28.7*	28.7**	13.5**
1986	9.4*	4.5**	6.2**
1987	6.4*	0.0**	0.0**
1988	9.3*	---**	---**
To Complete	173.9*	N/A	N/A
Total	248.3	53.8	39.2
Appropriation: Construction			
1985	6.3	Not Available	Not Available
Total	6.3	Not Available	Not Available

* Total includes SM-ALC/AFLC Programmed and Contractual funds in PE35160F.
** Only DMSP/AFSC obligations/expenditures are shown.

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

18. Operating and Support Costs: N/A.

2/ Obligation and Expenditure information reflects program office records as of 31 December 1987.

(2)

SAR-87-083

~~SECRET~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823 (U))
PROGRAM: Defense Support Program (DSP) (U)

AF-12 DSP

AS OF DATE: December 31, 1987

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CLEARED
AS AMENDED
MAY 12 1988

SAF/PAS
88-0134-L

1. (U) Designation and Nomenclature (Popular Name): Defense Support Program Satellite System (DSP).

(b)(1)

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

3.(U) Responsible Office and Telephone Number:

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 12431F (Shared funding)
PROCUREMENT: APPN 3020
APPN 3080
MILCON: PE 12431F

(b)(1)

6.(U) Mission and Description: The Defense Support Program is a highly available and reliable satellite-borne (b)(1) system. DSP performs the following missions: (b)(1)

(b)(1)

~~DECLASSIFY BY: HQ SPACECOM DSP 660 31 AUG 88~~
~~DECLASSIFY BY: OADR~~

~~SECRET~~

ASD(PA) DFOISR 88-T-0622

(b)(1) The system currently consists of (b)(1) (b)(1) two large processing stations, one simplified processing station, one multi-purpose facility, six mobile ground systems, and a ground communications network. The system does not replace any existing system.

7. (S) Program Highlights:

a. (S) Significant Historical Developments --

(S) The Defense Support Program (DSP) was developed as an outgrowth of the (b)(1) Full operational deployment of the DSP was completed during (b)(1) DSP satellites contain (b)(1) (b)(1)

(b)(1)

(S) (b)(1) The last five satellites (18-22) were approved by Congress to be procured using a Multi-Year Procurement (MYP) approach which saved the Government $455 million over an annual buy approach. (b)(1) (b)(1) DSP has been responsible for constructing three fixed sites, a multi-purpose training facility, one transportable data processing facility, six mobile ground systems, and provided user displays and software.

(S) The sensor has undergone Sensor Evolutionary Development (SED) improvements which are intended to prolong the useful life of each satellite, make the satellite more survivable in hostile environments, increase the viewing area of each satellite, and increase the accuracy of the data provided. The first satellite with SED enhancements was (b)(1) and the second (b)(1)

(b)(1)

[redacted]

(S) AFOTEC conducted Initial Operational Test and Evaluation (IOT&E) of the MGS (b)(1)

(b)(1)

[redacted]

(U) The fixed ground stations have completed the Large Processing Stations' Upgrade (LPSU) main computer replacement. They are undergoing the Peripheral Upgrade Program (PUP) and the Ground Stations' Upgrade for Satellite 14 (GS-14) to make them compatible with the second generation of satellites (Satellites 14-22). The CGS accepted the PUP equipment in April 1987.

(U) In 1986, Satellite 5R was demated from the Titan 34D booster due to the booster investigations caused by the previous booster disasters. This was the first time any satellite had been demated from its booster.

(b)(1)

[redacted]

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

(b)(1)

[redacted]

(U) FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

(U) The DSP is expected to satisfy mission requirements.

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

8.(U) Decision Coordinating Paper (DCP) Threshold Breaches: -- There are currently no DCP (dated September 1, 1972, #58) threshold breaches.

9.(U) Schedule:

a. (U) Milestones --

	Development Estimate/ Approved Program	Current Estimate	
(b)(1)			
(U) Delivery of Dual Satellite Software	Feb 74/Feb 74	Feb 74	
(U) Delivery of Simplified Processing Station (SPS)	Dec 78/Dec 78	Dec 78	
(U) Satellite 12 Delivery	Jun 81/Jun 81	Jun 81	
(U) Satellite 5R Delivery	Sep 82/Aug 85(Chg2)	Aug 85	
(U) Completion of Computer Replacement Large Processing Station Upgrade (LPSU)	Jun 83/Jun 83	Jun 83	
(U) Satellite 14-17 Design and Development (Start)			
(U) Sensor	Jul 81/Jul 81	Jul 81	
(U) Spacecraft	Nov 81/Nov 81	Nov 81	
(U) Long Lead Material Support (Sat 14-17)	Nov 81/Nov 81	Nov 81	
(U) Production Contract Award (Sat 14-17)			
(U) Sensor	Jan 83/Jan 83	Jan 83	
(U) Spacecraft	Oct 83/Oct 83	Oct 83	
(U) Production Contract Award Mobile Ground Terminal	Apr 81/Apr 81	Apr 81	
(b)(1)			
(U) Satellites 14-17 Delivery Start	Jan 87/Aug 88(Chg 2)	Jul 88	
(U) Satellites 18-22 MYP Contract Award	Dec 86/Aug 87(Chg2)	Aug 87	
(U) Satellites 18-22 Delivery Start	Jan 91/Jan 91	Jan 91	
(U) FOC Of MGS Sat 14 Compatibility	Feb 91/Feb 91	Feb 91	(Chg 1)
(U) System 1 Installation & Checkout (I&C)/OT&E	Dec 92/Dec 92	Dec 92	(Chg 1)
(U) Satellite Readout Station Upgrade I&C	Nov 93/Nov 93	Nov 93	(Chg 1)
(b)(1)			

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

a. (U) Additional Milestones per USD(A) Baseline Approval --

	Development Estimate/ Approved Program	Current Estimate
(U) Satellite 14-17 DSARC	-/Dec 79 (Chg 2)	Dec 79 (Chg 2)
(U) Flight 12 Launch (SED Sensor)	-/Dec 84 (Chg 2)	Dec 84 (Chg 2)
(U) Mobile Systems Turnover	-/Oct 86 (Chg 2)	Oct 86 (Chg 2)
(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. The 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.

c. (U) Current Change Explanations -- Change 1. No current milestone changes have been made; however, the last three items are new milestones that have been added. Change 2. Reflects USD(A) baseline approval.

d. (U) References --

Development Estimate:

PMD No. R-S 4047 (24), October 18, 1983;
FY 85 RDT&E Descriptive Summaries, January 1984.

Approved Program: PMD No. R-5 4047(27), 7 Jun 87; USD(A) memo, 9 Feb 1988

10. (S) Technical/Operational Characteristics:

a. (S) Technical --

	Dev Estimate/ Appr Program	Demonstrated Performance4/	Current Estimate5/
(b)(1)			

b. (S) Operational --

	Dev Estimate/ Appr Program	Demonstrated Performance4/	Current Estimate5/
(b)(1)			

* (b)(1)

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1/ (U) SED - Sensor Evolutionary Development

(b)(1)

4/ (U) Mean Values.

5/ (U) Requires System 1 Software With Stereo Processing

c. (S) Previous Change Explanations -- Caveats were added to better define what the numbers really mean. (b)(1)

(b)(1)

d. (U) Current Change Explanations:

Change 1. Current estimate is changed to reflect specs on contract with IBM for System 1 and simulation testing being conducted.

Change 2. Demonstrated performance updated to reflect the results of on-going analysis.

e. (U) References --

Development Estimates:
PMD NO. R-S 4047-(24), October 18, 1983;
Specification No. DSP-80-01, Revision A, May 1, 1984

Approved Program: PMD No. 5-R 4047(27), 7 Jun 87; USD(A) memo, 9 Feb 1988

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	$1304.3	$ +262.0	$1566.3
Procurement	3094.6	$+1027.9	$4122.5
Total Flyaway	(2364.4)	($+884.4)	($3248.8)
Other System Costs	(730.2)	($+143.5)	($873.7)
Construction (MILCON)	25.7	-0.1	$25.6
Total FY 78 Base Year $	4424.6	$+1289.8	$5714.4
Escalation	1123.0	+1445.7	2568.7
Development (RDT&E)	(-30.4)	(+237.8)	(+207.4)
Procurement	(+1151.6)	(+1207.8)	(+2359.4)
Construction (MILCON)	(+1.8)	(+0.1)	(+1.9)
Total Then-Year $	$5547.6	+2735.5	8283.1
b. Quantities --			
Development (RDT&E)	4	-	4
Procurement	15	+7	22
Total	19	+7	26
c. Unit Cost -			
Procurement:			
FY 78 Base-Year $	$206.307	-18.921	$187.386
Then-Year $	283.080	+11.552	$294.632
Program:			
FY 78 Base-Year $	232.874	$-13.089	$219.785
Then-Year $	$291.979	$+26.602	$318.581

d. Approved Design to Cost Goal -- None

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

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

	Current Year		Budget Year
	Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a. Program Acquisition --			
(1) Cost	8283.1	7615.8	8283.1
(2) Quantity	26	25	26
(3) Unit Cost	318.581	304.632	318.581
b. Current Procurement --	(FY 1988)	(FY 1988)*	(FY 1989)
(1) Cost	416.7	416.7	438.1
Less CY Adv Proc	-63.1	-63.1	-36.4
Plus PY Adv Proc	72.4	72.4	111.0
Net Total	426.0	426.0	512.7
(2) Quantity	1	1	2
(3) Unit Cost	426.000	426.000	256.350

*Differs from Dec 86 SAR based on FY 88 Appropriations Act.

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	-14.7	-181.6	-	-196.3
Quantity	-	+2309.8	-	+2309.8
Schedule	+0.4	+51.8	-	+52.2
Engineering	-	-	-	-
Estimating	+137.7	-760.8	-	-623.1
Other	-	-	-	-
Support	+252.5	+248.9	-	+501.4
Subtotal	+375.9	+1668.1	-	+2044.0
Current Changes:				
Economic	-1.1	+23.2	-0.2	+21.9
Quantity	-	+421.5	-	+421.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+133.3	+74.6	+0.2	+208.1
Other	-	-	-	-
Support	-8.3	+48.3	-	+40.0
Subtotal	+123.9	+567.6	-	+691.5
Total Changes	+499.8	+2235.7	-	+2735.5
Current Estimate	+1773.7	+6481.9	+27.5	+8283.1

(FY 1978 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	+1304.3	+3094.6	+25.7	+4424.6
Previous Changes:				
Quantity	-	+1033.8	-	+1033.8
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+71.5	-357.4	-0.3	-286.2
Other	-	-	-	-
Support	+130.7	+120.7	-	+251.4
Subtotal	+202.2	+797.1	-0.3	+999.0
Current Changes:				
Quantity	-	+177.7	-	+177.7
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+64.3	+30.3	+0.2	+94.8
Other	-	-	-	-
Support	-4.5	+22.8	-	+18.3
Subtotal	+59.8	+230.8	+0.2	+290.8
Total Changes	+262.0	+1027.9	-0.1	+1289.8
Current Estimate	+1566.3	+4122.5	+25.6	+5714.4

b. Previous Change Explanations --

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, extend development effort into FY 92, GRH reductions and to reflect PB 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, and FY 92.
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 and FY 92. Ground Station hardware acquisition. Addition of Satellite Readout Station Upgrade Project, GRH and Congressional reductions. Revised prior year actual costs. Decease to reflect PB funding.

MILCON

Estimating: revised prior year escalation indices.

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)	-	-1.1
Adjustment for current and prior year escalation changes (Estimating)	+1.1	+2.1

3. (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:	+18.4	+36.4
Satellite Readout Station Upgrade (SRSU) (Estimating)	(+11.6)	(+23.0)
System 1 Software Development (Estimating)	(+11.8)	(+22.4)
Launch Vehicle Integration Efforts (Estimating)	(-1.1)	(-2.0)
Mission A Testbed Upgrade (Estimating)	(-0.2)	(-0.4)
Implementation of the Atlantic Laser Ground Station (Estimating)	(-3.2)	(-5.8)
Software changes for transition to DSM/CSOC (Estimating)	(-0.5)	(-0.8)
Revised software development costs for the Austere Mobile Ground Terminals (MGTs) Command and Status efforts for DSP-1 Satellites (Support)	-4.5	-8.3
Program development extended one year (Estimating)	+44.8	+94.8
(2) Procurement		
Revised economic escalation indices. (Economic)	-	+23.2
Adjustment for current and prior year escalation changes:		
(Estimating)	-1.3	-2.3
(Support)	-0.1	-0.2
Acquisition of one additional satellite in FY 93	+209.9	+497.9
Acquisition of one satellite (Quantity)	(+177.7)	(+421.5)
Estimating changes applicable to the acquisition of one satellite (Estimating)	(+32.2)	(+76.4)

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

c. Current Change Explanations--

	(Dollars in Millions) Base Year	Then Year
(2) Procurement (Cont'd)		
Addition of Ground Support Costs for FY 93 (Support)	+26.9	+58.6
Reestimate of Satellite Readout Station Upgrade Costs (Support)	-14.8	-30.0
Reestimate of initial spares costs (Support)	+10.8	+19.9
Delay in production testing and launches (Estimating)	+0.6	+3.1
Reestimation of satellite procurement costs and incentives adjustments to actuals (Estimating)	-1.3	-2.8
Delay in procurement of changes to the MGS (Estimating)	+0.1	+0.2
(3) MILCON		
Revised economic escalation indices (Economic)	-	-0.2
Adjustment for current and prior year escalation changes (Estimating)	+0.2	+0.2

d. References:

PMD No. P-S 4047 (26), June 5, 1986, subject: Defense Support Program; PMP, December 15, 1982, subject: Defense Support Program.

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

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	-6.708	+26.440	+2.008	-	-15.961	-	+20.823	+26.602	318.581

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

a. RDT&E -

System 1
IBM Federal Systems 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
$80.8	N/A	0

Estimated Price at Completion	
Contractor	Program Manager
$80.6	$80.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date (10/16/87)	$+0.3	$-0.6
Net Change	$+0.3	$-0.6

Explanation of Change: This is the first time this contract has been included in the SAR. Slight negative schedule variance due to systems engineering difficulties. Slight positive cost variance in program management. Program Manager's estimate is that the contract will complete on time and at target price.

Ground Station Improvements, 86-89
IBM Federal Systems 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
$52.1	$52.1	0

Estimated Price at Completion	
Contractor	Program Manager
$50.0	$49.6

	Cost Variance	Sched Variance
Previous Cumulative Variances	$+4.8	$-1.8
Cumulative Variances to Date (10/16/87)	$+3.0	$-1.7
Net Change	$-1.8	$+0.1

Explanation of Change: Problems in Satellite 14 Operations Design and Development and Large Processing Station Software Enhancements have caused a minor schedule variance. The current cost underrun is due to late subcontractor billings and less support required than originally anticipated in several areas of management. The Program Manager's assessment is that the contract will complete on time with a slight underrun at completion and no impact to the program is expected.

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

b. Procurement

Mobile Ground Terminal-14
IBM Federal Systems Division,
Boulder, CO,
F04701-81-C-0022, FPIF/CPFF
Award: October 1, 1985
Definitized: N/A

Initial Contract Price		
Target	Ceiling	Qty
$62.0	$66.9	1

Current Contract Price		
Target	Ceiling	Qty
$146.6	$156.0	6

Estimated Price At Completion	
Contractor	Program Manager
$149.3	$150.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+1.2	$-6.1
Cumulative Variances To Date (10/16/87)	$-0.7	$-6.9
Net Change	$-1.9	$-0.8

Explanation of Change: Schedule variance due to late delivery of subcontracted items. Cost variance unfavorable mainly due to software problems requiring more resolution than previously anticipated. The Program Manager's assessment is that the contract will complete on time with a slight overrun at completion.

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
$668.9	$742.5	4

Estimated Price At Completion	
Contractor	Program Manager
$679.7	$687.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-27.0	$-25.7
Cumulative Variances To Date (11/06/87)	$-26.2	$-26.4
Net Change	$+ 0.8	$ -0.7

Explanation of Change: The contract cost variance has improved due to resolution of problems in the communications subsystems and assembly and test areas. The schedule variance remains unfavorable primarily due to late vendor deliveries to the Laser Crosslink Subsystem subcontractor. The program manager's assessment is that the contract will complete on time with a slight cost overrun at completion, but no impact to the program is expected.

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

b. Procurement (Cont)

Satellite 18-22 Production and Long-Lead
TRW Electronics and Defense,
Redondo Beach, CA,
F04701-85-C-0022, FPIF
Award: July 30, 1987
Definitized: N/A

Initial Contract Price		
Target	Ceiling	Qty
$743.5	$782.5	5

Current Contract Price		
Target	Ceiling	Qty
$741.9	$757.4	5

Estimated Price At Completion	
Contractor	Program Manager
$741.8	$743.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (11/06/87)	$+0.2	$-0.4
Net Change	$+0.2	$-0.4

Explanation of Change: Nominal positive cost variance due to systems engineering and program management. Nominal negative schedule variance in the communications subsystems. Program Manager's estimate is that the contract will complete on schedule at target price. No impact to overall program.

Sensor 18-22
Aerojet ElectroSystems Co,
Azusa, CA
F04701-85-C-0023, FPIF/AF/CPFF
Award: August 11, 1987
Definitized: N/A

Initial Contract Price		
Target	Ceiling	Qty
$432.8	$454.9	5

Current Contract Price		
Target	Ceiling	Qty
$430.7	$452.9	5

Estimated Price At Completion	
Contractor	Program Manager
$423.9	$423.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (10/31/87)	$+2.5	$+3.5
Net Change	$+2.5	$+3.5

Explanation of Change: Both positive cost and schedule variances are due mainly to the efficient management in the electronics subsystem. Program manager's estimate is that the contract will complete on schedule at target price. No impact to overall program.

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

a. Program Status --
(1) Percent Program Completed: 81.5% (22 yrs/27 years)

(2) Percent Program Cost Appropriated: 61.1% (5064.4/8283.1)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY67-88)	Budget Year (FY89)	(Then-Year Dollars in Millions) Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93)	Total
RDT&E	1,357.5	84.1	237.3	94.8	1,773.7
Procurement - Missile	2,810.9	432.8	1,602.5	497.9	5,344.1
Procurement - Other	868.5	5.3	205.4	58.6	1,137.8
MILCON	27.5	-	-	-	27.5
Total	5,064.4	522.2	2,045.2	651.3	8,283.1

c. Annual Summary --

Fiscal Year	Qty	FY 78 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E								
1967	-	-	-	57.1	-	-	30.8	3.1
1968	-	-	-	93.4	-	-	52.3	3.6
1969	-	-	-	162.4	-	-	95.3	4.2
1970	-	-	-	118.9	-	-	73.5	5.4
1971	-	-	-	130.7	-	-	84.4	5.3
1972	-	-	-	47.5	-	-	31.9	3.6
1973	-	-	-	46.7	-	-	32.3	3.6
1974	-	-	-	77.6	-	-	60.1	8.3
1975	-	-	-	40.7	-	-	34.4	10.8
1976	-	-	-	18.2	-	-	16.4	7.0
1977	-	-	-	30.4	-	-	29.4	7.5
1978	-	-	-	28.0	-	-	28.7	6.0
1979	-	-	-	27.2	-	-	30.6	8.4
1980	-	-	-	24.8	-	-	31.0	9.4
1981	-	-	-	63.2	-	-	87.6	11.9
1982	-	-	-	97.4	-	-	144.2	9.2
1983	-	-	-	76.9	-	-	119.2	4.9
1984	-	-	-	29.6	-	-	47.7	3.8
1985	-	-	-	38.1	-	-	63.3	3.4
1986	-	-	-	37.3	-	-	63.5	2.8
1987	-	-	-	63.9	-	-	112.4	2.7
1988	-	-	-	48.5	-	-	88.5	3.7
1989	-	-	-	44.4	-	-	84.1	3.8
1990	-	-	-	57.1	-	-	111.7	3.6
1991	-	-	-	30.7	-	-	61.9	3.3
1992	-	-	-	30.8	-	-	63.7	2.8
1993	-	-	-	44.8	-	-	94.8	2.3
Subtotal	4			1566.3			1773.7	-

FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

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

c. Annual Summary --

Fiscal Year	QTY	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Missile Procurement								
1969	-	-	-	31.4	-	-	17.8	3.5
1970	-	-	-	62.3	-	-	37.0	4.7
1971	3	-	282.6	165.3	-	-	102.8	5.7
1972	2	-	188.4	157.5	-	-	105.2	3.7
1973	3	-	282.6	231.4	-	-	167.1	4.7
1974	-	-	-	38.1	-	-	28.1	8.4
1975	1	-	94.2	91.7	-	-	80.8	16.3
1976	-	-	-	42.1	-	-	39.5	7.9
1977	-	-	-	27.9	-	-	28.0	7.5
1978	-	-	-	88.9	-	-	94.1	6.0
1979	-	-	-	100.0	-	-	123.4	8.7
1980	-	-	-	73.9	-	-	103.9	9.7
1981	-	-	-	33.5	-	-	51.8	11.9
1982	-	-	-	146.2	215.2	-	241.4	9.6
1983	2	-	546.0	237.6	-	107.6	414.4	9.0
1984	2	-	546.0	187.0	-	107.6	340.7	8.0
1985	-	-	-	28.3	-	-	53.0	3.4
1986	-	-	-	60.2	-	-	116.5	2.8
1987	-	-	-	136.3	216.3	-	273.6	2.7
1988	1	-	145.5	188.5	63.1	72.4	391.8	3.7
1989	2	-	291.0	201.6	36.4	111.0	432.8	3.8
1990	1	-	145.5	277.4	12.3	72.4	613.1	3.6
1991	2	-	291.0	221.8	-	72.3	502.6	3.3
1992	2	-	291.0	209.9	-	-	486.8	2.8
1993	1	-	144.9	209.9	-	-	497.9	2.3
Subtotal	22	-	3248.7	3248.7	543.3	543.3	5344.1	-

FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

DSP, December 31, 1987

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

c. Annual Summary --

Fiscal Year	QTY	FY 78 Base-Year Dollars			Then-Year Dollars			Escl Rate
		Flyaway		Total	Advance Proc		Total	(%)
		Nonrec	Rec		Debit	Credit		
Appropriation: Other Procurement								
1969	-	-	-	31.3	-	-	17.6	3.5
1970	-	-	-	144.5	-	-	85.4	4.7
1971	-	-	-	56.5	-	-	35.0	5.7
1972	-	-	-	65.2	-	-	42.0	3.7
1973	-	-	-	27.6	-	-	19.0	4.7
1974	-	-	-	2.2	-	-	1.7	8.4
1975	-	-	-	6.4	-	-	5.6	16.3
1976	-	-	-	13.7	-	-	12.8	7.9
1977	-	-	-	13.6	-	-	13.6	7.5
1978	-	-	-	0.3	-	-	0.3	6.0
1979	-	-	-	6.0	-	-	7.6	8.7
1980	-	-	-	19.0	-	-	26.6	9.7
1981	-	-	-	46.9	-	-	70.3	11.9
1982	-	-	-	64.4	-	-	100.1	9.2
1983	-	-	-	54.4	-	-	87.8	4.9
1984	-	-	-	21.7	-	-	36.1	3.8
1985	-	-	-	28.9	-	-	49.7	3.4
1986	-	-	-	70.3	-	-	124.7	2.8
1987	-	-	-	58.6	-	-	107.7	2.7
1988	-	-	-	13.1	-	-	24.9	3.7
1989	-	-	-	2.7	-	-	5.3	3.8
1990	-	-	-	59.3	-	-	120.1	3.6
1991	-	-	-	11.1	-	-	23.1	3.3
1992	-	-	-	29.2	-	-	62.2	2.8
1993	-	-	-	26.9	-	-	58.6	2.3
Subtotal	-	-	-	873.8	-	-	1137.8	-
Appropriation: Construction								
1975	-	-	-	19.6	-	-	17.3	8.5
1976	-	-	-	-	-	-	-	-
1977	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	-	-	-	1.2	-	-	1.9	4.9
1984	-	-	-	-	-	-	-	-
1985	-	-	-	4.8	-	-	8.3	3.4
Subtotal	-	-	-	25.6	-	-	27.5	-
Total	26	-	-	5714.4	-	-	8283.1	-

FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in future SAR.

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

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated 1	Expended 1
Appropriation: RDT&E			
1967	30.8	30.8	30.8
1968	52.3	52.3	52.3
1969	95.3	95.3	95.3
1970	73.5	73.5	73.5
1971	84.4	84.4	84.4
1972	31.9	31.9	31.9
1973	32.3	32.3	32.3
1974	60.1	60.1	60.1
1975	34.4	34.4	34.4
1976	16.4	16.4	16.4
1977	29.4	29.4	29.4
1978	28.7	28.7	28.7
1979	30.6	30.6	30.6
1980	31.0	31.0	31.0
1981	87.6	87.6	87.6
1982	144.2	144.2	144.2
1983	119.2	119.2	119.2
1984	47.7	47.7	47.7
1985	63.3	63.3	59.4
1986	63.5	63.5	45.1
1987	112.4	103.8	27.2
1988	88.5	5.5	0.2
1989-1993	416.2	-	-
Total	1773.7	1265.9	1161.7
Appropriation: Missile Procurement			
1969	17.8	17.8	17.8
1970	37.0	37.0	37.0
1971	102.8	102.8	102.8
1972	105.2	105.2	105.2
1973	167.1	167.1	167.1
1974	28.1	28.1	28.1
1975	80.8	80.8	80.8
1976	39.5	39.5	39.5
1977	28.0	28.0	28.0
1978	94.1	94.1	94.1
1979	123.4	123.4	123.4
1980	103.9	103.9	103.9
1981	51.8	51.8	51.8
1982	241.4	241.4	241.4
1983	414.4	414.4	414.4
1984	340.7	340.7	272.7
1985	53.0	53.0	44.8
1986	116.5	111.4	70.0
1987	273.6	250.6	81.1
1988	391.8	163.1	0
1989-1993	2533.2	-	-
Total	5344.1	2554.1	2103.9

1 Obligation and expenditure data reflects Program Office records as of 31 Dec 87.

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

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated 1	Expended 1
Appropriation: Other Procurement			
1969	17.6	17.6	17.6
1970	85.4	85.4	85.4
1971	35.0	35.0	35.0
1972	42.0	42.0	42.0
1973	19.0	19.0	19.0
1974	1.7	1.7	1.7
1975	5.6	5.6	5.6
1976	12.8	12.8	12.8
1977	13.6	13.6	13.6
1978	0.3	0.3	0.3
1979	7.6	7.6	7.6
1980	26.6	26.6	26.6
1981	70.3	70.3	70.3
1982	100.1	100.1	100.1
1983	87.8	87.8	87.8
1984	36.1	36.1	35.1
1985	49.7	49.7	35.8
1986	124.7	107.3	58.6
1987	107.7	64.9	44.9
1988	24.9	4.5	2.9
1989-1993	269.3	-	-
Total	1137.8	787.9	702.7
Appropriation: Construction			
1975	17.3	17.3	17.3
1976	-	-	-
1977	-	-	-
1978	-	-	-
1979	-	-	-
1980	-	-	-
1981	-	-	-
1982	-	-	-
1983	1.9	1.9	1.9
1984	-	-	-
1985	8.3	8.3	8.3
1986-1993	-	-	-
Total	27.5	27.5	27.5

1 Obligation and expenditure data reflects Program Office records as of 31 Dec 1987

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

18. (U) Operating and Support Costs: N/A

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SAR-87-002

~~(CONFIDENTIAL)~~

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: EA-6B

N-15 EA6B-4

AS OF DATE: DECEMBER 31, 1987

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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, D.C. 20361
   PROGRAM MANAGER: CAPT M. E. KEARNEY
   ASSIGNED: 4 AUGUST 1987
   TELEPHONE: 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 88-F-0757

6. MISSION AND DESCRIPTION: (U) MISSION: The EA-6B's primary mission is the suppression and degradation of enemy defense systems by tactical jamming of enemy electronic activity. Secondary missions include passive early warning for fleet defense and battlefield electronic surveillance. The EA-6B is a four place derivation of the highly successful A-6 series attack aircraft. It is equipped with a computer controlled electronics surveillance and control system 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-P-408 engines. The aircraft is 59 feet in length and has a wing span of 53 feet.

7. PROGRAM HIGHLIGHTS (SINCE LAST REPORT):

a. (U) Significant Historical Developments -- The basic EA-6B aircraft was introduced into the fleet in 1971. Since Initial Operating Capability (IOC) several improvements have been approved for the basic EA-6B aircraft including Expanded Capability (EXCAP), Improved Capability I (ICAP-I), Improved Capability II (ICAP-II) and Advance Capability (ADVCAP). All of these improvements have been introduced into the fleet with the exception of ADVCAP which has an (b)(1) [redacted]

An interim capability to integrate the HARM missile onto the EA-6B was accelerated into FY-86. Four successful test firings of the HARM missile preceded deployment in August 1986.

b. Significant Developments (Since Last Report):

APR 1987	--	Definitized FY-87 advanced acquisition contract ($170.2 million for twelve EA-6Bs).
MAY 1987	--	Awarded ACC Advanced Acquisition Contract for six FY-88 EA-6Bs.
JUN 1987	--	First Navy ICAP-II software was released.
SEP 1987	--	Executed buy-out of the total ALQ-99 universal exciter requirement (248) plus production options for FYs-85 through -90.
DEC 1987	--	Band two/three FSD Full Scale Development contract was awarded to Teledyne, Counter Measures Equipment Company.
DEC 1987	--	First receiver processor group engineering development model delivered.

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

8. DECISION COORDINATING PAPER (DCP) THRESHOLD BREACHES: None

9. (U) SCHEDULE:

a.

MILESTONES	PRODUCTION ESTIMATE/ APPROVED PROGRAM	CURRENT ESTIMATE
- Milestone IIIA Production Decision	N/A/NOV 70	NOV 70
- EA-6B NAVY DECISION COORDINATION PAPER NO. 20 REV A)	JUNE 1971/N/A	JUNE 1971
- EA-6B Standard Version (Board of Inspection Survey)	1971/1971/N/A	JAN 1971
- EA-6B Standard Version (Navy Preliminary Evaluation)	1972/N/A	1972
- EXCAP EA-6B Operation Evaluation	MAY 74/N/A	MAY 74
- First EXCAP Delivery	N/A/NOV 77	
- EA-6B ICAP/ALQ-99 TJS (Navy Preliminary Evaluation)	NOV 75/N/A	NOV 75
- ICAP ALQ-99 TJS (Navy Preliminary Evaluation)	APR 76/N/A	APR 76
- EA-6B EXCAP (Operation Evaluation)	JUL 76/N/A	JUL 76
- SERVICE ACCEPTANCE TRAILS & TECH EVAL OF ICAP EA-6B; FINAL REPORT	NOV 77/N/A	NOV 77
- EA-6B ICAP BIS	NOV 77/N/A	NOV 77
- EA-6B ICAP AIRCRAFT (Operational Evaluation)	MAR 79/N/A	MAR 79
- First ICAP Delivery	N/A/NOV 77	NOV 77
- NAVY PRELIMINARY EVALUATION OF AN/ ALQ-99 SYS IN EA-6B ICAPII APLN	MAR 82/N/A	MAR 82
- First ICAP-II Delivery	N/A/SEP 82	SEP 82
- ICAP II INITIAL TRIALS PHASE & NAVY TECHNICAL EVALUATION OF SERVICE ACCEPTANCE TRIALS, PROJ BIS 21323		
- FINAL REPORT	SEP 82/N/A	SEP 82
- OPERATIONAL EVALUATION OF ICAP II AIRCRAFT	DEC 82/N/A	DEC 82
- BOARD OF INSPECTION SURVEY REPORT ICAP II	AUG 83/N/A	AUG 83
- Full Scale Development (EA-6B ADVCAP)	MAR 83/MAR 83	MAR 83
First Flight	MAY 87/FEB 89	FEB 89
- CTE (Contractor Tech. Eval.)	FEB 85/FEB 89	FEB 89
- NPE I (Navy Prelim. Eval.)	AUG 87/JUL 89	JUL 89
- TECHEVAL (Technical Evaluation)	JUL 88/OCT 89	OCT 89
- OPEVAL (Operational Evaluation)	DEC 88/APR 92	APR 92
- III B Full Prod. Decision	MAY 89/N/A	MAR 93
- First Production Delivery (ADVCAP)	SEP 90/DEC 92	DEC 92

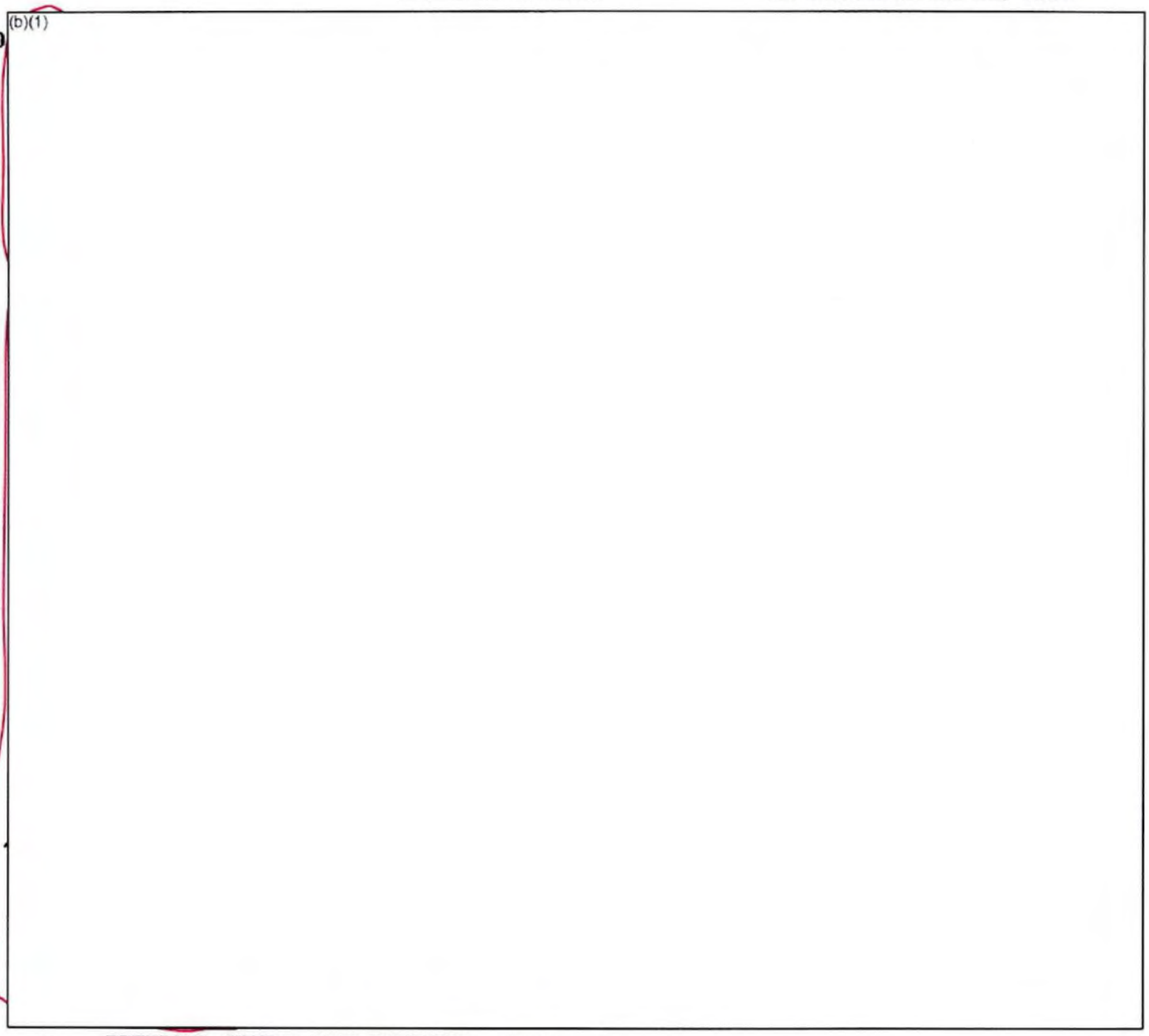
b. PREVIOUS CHANGE EXPLANATIONS: Production Estimate/Approved Program milestones were updated to reflect the approved NDCP for EW Counter Response dated 9 September 1985.

Current estimates reflects milestone changes that were necessary due to dollar reductions in the program in FY90 and FY91. The changes reflect Advance Capability (ADVCAP) going into production in FY91 instead of FY90 as originally scheduled.

c. CURRENT CHANGE EXPLANATIONS: None

d. REFERENCES: EW Counter Response NDCP dated 9 September 1985.
Approved Program: FY 88/89 Amended President's Budget Submission.
NDCP for EW Counter Response dated 9 September 1985.
DAE Baseline Approved 17 February 1988.

10 (b)(1)



c. PREVIOUS CHANGE EXPLANATIONS: None

d. CURRENT CHANGE EXPLANATION: CH-1 -- Changed to agree with the approved DAE Baseline.

e. REFERENCES: Prod Est. PBD 369-1 of 30 Dec 1966.
Approved Program: FY 88/89 Amended President's Budget Submission.
DAE Baseline Approved 17 Feb 1988.

11. PROGRAM ACQUISITION COST:

	PRODUCTION ESTIMATE BASELINE	CHANGES	CURRENT ESTIMATE
a. COST			
DEVELOPMENT (RDT&E)	210.6	+ 134.9	371.5
PROCUREMENT	2,029.0	+1,435.6	3,464.6
AIRFRAME	(639.9)	(+ 575.0)	(1,214.9)
ENGINE	(98.9)	(+ 109.1)	(208.0)
OTHER GFE	(490.9)	(+ 436.6)	(927.5)
TOTAL FLYAWAY	(1,229.7)	(+1,120.7)	(2,350.4)
OTHER WPN SYS COST	(678.6)	(+ 266.7)	(945.3)
INITIAL SPARES	(120.7)	(+ 48.2)	(168.9)
CONSTRUCTION (MILCON)	-0-	-0-	-0-
TOTAL FY-84 BASE-YEAR	2,239.6	+ 1,596.5	3,836.1
ESCALATION	508.2	+ 242.9	751.1
DEVELOPMENT (RDT&E)	(30.9)	+ (26.3)	(57.2)
PROCUREMENT	(477.3)	(+ 216.6)	(693.9)
CONSTRUCTION (MILCON)	(-0-)	(-0-)	(-0-)
TOTAL THEN-YEAR	2,747.8	+ 1,839.4	4,587.2
b. QUANTITIES			
DEVELOPMENT (RDT&E)	---	---	---
PROCUREMENT	38	+ 48	86
TOTAL	38	+ 48	86
c. UNIT COST			
PROCUREMENT			
FY-84 BASE-YEAR	53.4	- 13.1	40.3
THEN-YEAR	65.9	- 17.5	48.4
PROGRAM			
FY-84 BASE-YEAR	58.9	- 14.3	44.6
THEN-YEAR $'S	72.3	- 19.0	53.3

d. APPROVED DESIGN TO GOAL COST: N/A

e. FOREIGN MILITARY SALES: None

f. NUCLEAR COSTS: None

12. PROGRAM ACQUISITION/CURRENT PROCUREMENT COST SUMMARY: (Current (Then Year) Dollars in Millions)

	CURRENT YEAR	BUDGET YEAR	
	SAR CURRENT ESTIMATE(Dec '87)	UCR BASELINE ESTIMATE(Dec '86)	UCR BASELINE] ESTIMATE(Dec '87)
a. Program Acquisition —			
(1) Cost	4,587.2	4,442.8	4,587.2
(2) Quantity	86	80	86
(3) Unit Cost	53.3	55.5	53.3
	FY 1988 Appropriation Act		
b. Current Procurement —	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	458.1	458.1	510.9
Less CY ADV. Proc.	- 22.7	- 22.7	- 18.3
Plus PY ADV. Proc.	+ 21.3	+ 21.3	+ 22.7
Net Total	456.7	456.7	515.3
(2) Quantity	12	12	9
(3) Unit Cost	38.1	38.1	57.3

13. COST VARIANCE ANALYSIS:
a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
PRODUCTION ESTIMATE	241.5	2,506.3		2,747.8
PREVIOUS CHANGES				
ECONOMIC	+45.4	+ 508.8		+ 554.2
QUANTITY		+2,113.7		+2,113.7
SCHEDULE	+148.9	+ 25.8		+ 174.7
ENGINEERING				
ESTIMATING	- 50.4	-1,500.6		-1,551.0
OTHER				
SUPPORT		+ 403.4		+ 403.4
SUBTOTAL	+143.9	+1,551.1		+1,695.0
CURRENT CHANGES				
ECONOMIC		+ 23.6		+ 23.6
QUANTITY		+ 255.7		+ 255.7
SCHEDULE		- 106.9		- 106.9
ENGINEERING				
ESTIMATING	+ 43.3	- 85.5		- 42.2
OTHER				
SUPPORT		+ 14.2		+ 14.2
SUBTOTAL	+ 43.3	+ 101.1		+ 144.4
TOTAL CHANGES	+187.2	+1,652.2		+1,839.4
CURRENT ESTIMATES	428.7	4,158.5		4,587.2

13. COST VARIANCE ANALYSIS (CONT'D):
(FY 84 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
PRODUCTION ESTIMATE	210.6	2,029.0		2,239.6
PREVIOUS CHANGES				
ECONOMIC				
QUANTITY		+1,661.3		+1.661.3
SCHEDULE	+124.5	- 1.8		+ 122.7
ENGINEERING				
ESTIMATING	+ .7	- 575.3		- 574.6
OTHER				
SUPPORT		+ 295.6		+ 295.6
SUBTOTAL	+125.2	+1,379.8		+1,505.0
CURRENT CHANGES				
ECONOMIC				
QUANTITY		+ 190.5		+ 190.5
SCHEDULE		- 69.5		- 69.5
ENGINEERING				
ESTIMATING	+ 35.7	- 69.5		- 33.8
OTHER				
SUPPORT		+ 4.3		+ 4.3
SUBTOTAL	+ 35.7	+ 55.8		+ 91.5
TOTAL CHANGES	+160.9	+1,435.6		+1,596.5
CURRENT ESTIMATES	371.5	3,464.6		3,836.1

b. Previous Change Explanations:

(1) RDT&E
Economic: Revised escalation indices
Schedule: Increase is attributable to the introduction of ALQ-149 into ADVCAP aircraft, integration of HARM into ICAP II and ADVCAP aircraft development of Jammer Modulation, ADVCAP repricing and expanded frequency jammer development.
Estimating: Offset of revised escalation indices

(2) Procurement
Economic: Revised escalation indices
Quantity: Increase in the number of budgeted aircraft. Decrease in number of budgeted aircraft.
Support: Attributable to support material/services for Peculiar Ground Support Equipment (PGSE), Peculiar Training, Publications/Tech Data & Integrated Logistics.
Estimating: Increase is related to inventory requirements for Pods (universal exciters, transmitters) and non-recurring costs for Receiver Processor Group (RPG), ALQ-149 and other proposed changes.

c. Current Change Explanations - (Dollars in Millions)

		BASE YEAR DOLLARS	THEN YEAR DOLLARS
(1) RDT&E			
Economic:	No explanation required	N/A	-0-
Estimating:	Revised program estimates.	+ 35.7	+ 43.3
(2) Procurement			
Economic:	Revised escalation indices	N/A	+ 23.6
Quantity:	Increase in the total number of budgeted aircraft.	+ 190.5	+255.7
Schedule:	Decrease is associated with the increase in the number of budgeted aircraft.	- 69.5	-106.9
Estimating:	Decrease is due to revised program estimates.	- 69.5	- 85.5
Support:	Attributable to additional support material/services and initial spares required for the additional aircraft.	+ 4.3	+ 14.2

(3) MILCON None

c. References - Production Estimate (FY 88/89 Amended Budget Submission).

14. PROGRAM ACQUISITION UNIT COST (PAUC) HISTORY: Millions of then-year $s

a. Initial SAR Estimate to Current Baseline Estimate

PAUC Pde EST.	CHANGES (THEN YEAR DOLLARS IN MILLIONS)								PAUC CURRENT ESTIMATE)
	ECON	QTY	SCH	ENG	EST	OTHER	SPT	TOTAL	
72.311	+6.719	-12.809	+.788		-18.526		+4.856	-18.972	53.339

15. CONTRACT INFORMATION: (Then-Year Dollars in Millions)

a. RDT&E: None

b. PROCUREMENT:

AIRFRAME
Grumman Aerospace
Long Island, NY
N00019-85-C-0380/FFP
Award Date: May 1986
Definitization: March 1987

Initial Contract Price

Target	Ceiling	Qty
$170.2	N/A	12

Current Contract Price

Target	Ceiling	Qty
$170.2	N/A	12

Estimated Price at Completion

Contractor	Program Manager
$170.2	$170.2

Previous Cumulative Variances To Date -- N/A
Cummulative Variance to Date (12/31/87) -- N/A

16. PROGRAM FUNDING SUMMARY: (Current Estimate in Millions of Dollars)

a. Program Status
(1) Percent Program Completed: 66.7%
(2) Percent Program Cost Appropriated: 52.7% ($2,399.1/$4,554.9)

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

Appropriation	Current & Prior Yrs (FY84-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Balance to Complete Beyond FYDP (FY93)	Total
RDT&E	259.4	32.2	137.1	-0-	428.7
Procurement	2,141.2	510.9	1,506.4	---	4,158.5
MILCON	-0-	-0-	-0-	---	-0-
TOTAL	2,400.6	543.1	1,643.5	---	4,587.2

FISCAL YEAR	QTY	FY84 Base-Year Dollars FLYAWAY NONREC	FLYAWAY REC	TOTAL	Then-Year Dollars ADVANCE PROCUREMENT DEBIT	ADVANCE PROCUREMENT CREDIT	TOTAL	ESCL RATE (%)
c. Annual Summary								
APPROPRIATION: RDT&E								
1984				24.8			25.3	3.80
1985				34.1			35.8	3.40
1986				75.1			81.1	2.80
1987				45.0			50.1	2.70
1988				58.2			67.2	3.70
1989				26.9			32.2	3.80
1990				35.1			43.4	3.60
1991				31.9			40.7	3.30
1992				40.4			52.9	2.80
SUB-TOTAL				371.5			428.7	
APPROPRIATION: PROCUREMENT								
1983				16.2	17.0		17.0	9.00
1984	8	2.5	221.5	440.2	22.7	17.0	463.2	8.00
1985	6	9.9	180.8	337.1	20.2	22.7	366.3	3.40
1986	12	27.3	274.3	366.4	21.5	20.2	411.1	2.80
1987	12	3.7	275.7	366.2	21.3	21.5	425.5	2.70
1988	12	4.6	284.5	380.7	22.7	21.3	458.1	3.70
1989	9	46.6	244.1	411.0	18.3	22.7	510.9	3.80
1990	9	44.6	201.9	371.1	19.3	18.3	475.0	3.60
1991	9	25.5	212.3	371.6	36.1	19.3	488.3	3.30
1992	9	12.3	278.3	403.8	36.9	36.1	543.1	2.80
SUB-TOTAL	86	177.0	2,173.4	3,464.6	236.0	199.1	4,158.5	
TOTAL	86	177.0	2,173.4	3,836.1	236.0	199.1	4,587.2	

d. Obligations and Expenditures

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
Appropriation: RDT&E			
1984	25.3	25.3	23.1
1985	35.8	35.8	32.2
1986	81.1	81.1	74.1
1987	50.1	50.1	33.6
1988	67.2		
To Complete	169.2	N/A	N/A
Total	428.7	192.3	163.0

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation:	Procurement	
1984	480.2	480.2	428.3
1985	389.0	366.4	284.7
1986	431.3	413.6	248.5
1987	447.0	384.2	51.2
1988	479.4	34.7	4.8
1989	22.7	.3	-0-
To Complete	1,887.2	N/A	N/A
Total	4,158.5	1,679.4	1,017.5

17. PRODUCTION RATE DATA:

a. Annual Production Rates

Fiscal Year	Production Rates (Quantity/Year) Development Estimate	Production Estimate Baseline	Current Estimate	Maximum Economic
1984	N/A	8	8	24
1985	N/A	6	6	24
1986	N/A	12	12	24
1987	N/A	12	12	24
1988	N/A	12	12	24
1989	N/A	12	9	24
1990	N/A	12	9	24
1991	N/A	12	9	24
1992	N/A		9	24

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	+1,596.5	3,836.1	---	3,836.1
	(TY $)	2,747.8	+1,839.4	4,587.2	---	4,587.2
Pauc	(BY $)	58.9	- 14.3	44.6	---	44.6
	(TY $)	72.3	- 19.0	53.3	---	53.3

c. Schedule Variance

	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date	9/85	--	8/85	---	9/85
Duration	70	+36	106	-0-	106
End Date	7/91	--	7/94		7/94

d. Deliveries (Plan/Actual)

	To Date
RDT&E	0/0
Procurement	19/19

18. Operating and Support Cost: N/A

(3)

SAR-87-005

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: E-6A

N-14 E-6A

AS OF DATE: DECEMBER 31, 1987

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1. Designation/Nomenclature: E-6A Airborne Strategic Communications

2. DoD Component: U. S. Navy

3. Responsible Office and Telephone Number:

E-6A Program Office (PMA271)
Naval Air Systems Command
Washington, DC 20361

PM: CAPT Ernest L. Lewis, USN
Assigned: 30 December 1985
AUTOVON: 222-8086
COMM: 202-692-8086

4. Program Elements/Procurement Line Items
RDT&E: 0101402N

PROCUREMENT: 11315N APPN 1506 ICN 0435

5. Related Programs: EC-130Q/TACAMO; High Power Transmit Set (HPTS); E-3; TRIDENT Fleet

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OASD(PA) DFOISR 88-F-0942

6. Mission and Description: The E-6A, 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 mockup 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.

b. Significant Developments Since Last Report -- 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, incorporating increased skin thickness and additional stringers. The Long Trailing Wire Antenna (LTWA) touched the tail stabilator at high bank angle in August 1987. Alternatives to fix problem now being evaluated. 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

Program Highlights (Cont'd)

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 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).

8. Decision Coordinating Paper (DCP) Threshold Breached: Revising of DCP was in process in anticipation of a Milestone III Decision Briefing scheduled for July 1987. Briefing was superceded by SECNAV ltr of 3 February 1986, therefore DCP was not required.

9. Schedule

a. Milestones —	Development/Approved Estimate/Program	Current Estimate
Justification for Major Systems New Starts (JMSNS)(Substantiation with POM)	Jul 81/Jul 81	Jul 81
Program Initiation (NADEC Decision Memo)	Dec 81/Dec 81	Dec 81
Operational Requirement	Jan 82/Jan 82	Jan 82
Request for Quotations (RFQ)	Mar 82/Mar 82	Mar 82
Award of Full Scale Development Contract	May 83/Apr 83	Apr 83
Preliminary Design Review (PDR)	Oct 83/Nov 83	Nov 83
DNSARC III	Dec 83/Apr 85	*Superceded
Release Long Lead Production Funds	Dec 83/Jun 84	Jun 84
Critical Design Review (CDR)	Aug 84/Jul 85	Jul 85
First Test Flight	Aug 86/Jun 87	Jun 87
Navy Technical Evaluation (NTE)	Aug 87/Jul 88	Jul 88
Deliver Prototype Aircraft	Feb 87/Jan 89	Mar 89(CH-1)
Deliver First Production Aircraft	Aug 87/Jan 89	Mar 89(CH-2)

(b)(1)

* DNSARC III was superceded by SECNAV ltr of 3 February 1986 approving production.

b. Previous Change Explanations -- N/A

c. Current Change Explanations —

(CH-1) ECPs for KG-84 (Crypto equipment replacing the KW-7) and EVS (Enhanced VERDIN Systems.
(CH-2) ECPs for KG-84 (Crypto equipment replacing the KW-7) and EVS (Enhanced VERDIN System).
(CH-3) IOC date reflects current 2-3-3-7 production aircraft buy schedule.
(CH-4) FOC date accelerated due to accelerated aircraft delivery schedule because of contract savings and production efficiencies.

Schedule: (Cont'd)

d. References:

Development Estimate: Operational Requirement W1438 11 Jan 1982 Annex C to JSPD 84-91 (Secret) PE 0101402N.

Approved Program: FY 1988/1989 Amended President's Biennial Budget DAE approved 17 February 1988.

10. Technical/Operational Characteristics:

	Development/Approved Estimate/Program	Demonstrated Performance	Current Estimate
a. Technical --			
(U) Weight Empty (lbs)	165,125/167,800	TBD	167,800
(U) Maximum Gross Weight (lbs)	342,000/342,000	TBD	342,000
(U) Maintainability(manhours/flt hr)	16.5/ 16.5	TBD	16.5
(b)(1)			
b. Operational			
(U) Cruise Speed (Mach No.)	.75/ .75	TBD	.75
(U) Endurance (hours)	14/ 14	TBD	14
(U) Critical Field Length(feet)	7,500/ 7,500	TBD	7,500
(U) Range (unrefueled: NM)	6,000/ 6,000	TBD	6,000
(U) Extended Airborne Operations(hr)	72/ 72	TBD	72
(U) EMP Hardened (Upset Margin - db)	30/ 30	TBD	30
(b)(1)			
(U) Emergency Operations	Critical Engine Inoperative	TBD	Critical Engine Inoperative

c. Previous Change Explanation -- N/A

d. Current Change Explanations -- N/A

e. References --

Development Estimate: Operational Requirement W1438 11 Jan 1982 Annex C to JSPD FY 84-91 PE #0101402N.

Approved Program: FY 1988/1989 Amended President's Biennial Budget. DAE Approved 17 February 1988.

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

	Development Estimate	Changes	Current Estimate
a. Cost —			
Development (RDT&E)	292.6	+ 33.9	326.5
Procurement	1,292.1	- 223.4	1,068.7
Airframe	(653.7)	(+230.8)	(884.5)
Engines	(168.7)	(-168.7)	(-0-)
Avionics	(121.6)	(-120.5)	(1.1)
Total Flyaway	(944.0)	(- 58.4)	(885.6)
Other Wpn Sys Cost	(213.2)	(-106.1)	(107.1)
Initial Spares	(134.9)	(- 58.9)	(76.0)
Construction (MILCON)	-0-	37.4	37.4
Total FY 82 Base-Year $	1,584.7	-152.1	1,432.6
Escalation	667.0	-199.4	467.6
Development (RDT&E)	(61.6)	(- 9.6)	(52.0)
Procurement	(605.4)	(-202.3)	(403.1)
Construction (MILCON)	(-0-)	(+ 12.5)	(12.5)
Total Then-Year $	2,251.7	-351.5	1,900.2
b. Quantities —			
Development (RDT&E)	1	-	1
Procurement	14	+1	15
Total	15	+1	16
c. Unit Cost —			
Procurement			
FY 82 Base-Year $	92.3	- 21.1	71.2
Then-Year	135.5	- 37.4	98.1
Program:			
FY 82 Base-Year $	105.6	- 16.1	89.5
Then-Year $	150.1	- 31.3	118.8

d. Approved Design to Cost Goal — None

e. Foreign Military Sales — None

f. Nuclear Costs — None

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

	Current Year		Budget Year
	SAR Current Estimate Dec 87 SAR	UCR Baseline Estimate Dec 86 SAR	UCR Baseline Estimate Dec 87 SAR
a. Program Acquisition:			
(1) Cost	1,900.2	1,927.9	1,900.2
(2) Quantity	16	16	16
(3) Unit Cost	118.8	120.5	118.8
	FY 1988 Appropriation Act		
b. Current Procurement:	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	323.0	323.0	363.6
Less CY Adv Proc	137.7	137.7	-0-
Plus FY Adv Proc	71.3	71.3	137.7
Net Total	256.6	256.6	501.3
(2) Quantity	3	3	7
(3) Unit Cost	85.5	85.5	71.6

13. Cost Variance Analysis

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	354.2	1,897.5	-	2,251.7
Previous Changes:				
Economic	- 9.3	- 216.4	- 2.2	- 227.9
Quantity		+ 61.2		+ 61.2
Schedule		- 5.5		- 5.5
Engineering	- 2.9	+ 50.5		+ 47.6
Estimating	+ 34.4	+ 3.1	+ 52.1	+ 89.6
Other	-	-	-	-
Support	+ 2.9	- 291.7	-	- 288.8
Subtotal	+ 25.1	- 398.8	+ 49.9	- 323.8
Current Changes:				
Economic	- 1.1	+ 5.0	+ .3	+ 4.2
Quantity	-	-	-	-0-
Schedule	-	-	-	-0-
Engineering	-	-	-	-0-
Estimating	+ .3	- 1.0	- .3	- 1.0
Other	-	-	-	-0-
Support	-	- 30.9	-	- 30.9
Subtotal	- .8	- 26.9	-0-	- 27.7
Total Changes	+ 24.3	- 425.7	+ 49.9	- 351.5
Current Estimate	378.5	1,471.8	49.9	1,900.2

FY 82 Constant Dollars (Base Year) in Millions

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	292.6	1,292.1	-	1,584.7
Previous Changes:				
Quantity	-	+ 41.1	-	+ 41.1
Schedule	-	- 5.3	-	- 5.3
Engineering	- 2.4	- 7.1	-	- 9.5
Estimating	+ 27.9	- 55.0	+ 37.5	+ 10.4
Other	-	-	-	-
Support	+ 8.2	- 185.0	-	- 176.8
Subtotal	+ 33.7	- 211.3	+ 37.5	- 140.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+ .2	+ 9.8	- .1	+ 9.9
Other	-	-	-	-
Support	-	- 21.9	-	- 21.9
Subtotal	+ .2	- 12.1	- .1	- 12.0
Total Changes	+ 33.9	- 223.4	+ 37.4	- 152.1
Current Estimate	326.5	1,068.7	37.4	1,432.6

b. Previous Change Explanations --

RDT&E
- Economic: revised escalation indices
- Engineering: revised test program scope
- Estimating: communications suites integration and testing
- Support: increased field requirements

Procurement
- Economic: revised escalation rates
- Schedule: delivery schedule stretched out one year
- Engineering: revised mission avionics requirements
- Estimating: reduction caused by restructured program; revised change order; availability of independent cost estimate
- Support: refinement of Support Equipment Requirement Document

MILCON
Economic: revised escalation rates
Estimating: reduced hangar facility requirements

c. Current Change Explanations

	(Dollars in Millions) Base Year	Then Year
(1) RDT&E		
Revised escalation rates (Economic)	N/A	- 1.1
Refined estimates	+ .2	+ .3
(2) Procurement		
Revised escalation rates (economic)		+ 5.0
Refined estimates	- .6	- 1.0
Correction of error in prior reports (est)	+ 10.4	-
Refinement of requirements for support equipment, peculiar training equipment, technical pubs, and production support based on current basing plan and support concept (support)	- 21.9	- 30.9
(3) MILCON		
Revised escalation rates (economic)	N/A	+ .3
Refined estimates	- .1	- .3

d. References —

Development Estimate: Operational Requirement W1438 11 Jan 1982
Annex C to JSPD FY 84-91 PE #0101402N.

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 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	Spt	Other	Total	
150.113	-13.981	-5.557	-.344	+2.975	+5.538	-19.981	-	-31.350	118.763

15. Contract Information: (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			Estimated Price At Completion	
Target	Ceiling	Qty	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

Explanation of Change: FSD contract definitized FFP.

b. Procurement —

Production Aircraft	Initial Contract Price		
	Target	Ceiling	Qty
Boeing Aerospace Co., Seattle, Washington	NTE 1,305.3	N/A	14

N00019-83-C-0176, Advance Acquisition Contract
Award date: 30 June 1984
Definitization: FY 86 - 88 scheduled for Sep 88. FY 89 option will be exercised when funds are appropriated.

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
NTE 1,380.3	1,380.3	15	NTE 1,295.3	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

Explanation of Change: N/A

c. MILCON: N/A

[1] Disclosure could jeopardize negotiations.

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

a. Program Status —
(1) Percent Program Completed: 88.9 (8 yrs/9 yrs)
(2) Percent Program Cost Appropriated: 1,498.5/1,900.2 78.9%

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

Appropriation	Current & Prior Yrs (FY81-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-91)	Balance to Complete Beyond FYDP (FY92)	Total
RDT&E	378.5	-	-	-	378.5
Procurement	1,108.2	363.6	-	-	1,471.8
MILCON	11.8	38.1	-	-	49.9
Total	1,498.5	401.7	-	-	1,900.2

c. Annual Summary —

Fiscal Year	Qty	FY 82 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Flyaway Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Then-Year Dollars Total	Escl Rate (%)
Appropriation: RDT&E								
1981				.9			.9	10.6
1982				1.0			1.0	7.6
1983	1			34.7			37.2	4.9
1984				63.1			70.0	3.8
1985				58.9			67.4	3.4
1986				76.7			90.2	2.8
1987				62.8			76.1	2.7
1988				28.4			35.7	3.7
Subtotal	1			326.5			378.5	

16. Program Funding Summary (Cont'd)

Appropriation: Procurement

1984				79.6	98.4		98.4	8.0
1985								3.4
1986	2	117.8	130.9	255.4	53.1	98.4	336.5	2.8
1987	3	2.6	167.9	256.6	71.3	53.1	350.3	2.7
1988	3	1.4	154.0	228.3	137.7	71.3	323.0	3.7
1989	7		311.0	248.8		137.7	363.6	3.8
1990								
1991					-	-	-	-
Subtotal	15	121.8	763.8	1,068.7	360.5	360.5	1,471.8	

Appropriation: MILCON

1988			9.1			11.8	3.7
1989			28.3			38.1	3.8
Subtotal			37.4			49.9	

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1981	.9	.9	.9
1982	1.0	1.0	1.0
1983	37.2	37.2	37.2
1984	70.0	70.0	70.0
1985	67.4	67.3	63.9
1986	90.2	89.9	88.7
1987	76.1	76.1	17.8
To Complete	35.7	3.7	.0
Total	378.5	346.1	279.5
Appropriation: Procurement			
1984	98.4	98.1	98.7
1985	-	-	-
1986	336.5	336.4	238.3
1987	350.3	269.4	44.3
To Complete	686.6	7.8	.7
Total	1,471.8	711.7	382.0
Appropriation: MILCON			
1988	11.8	-	-
1989	38.1	-	-
Total	49.9	-	-

17. Production Rate Data

a. Annual Production Rates:

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1985	2	N/A	0	N/A
1986	3	N/A	2	N/A
1987	3	N/A	3	N/A
1988	3	N/A	3	N/A
1989	3	N/A	7	N/A
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	1,432.6	N/A	N/A
TY$	N/A	N/A	1,900.2	N/A	N/A
PAUC BY$	N/A	N/A	89.5	N/A	N/A
TY$	N/A	N/A	118.8	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	JAN/91	N/A	N/A

d. Deliveries (Plan/Actual) —

	To Date
RDT&E	0/0
Procurement	0/0

18. Operating and Support Costs: N/A

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: Army Tactical Missile System (Army TACMS)

A4 ATACMS

AS OF DATE: December 31, 1987

87-025

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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: N/A

5. (U) Related Programs: Multiple Launch Rocket System (MLRS); Infrared Terminally Guided Submunition (IRTGSM)

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.

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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. The contract contains language that requires the government to exercise these options in the quantity at the time stated (in sequence) or all the follow-on options are void. Failure to exercise any of these options will significantly impact the cost of Army TACMS.

b. (U) Accomplishments during the past year are as follows:

(1) Static test firing of seven flightweight rocket motors successfully completed during 1987.

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~~19 Sep 87~~
~~DECLASSIFY ON: OADR~~

(2) Hardware critical design review held March 31-April 2, 1987.

(3) M74 Grenade Fuzes (M219E1A1) successfully tested in April 1987.

(4) Army TACMS was selected to receive the DoD Acquisition Streamlining Excellence Award at the National Conference on Acquisition Streamlining.

(5) Critical Design Review for missile software held May 19-20, 1987.

(6) The Army TACMS development baseline document was signed by the Army Acquisition Executive July 27, 1987 and approved by the Defense Acquisition Executive February 26, 1988. Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.

(7) Army TACMS Integration Contract Summary Critical Design Review (CDR) was successfully conducted August 26, 1987. The CDR included all hardware items except the fire direction data manager (FDDM).

(8) During October 1987 the first motor case burst test was successfully completed.

(9) During December 1987, the prime contractor's office was activated at the White Sands Missile Range test site.

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

8. (U) DCP Threshold Breaches: There are currently no DCP (approved September 11, 1986) or SDDM (dated March 18, 1986) breaches.

9. (U) Schedule:

a. (U) Milestones	Development 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

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~~18 Sep 87~~
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9. (U) Schedule (continued):

(U) Milestones	Development Estimate/ Approved Program	Current Estimate
(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 /Jun 88	Jun 88
(U) EDT-C Completion	N/A /Aug 88	Aug 88
(U) DA Program Review	N/A /Oct 88	Oct 88
(U) LRIP Contract Option Award	N/A /Oct 88	Oct 88
(U) DT II Completion	N/A /Mar 89	Mar 89
(U) OT II Completion	N/A /Aug 89	Aug 89
(U) Type Classification Limited Production (TC-LP)	N/A /Sep 88	Sep 88 (Chg 2)
(U) Milestone III (ASARC)	N/A /Sep 89	Sep 89 (Chg 1)

(b)(1)

b. (U) Previous Change Explanations: (Chg 1) Milestone III was added to the schedule.

c. (U) Current Change Explanations:

(U) (Chg 2) Milestone for TC-LP added to the schedule.

(U) (Chg 3) Milestone for FUE added to the schedule.

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: Program Baseline approved February, 26, 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(b)(1)			
(U) Launcher Reliability	N/A /54 hr MTBOMF		54

OASD(PA) DFOISR 88-F-0999

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

b. (U) Operational	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(b)(1)			
(U) Missile Launch Pod Assembly Weight	N/A/NTE 2,300 kg		NTE 2,300 kg

c. (U) Previous Change Explanations: None.

d. (U) Current Change Explanations: None.

e. (U) References:

(U) Development Estimate: SDDM, March 18, 1986, subject: Army Tactical Missile System (Army TACMS) Block I; based on Milestone II (DSARC) decision.

(U) Approved programs: Program Baseline approved February 26, 1988.

~~CLASSIFIED BY: ARMY TACMS SCG~~
~~18 Sep 87~~
~~DECLASSIFY ON: OADR~~

~~Conceal in Classification~~
~~7 APR 1988~~

~~APR 7 1988~~

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

a. (U) Cost:	Development Estimate	Changes	Current Estimate
Development (RDT&E)	$ 651.5	$ - 60.7	$ 590.8
Procurement	484.4	- 25.5	458.9
Missiles	(460.8)	(- 8.6)	(452.2)
Ground Support Equipment	(.8)		(.8)
Total Flyaway	(461.6)	(- 8.6)	(453.0)
Other Weapon System Cost	(22.2)	(- 16.4)	(5.8)
Initial Spares	(.6)	(- .5)	(.1)
Total FY87 Base-Year $	$1135.9	$ - 86.2	$1049.7
Escalation	86.4	8.2	94.6
Development (RDT&E)	(5.2)	(2.5)	(7.7)
Procurement	(81.2)	(5.7)	(86.9)
Total Then-Year $	$1222.3	$(- 78.0)	$1144.3

b. (U) Quantities:			
Development (RDT&E)	50	-0-	50
Procurement	1000	-0-	1000
Total	1050		1050

c. (U) Unit Cost:			
Procurement			
FY87 Base-Year $	$ .48	- .02	$ .46
Then-Year $	$ .57	- .02	$ .55
Program:			
FY87 Base-Year $	$ 1.08	$- .08	$ 1.00
Then-Year $	$ 1.16	$- .07	$ 1.09

d. (U) Approved Design-to-Cost Goal (Average Unit Flyaway Cost)

Missiles	Development Estimate/ Approved Program	Current Estimate	Latest Approved Threshold
@ Qty:	1000/1000	1000	1000
@ Peak Rate:	38-Mo/38-Mo	38-Mo	38-Mo
FY87 Base Year $	$.462/$.449	$.453	$.494
Then-Year $	$.539/$.513	$.538	$.593

e. (U) Foreign Military Sales: None.

f. (U) Nuclear Costs: None.

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

		Current Year		Budget Year
		Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. (U)	Program Acquisition			
(1) (U)	Cost	1144.3	1163.3	1144.3
(2) (U)	Quantity	1050	1050	1050
(3) (U)	Unit Cost	1.1	1.1	1.1
b. (U)	Current Procurement	FY88	FY88	FY89
(1) (U)	Cost	N/A	N/A	80.6
	Less CY Adv Proc			- 4.3
	Plus PY Adv Proc			1.8
	Net Total			78.1
(2) (U)	Quantity	N/A	N/A	66
(3) (U)	Unit Cost	N/A	N/A	1.2

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	- 46.1	- 10.0		- 56.1
Other				
Support				
Subtotal	- 47.0	- 12.0	-0-	- 59.0
Current Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating	- 11.2	- 7.8		- 19.0
Other				
Support				
Subtotal	- 11.2	- 7.8	-0-	- 19.0
Total Changes	- 58.2	- 19.8	-0-	- 78.0
Current Estimate	598.5	545.8	-0-	1144.3

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 Other Support	- 44.5	- 12.2		-56.7
Subtotal	- 44.5	- 12.2	-0-	- 56.7
Current Changes: Quantity Schedule Engineering Estimating Other Support	- 16.2	- 13.3		- 29.5
Subtotal	- 16.2	- 13.3	-0-	- 29.5
Total Changes	- 60.7	- 25.5	-0-	- 86.2
Current Estimate	590.8	458.9	-0-	1049.7

b. (U) Previous Change Explanations

		(Dollars in Millions) BASE YEAR	THEN YEAR
(1) (U) RDTE			
Revised economic escalation indices. (Economic)			$ - .9
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 (estimating).		$ - 44.5	$ - 46.1
(2) (U) Procurement			
Revised economic escalation indices (economic).			$ - 2.0
Program cost estimate revision is mandated by a funding reduction contained in PBD 104. The following areas will be reduced in order to comply with approved funding (estimating):		$ - 12.2	$ - 10.0
(Engineering Services		$ - 2.5	$ - 2.5)
(TRACE-P		$ - 9.7	$ - 7.5)

13. (U) Cost Variance Analysis (Cont)

c. (U) Current Change Explanations:

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDTE		
Reduction is the result of reprogramming to other projects (estimating).	- 16.2	- 11.2
(2) (U) Procurement		
Reduction is the result of a program cost estimate revision. There is no adverse impact to the procurement program. Funds were reduced from the hardware funds as opposed to the advance procurement funds (estimating).	- 13.3	- 7.8

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	-.003				-.071			-.074	1.090

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: Not Applicable

Initial Contract Price		
Target	Ceiling	Qty
$180.4	$203.4	50

Current Contract Price		
Target	Ceiling	Qty
$180.7	$203.7	50

Estimated Price at Completion	
Contractor	Program Manager
$ 180.7	$ 182.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ .277	$ -3.520
Cumulative Variances to Date 31 October 1987	$ -1.015	-7.280
Net Change	$ -1.292	$ -3.760

M/LPA

Explanation of Change: The unfavorable cost variance is due to an increase in overhead rates, use of overtime, and rework of hardware. The major drivers of the unfavorable schedule variance which occurred earlier in the program were the late release of engineering drawings and engineering redesigns. This delay caused slippage in the procurement of hardware and software. The major casting vendors are being closely monitored and supported by the prime contractor due to late deliveries of hardware to improve the schedule posture. Fifty-two percent or $3.7M of the schedule variance is in the material area; $2.0M is currently in stores awaiting issue and utilization. Approximately $1.1M of the schedule variance is associated with overhead rates and factors. No program impact is expected. This contract also includes $2.7 in firm-fixed price RDTE Test Support Flight Options which are not reflected in the above prices. There are also Production Options with not-to-exceed amounts that may total up to $386.0.

Integration

LTV Aerospace & Defense Co.
Dallas, TX
DAAH01-86-C-A037, FPI
Award: 27 March 1986
Definitized: Not Applicable

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 (b)(1)	Program Manager (b)(1)
$ 94.4	$108.1	0		
			Cost Variance	Schedule Variance
Previous Cumulative Variances			$ .733	$ -1.797
Cumulative Variances to Date 31 October 87			$ .779	$ -6.169
Net Change			$ .046	$ -4.372

Explanation of Change: The full-scale development launcher and ground support equipment integration contract unfavorable schedule variance is due to late start of the development of the software and hardware earlier in the program. Effort is proceeding based on the work-around schedule. The favorable cumulative cost variance is due to manufacturing engineering's delay in allocating manpower to several tasks. This contract also includes a maintenance effort under a cost-plus-fixed-fee portion in the amount of $3.4M which is not reflected in the above prices.

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: 69% (9 yrs/13 yrs)

(2) (U) Percent Program Cost Appropriated: 40% (461.1/1144.3)

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

Appropriation	Current & Prior Yrs (FY80-88)	Budget Year (FY89)	Balance To Complete FYDP (FY 90-92)	Balance To Complete Beyond FYDP (FY93)	Total
RDTE	$ 452.0	$ 84.4	$ 62.1	-0-	$ 598.5
Procurement	9.1	80.6	456.1	-0-	545.8
MILCON	-0-	-0-	-0-	-0-	-0-
Total	$ 461.1	$ 165.0	$ 518.2	-0-	$ 1144.3

16. (U) Program Funding Summary (Cont)

c. (U) Annual Summary. Program funding and quantities reflect the FY88/89 President's Budget except as adjusted for FY88 congressional direction and FY89 amended budget decisions.

Fiscal Year	Qty	FY 87 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1980				12.7			9.4	10.6
1981				17.1			14.0	10.6
1982				13.6			11.8	7.6
1983				6.7			6.0	4.9
1984				53.6			50.2	3.8
1985				79.2			76.4	3.4
1986				107.1			106.6	2.8
1987				74.4			76.3	2.7
1988				95.2			101.3	3.7
1989				76.6			84.4	3.8
1990				54.6			62.1	3.6
Subtotal	50			590.8			598.5	
Appropriation: Procurement								
1988		N/A	N/A	8.3	1.8		9.1	3.7
1989	66	N/A	72.0	70.6	4.3	1.8	80.6	3.8
1990	276	N/A	129.3	134.6	7.6	4.3	158.2	3.6
1991	452	N/A	175.7	173.4	4.9	7.6	209.0	3.3
1992	206	N/A	76.0	72.0		4.9	88.9	2.8
Subtotal	1000		453.0	458.9	18.6	18.6	545.8	
TOTAL	1050			1049.7			1144.3	

16. (U) Program Funding Summary (Cont)

d. (U) Obligations and Expenditures:

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1980	9.4	9.4	9.4
1981	14.0	14.0	14.0
1982	11.8	11.8	11.8
1983	6.0	5.7	5.7
1984	50.2	34.0	32.8
1985	76.4	51.2	42.1
1986	106.6	106.6	91.4
1987	76.3	76.3	25.0
1988	101.3	40.4	.4
1989	84.4	N/A	N/A
1990	62.1	N/A	N/A
Total	598.5	349.4	232.6

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	66	N/A	66	N/A
1991	276	N/A	276	N/A
1992	452	N/A	452	N/A
1993	206	N/A	206	N/A

17. Production Rate Data (Cont)

b. (U) Cost Variance:

Item	Production Estimate	Variance Estimate	Current Estimate	Variance Economic	Maximum Economic
Prog Acq Cost (BY $)	N/A	N/A	1049.7	N/A	N/A
(TY$)	N/A	N/A	1144.3	N/A	N/A
PAUC (BY$)	N/A	N/A	1.0	N/A	N/A
(TY$)	N/A	N/A	1.1	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	06/88	N/A	06/88
Duration (in months)	N/A	N/A	57	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	03/93	N/A	N/A

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

	To Date
RDTE	0/0
Procurement	0/0

18. (U) Operating and Support Costs: N/A.

SAR-87-075

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: V-22 (OSPREY)

N-42 V-22

AS OF DATE: December 31,1987

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CLEARED APR 14 1988

1. Designation/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: COL H.W. Blot, USMC
   Assigned: January 21, 1986
   (202) 692-7413
   AUTOVON 222-7413

4. Program Elements:
   RDT&E: PE 0603203N
   PE 0604262N
   PE 0603256N
   PE 64222A
   PE 1110011F (Shared)
   PE 64227F
   PROCUREMENT: APPN 1506 ICN 0163
   PE 1110011F
   PE 0206121M
   MILCON: N/A



5. Related Programs: None

OASD(PA) DPOISR 88-T-0962

6. 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 combat search and rescue (CSAR) needs of the Navy, and the special operations needs of the Air Force. The V-22 will replace the CH-46 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 -- Not to exceed (NTE) options for the first three lots of aircraft production have been incorporated into the FSD airframe contract. The engine manufacturer (Allison) has delivered the engines for the ground test article and aircraft #1 to the airframe manufacturer (Bell-Boeing). The fuselage for aircraft #1 has been delivered to the Ft. Worth facility for mating with the wing/nacelles and start of ground testing prior to first flight. A 34-foot fuselage test article is currently undergoing static testing, and the flight control systems integration rig is in operation.

This SAR reflects the withdrawal of the Army from participation in the V-22 program. Total procurement quantities have decreased by 231 aircraft and total program cost has decreased by $5,996.0 to $23,666.3. The airframe estimates in this SAR continue to be based on a 913 aircraft buy due to the limited time available for reestimation of the total program for submission of the FY 1988/89 amended budget. The impact on airframe costs of the quantity changes will be reflected in the next SAR submission.

c. The V-22 system is expected to satisfy all the mission requirements.

d. Changes Since "As Of" Date: None.

8. Decision Coordinating Paper (DCP) Threshold Breaches: Not applicable.

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	(CH-1)
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 1992	1992	
USAF IOC (6 Acft Mission Capabable)	1994/1994	1994	
USA FUE (First Unit Equipped)	FY1994/N/A	N/A	(CH-2)
USA IOC (First Operational Company Equipped)	FY1995/FY 1995	N/A	(CH-2)

b. Previous Change Explanations -- None

c. Current Change Explanations --

(CH-1) Contract award date now reflects contractual agreement. (+2 mos)

(CH-2) No longer applicable.

d. References --

Development Estimate: DCP dtd 1 May 1986

Approved Program: FY 1988/89 Amended President's Budget.
DAE baseline approved 17 Feb 1988.

10. Technical/Operational Characteristics:

a. Technical	Development Estimate/ App. Program	Demonstrated Performance	Current Estimate
Length, ft Folded/Unfolded	62.24/57.33/same		62.24/57.33
Width, ft Folded/Unfolded	18.42/83.83/same		18.42/83.83
Height, ft Folded/Unfolded	17.98/21.73/same		17.98/21.73
Empty Weight, lbs	31,768/31,768		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/same		+4.0/-1.0
Troop Capacity	24/24		24
External Cargo, lbs	10,000/10,000		10,000

c. Previous Change Explanations -- None

d. References --

Development Estimate: DCP dtd 1 May 1986.

Approved Program: FY 1988/89 Amended President's Budget.
DAE baseline approved 17 Feb 1988.

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	2443.7	+27.7	2471.4
Procurement	20493.1	-4581.8	15911.3
Airframe	(11013.0)	(-2325.5)	(8687.5)
Engine	(1519.8)	(-377.7)	(1142.1)
Avionics	(1293.5)	(-139.9)	(1153.6)
Other Hardware	(493.7)	(- 76.0)	(417.7)
Non Recurring	(1197.1)	(-82.6)	(1114.5)
Total Flyaway	(15517.1)	(-3001.7)	(12515.4)
Other Wpn Sys Cost	(3299.6)	(-818.0)	(2481.6)
Initial Spares	(1676.4)	(-762.1)	(914.3)
Construction (MILCON)	136.2	-0.1	136.1
Total FY 86 Base-Year $	23073.0	-4554.2	18518.8
Escalation	6589.3	-1441.8	5147.5
Development (RDT&E)	(181.5)	(+10.2)	(191.7)
Procurement	(6371.1)	(-1453.6)	(4917.5)
Construction (MILCON)	(36.7)	(+1.6)	(38.3)
Total Then-Year $	29662.3	-5996.0	23666.3
b. Quantities --			
Development (RDT&E)	6	-	6
Procurement	913	-231	682
Total	919	-231	688
c. Unit Cost --			
Procurement:			
FY 86 Base-Year $	22.447	+0.883	23.330
Then-Year $	29.426	+1.115	30.541
Program:			
FY 86 Base-Year $	25.107	+1.810	26.917
Then-Year $	32.278	+2.121	34.399

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

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

	Current Year		Budget Year
	SAR Current Estimate (Dec 87)	UCR Baseline Estimate (Dec 86)	UCR Baseline Estimate (Dec 87)
a. Program Acquisition --			
(1) Cost	23666.3	29662.3	23666.3
(2) Quantity	688	919	688
(3) Unit Cost	34.4	32.3	34.4
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	N/A	N/A	335.3
Less CY Adv Proc	N/A	N/A	-335.3
Plus PY Adv Proc	N/A	N/A	0
Net Total	N/A	N/A	0
(2) Quantity	N/A	N/A	0
(3) Unit Cost	N/A	N/A	N/A

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	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current 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
Total Changes	+37.9	-6035.4	+1.5	-5996.0
Current Estimate	2663.1	20828.8	174.4	23666.3

13. Cost Variance Analysis (Cont'd):
(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	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current 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
Total Changes	+27.7	-4581.8	-0.1	-4554.2
Current Estimate	+2471.4	+15911.3	+136.1	+18518.8

b. Previous Change Explanations --

RDT&E -- None

Procurement -- None

Milcon -- None

c. Current Change Explanations --

	(Dollars in Millions) Base-Year $	Then-Year $
(1) RDT&E		
Revised Jan 88 escalation rates (Economic)	N/A	+1.2
Air Force moved EW suite and fuel tank development two years to the right (Schedule)	0	+0.6
ASN allocation reduction (FY 86) (Estimating)	-1.0	-1.7

13. Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year $	Then-Year $
Navy Reprogrammings to Carrier ATC, SSBN security, Lamps Improvement, SH-2 Reliab. Readiness Improvement, AIM-9M PIP (FY83/84/86/87) (Estimating)	-0.4	-2.4
Budget adjustments attributed to official escalation rates not reflected in controls (Estimating)	0	-0.7
Navy Budget adjustments in outyears to accomodate FY 89 controls (FY88-92) (Estimating)	-2.9	0
Air Force added 8 items under systems integration, reestimated ECM Suite, Test, GFE, ENSIP, and ECO (Estimating)	+11.3	+13.8
Air Force added simulator modification (Estimating)	+11.6	+14.3
Air Force supplemental budget disapproved (Estimating)	-5.3	-5.6
Air Force added Integrated Defensive Avionics Digital System (Estimating)	+14.4	+18.4
(2) Procurement		
Revised Jan 88 escalation rates (Economic)	N/A	+214.3
Army withdrawal (Quantity)	-4623.2	-6308.2
Navy adjustment in tooling estimate to agree with contractual commitment (Estimating)	+87.0	+116.7
Air Force budget adjustments attributed to official escalation rates (Estimating)	-15.4	-20.8
Navy initial spares-increase in PSE requirements, change in engine requirements-(Support)	+66.4	+ 82.7

13. Cost Variance Analysis (Cont'd):

	(Dollars in Millions) Base-Year $	Then-Year $
Navy Budget adjustments attributed to official escalation rates (Support)	-90.6	-112.6
Air Force budget adjustments attributed to official escalation rates (Support)	- 3.5	- 4.6
Navy FY 90 budget adjustments to reach FY 90 controls (Support)	- 2.5	- 2.9
(3) MILCON		
Revised Jan 89 escalation rates (Economic)	N/A	+1.6
Budget adjustments attributed to official escalation rates (Estimating)	-0.1	-0.1

d. References --
Development Estimate - FY 1988/89 President's Budget;
Current Estimate - FY 1988/89 Amended President's Budget.
DAE baseline approved 17 Feb 1988.

14. Program Acquisition Unit (PAUC) History:

a. Initial SAR Estimate to Current Baseline Estimate

PAUC Planning Estimate	CHANGES (Then Year Dollars in Millions) Econ	Qty	Sch	Eng	Est	Spt	Other	Total	PAUC Development Estimate
40.2	-4.9	-6.7	+0.8	-	-	+2.9	-	-7.9	32.3

b. Current Baseline Estimate to Current Estimate

PAUC (Dev Est)	CHANGES (Then Year) Dollars in Millions Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC Current Estimate
+32.278	+0.316	+1.667	-	-	+0.192	-	-0.054	+2.121	+34.399

15. Contract Information: (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
$1,718.1	$1,814.3	6

Estimated Price at Completion	
Contractor	Program Manager
1763.7	1765.0
Cost Variance	Schedule Variance
-24.5	-43.7
-116.2	-141.9
-91.7	-98.2

Previous Cumulative Variance
Cumulative Variances to Date (11/30/87)
Net Change

Explanation of Change: Unfavorable cost and schedule variances continue to grow reflecting increased tooling and production rework associated with early assembly conditions, and resolution of fit problems. Additionally, redesign activities resulted in late engineering releases that have impacted testing, tooling and developmental tasks associated with the fuselage, landing gear, and systems test and evaluation.

The contract effort was increased for a Map System and Color display increasing the target price by $4.1M and the ceiling by $4.3M.

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
$77.3	$77.3	21

Estimated Price at Compleation	
Contractor	Program Manager
77.3	77.3

Explanation of Change: The contract effort was increased by $0.9M to include structural durability, engine containers, torgue meters and, hydraulic starters.

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: 38.9% (7 yrs/18 yrs)

(2) Percent Program Cost Appropriated: 7.4% ($1744.1/$23666.3)

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

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (82-88)	Budget Year (FY 89)	Balance to Complete FYDP (FY 90-93)	Balance to Complete Beyond FYDP (FY 94-00)	Total
RDT&E	1744.1	332.3	566.4	20.3	2663.1
Procurement	-	335.3	10352.5	10141.0	20828.8
MILCON	-	-	167.9	6.5	174.4
Total	1744.1	667.6	11086.8	10167.8	23666.3

c. Annual Summary --

Fiscal Year	Qty	FY 86 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E Total (Navy, Air Force and Army)								
1982	-			1.7			1.5	7.60
1983	-			37.3			34.5	4.90
1984	-			90.2			86.5	3.80
1985	-			176.7			174.5	3.40
1986	6			517.1			525.2	2.80
1987	-			405.1			424.3	2.70
1988	-			458.0			497.6	3.70
1989	-			294.9			332.3	3.80
1990	-			209.7			244.3	3.60
1991	-			150.6			180.8	3.30
1992	-			98.6			121.5	2.80
1993	-			15.7			19.8	2.30
1994	-			15.8			20.3	2.30
Subtotal	6			2471.4			2663.1	
Appropriation: Procurement Total (Navy, Air Force)								
1989	-	-	-	278.7	335.3		335.3	3.80
1990	12	612.4	657.0	1600.2	181.6	335.3	1929.7	3.60
1991	45	86.9	1441.0	2178.9	188.7	181.6	2693.5	3.30
1992	67	75.4	1479.6	2192.5	218.0	188.7	2774.8	2.80
1993	94	69.4	1659.9	2281.7	252.2	218.0	2954.5	2.30
1994	108	61.1	1609.7	2101.6	218.8	252.2	2783.8	2.30
1995	98	55.3	1366.8	1731.8	206.5	218.8	2346.7	2.30
1996	96	54.8	1267.0	1470.4	177.2	206.5	2038.7	2.30
1997	86	49.3	1046.6	1166.2	151.8	177.2	1653.8	2.30
1998	76	49.9	873.3	875.3	-	151.8	1267.7	2.30
1999	-	-	-	34.0	-	-	50.3	2.30
Subtotal	682	1114.5	11400.9	15911.3	1930.1	1930.1	20828.8	

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

Fiscal Year	Qty	FY 86 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: MILCON Total (Navy and Air Force)								
1990				4.0			4.8	3.60
1991				4.1			5.0	3.30
1992				23.2			29.3	2.80
1993				99.9			128.8	2.30
1994				1.9			2.5	2.30
1995				3.0			4.0	2.30
Subtotal				136.1			174.4	
Total Program				18518.8			23666.3	
Appropriation: RDT&E Navy								
1982	-			1.7			1.5	7.60
1983	-			37.3			34.5	4.90
1984	-			90.2			86.5	3.80
1985	-			175.9			173.7	3.40
1986	6			514.8			522.9	2.80
1987	-			402.2			421.3	2.70
1988	-			428.6			465.7	3.70
1989	-			272.2			306.7	3.80
1990	-			190.8			222.3	3.60
1991	-			134.0			160.9	3.30
1992	-			78.4			96.6	2.80
Subtotal	6			2326.1			2492.6	

*NOTE: FY 1983 RDT&E $'s reflect $29.9M of Army funds (P.E. 64222A)

Appropriation: RDT&E Air Force								
1985	-			0.8			0.8	3.40
1986	-			2.3			2.3	2.90
1987	-			2.9			3.0	2.70
1988	-			29.4			31.9	3.70
1989	-			22.7			25.6	3.80
1990	-			18.9			22.0	3.60
1991	-			16.6			19.9	3.30
1992	-			20.2			24.9	2.80
1993	-			15.7			19.8	2.30
1994	-			15.8			20.3	2.30
Subtotal	-			145.3			170.5	

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

Fiscal Year	Qty	FY 86 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement Navy								
1989	-	-	-	278.7	335.3	-	335.3	3.80
1990	12	612.4	657.0	1600.2	181.6	355.3	1929.7	3.60
1991	45	86.9	1441.0	2161.0	166.1	181.6	2670.9	3.30
1992	61	69.1	1317.9	1971.4	181.2	166.1	2494.8	2.80
1993	82	61.2	1398.2	1918.8	202.5	181.2	2484.5	2.30
1994	90	51.6	1276.1	1697.1	170.6	202.5	2247.8	2.30
1995	80	45.8	1051.2	1338.1	160.3	170.6	1813.2	2.30
1996	78	45.1	965.4	1120.7	155.9	160.3	1554.3	2.30
1997	78	45.1	917.9	1026.7	151.8	155.9	1456.4	2.30
1998	76	49.9	873.3	875.3	-	151.8	1267.7	2.30
1999	-	-	-	34.0	-	-	50.3	2.30
Subtotal	602	1067.1	9898.0	14022.0	1705.3	1705.3	18304.9	
Appropriation: Procurement Air Force								
1991	-	-	-	17.9	22.6	-	22.6	3.30
1992	6	6.3	161.7	221.1	36.8	22.6	280.0	2.80
1993	12	8.2	261.7	362.9	49.7	36.8	470.0	2.30
1994	18	9.5	333.6	404.5	48.2	49.7	536.0	2.30
1995	18	9.5	315.6	393.7	46.2	48.2	533.5	2.30
1996	18	9.7	301.6	349.7	21.3	46.2	484.4	2.30
1997	8	4.2	128.7	139.5	-	21.3	197.4	2.30
Subtotal	80	47.4	1502.9	1889.3	224.8	224.8	2523.9	
Appropriation: MILCON Navy								
1990				4.0			4.8	3.60
1991				4.1			5.0	3.30
1992				4.0			5.1	2.80
1993				-			-	2.30
1994				1.9			2.5	2.30
1995				3.0			4.0	2.30
Subtotal				17.0			21.4	
Total Navy				16365.1			20818.9	
Appropriation: MILCON Air Force								
1992				19.2			24.2	2.80
1993				99.9			128.8	2.30
Subtotal				119.1			153.0	
Total Air Force				2153.7			2847.4	

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1982	1.5	1.3	1 .1
1983	34.5	34.5	34.4
1984	86.5	86.5	80.3
1985	174.5	174.5	170.9
1986	525.2	525.1	485.5
1987	424.3	422.3	318.8
1988	497.6	386.4	47.3
To Complete	919.0	N/A	N/A
Total	2663.1	1630.6	1138.3

17. Production Rate Data:

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1990	12	N/A	12	N/A
1991	45	N/A	45	N/A
1992	75	N/A	67	N/A
1993	108	N/A	94	N/A
1994	132	N/A	108	N/A
1995	132	N/A	98	N/A
1996	132	N/A	96	N/A
1997	132	N/A	86	N/A
1998	116	N/A	76	N/A
1999	29	N/A	0	N/A

b. Cost Variance -- Dollars in Millions

Item		Development Estimate	Variance (CE less DE)	Current Estimate	Variance (CE less DE)	Maximum Economic
Prog Acq Cost	(BY $)	23073.0	-4554.2	18518.8	N/A	N/A
	(TY $)	29662.3	-5996.0	23666.3	N/A	N/A
PAUC	(BY $)	25.1	+1.8	26.9	N/A	N/A
	(TY $)	32.3	+2.1	34.4	N/A	N/A

c. Schedule Variance --

Start Date (Mo/Yr)	1/89	+2/0	3/89	N/A	N/A
Duration (in Months)	153	0	153	N/A	N/A
End Date (Mo/Yr)	9/01	+2/0	11/01	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	0/0

18. Operating and Support Costs: N/A

SAR-87-045

UNCLASSIFIED

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

PROGRAM: LCAC

N-23 LCAC

AS OF DATE: December 31, 1987

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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:

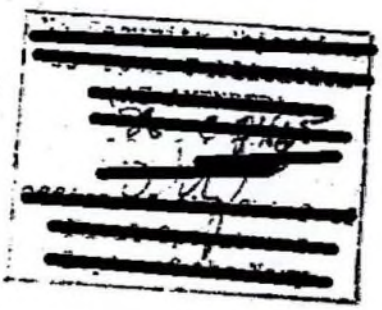
Amphibious Warfare and Strategic
Sealift Program Office (PMS377)
Naval Sea Systems Command
Washington, DC 20362

PM: E. E. Shoults
Assigned: April 29, 1985
AUTOVON: 222-8511
COMM: (202) 692-8511

4. (U) Program Elements:

RDT&E: PE0604567N (shared funding)
PROCUREMENT: 24411N, APPN 1611, ICN 5105
MILCON: 24796N, 65896N

5. (U) Related Programs: AALC; LHD; LSD 41



OASD(PA) DFOISR 88-T-0997

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 for the design and construction of prototype Amphibious Assault Landing Craft (AALC), nicknamed JEFF Craft, designated JEFF (A) (Aerojet) and JEFF (B) (Bell) were delivered in 1978 and 1979. These crafts have undergone an extensive testing program since delivery. Results from the test program were extremely successful, with the craft satisfying all established performance requirements.

Bell Aerospace, Textron was competitively selected and subsequently awarded contracts for production of six craft (three authorized in FY82 and three in FY83). Additional contracts were awarded to Bell in November 1983 for Long Lead Material and on 9 March 1984 a Fixed Price Incentive (FPI) contract for the construction of six additional LCAC.

The first LCAC successfully completed acceptance trials on 7 December 1984 at the Naval Coastal Systems Center (NCSC) 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. LCAC 002 was delivered 22 February 1986.

In 1984, Bell Aerospace reported a potential cost growth of $11.1 million on the FY 1982/1983 LCAC contract. This growth was associated with production facility start-up and material cost. On April 3, 1985, the Navy converted the FY 82/83 contract from a Cost Plus Award Fee (CPAF) to a Fixed Price Incentive (FPI) contract with a 50/50 share line to limit the Navy's liability for the projected cost overrun.

A second source builder, Lockheed Shipbuilding Company, was selected and a contract to produce two FY85 craft was awarded on September 30, 1985. These craft are being be produced in Gulfport, Mississippi, with delivery scheduled for mid-1988.

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

Textron Marine Systems, formerly Bell Aerospace, was awarded a Fixed Price Incentive (FPI) contract for two FY85 craft on 25 November 1986.

b. (U) Significant Developments Since Last Report-- Two Fixed Price Incentive contracts were competitively awarded for 17 craft on 1 July 1987 ((10) craft to Textron Marine Systems and (7) craft to Lockheed Shipbuilding Company, Gulfport Marine).

During 1987, Final Contract Trials (FCT) were completed on LCAC 001, 004, 005, 006, 007, 008 and 009.

The Navy accepted delivery of LCAC 007 on 18 March 1987, LCAC 008 on 3 June 1987, LCAC 009 on 26 June 1987, LCAC 010 on 4 September 1987, LCAC 011 on 7 December 1987 and LCAC 012 on 23 December 1987.

Operational Testing (OT IIIB) on LCAC was completed on 15 April 1987. Approval for Full Production was granted by ASN on 26 June 1987.

Assault Craft Unit 4 (ACU 4) was relocated to their permanent base at NAB, Little Creek, Virginia in October 1987. LCAC 007 through 011 were subsequently transported to this new facility, establishing the first fleet operating unit on the East Coast (ACU 5 had previously been activated on the West Coast in 1986 with LCAC 001 through 006).

c. (U) Changes Since "as of" Date -- None

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no NDCP (SECNAV memo dated December 21, 1981) threshold breaches.

9. (U) Schedule:

a. (U) Milestone --	Production Estimate/Approved Program	Current Estimate
(U) 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) APPROVAL OF LEAD PRODUCTION	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
APPROVAL FOR FULL PRODUCTION	Jul 85/Jul 85	Jun 87 (CH-1)
MATERIAL SUPPORT DATE	Apr 88/Apr 88	Apr 90 (CH-1)
NAVAL SUPPORT DATE	Jan 90/Jan 90	Jan 92 (CH-1)
*(U) INITIAL OPERATIONAL CAPABILITY	Jul 86/Jul 86	Dec 86

*IOC - reflects date the lead craft are ready for operational deployment

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

b. (U) Previous Change Explanations --

Correction of operating problems surfaced during operational testing on LCAC 1 and trials on LCAC 2 caused delay in delivery of LCAC 2-6. This resulted in the slippage of Initial Operating Capability by 5 months. IOC has been accomplished.

c. (U) Current Change Explanation --

(CH-1) Updated to reflect DAE baseline of Feb 17, 1988

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: SECNAV Memo dated December 21, 1981, subject "LCAC Milestone IIIA DNSARC Decision Memorandum"; Approved LCAC NDCP dated May 25, 1983; FY88/89 amended Biennial Budget; DAE baseline, dated Feb 1988

10. (U) Technical/Operational Characteristics:

	Production Estimate/Approved Program	Demonstrated Performance	Current Estimate
a. (U) Technical --			
(U) Operating Crew	5/5	5	5
(U) Troop Capacity (Internal)	24/24	24	24
(U) Cargo Deck Area (ft2)	1,800/1,800	1,809	1,809
(U) Length-On Cushion (ft)	88/88	87'11"	87'11"
(U) Beam-On Cushion (ft)	47/47	47'	47'
b. (U) Operational --			
(U) Speed (kts)	35+/35+	40+	40+
(U) Design Payload (lbs)	120,000/120,000	120,000	120,000
(U) System Reliability	0.90/0.90	0.96	0.96
(U) Maintainability MMH/OH Total (CM+PM)	34/34	29.6	34
(U) Unrefueled Range	195+/195+	200+	195+ (CH-1)

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.

d. (U) Current Change Explanations --

(CH-1) Updated to reflect DAE baseline of Feb 17, 1988

e. (U) References --

Production Estimate: Approved LCAC NDCP dated May 25, 1983.

Approved Program: LCAC NDCP dated May 25, 1983; FY88/89 amended Biennial Budget; DAE baseline dated Feb 17, 1988.

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

	Production Estimate	Changes	Current Estimate
a. Cost			
Development (RDT&E)	21.2	13.5	34.7
Procurement (SCN)	1023.6	592.6	1616.2
(Sailaway)	(982.3)	(538.3)	(1520.6)
(Ship System)	(3.3)	(0.4)	(3.7)
(Initial Spares)	(13.4)	(-13.4)	(0.0)
(Outfitting/Post Delivery)	(24.6)	(67.3)	(91.9)
Construction (MILCON)	58.5	27.1	85.6
Total FY82 Base-Year $	1103.3	633.2	1736.5
Escalation	507.4	-78.1	429.3
Development (RDT&E)	(0.2)	(0.4)	(0.6)
Procurement	(489.3)	(-85.1)	(404.2)
Construction (MILCON)	(17.9)	(6.6)	(24.5)
Total Then-Year $	1610.7	555.1	2165.8*
b. Quantities			
Development (RDT&E)	0	0	0
Procurement	60	18	78
Total	60	18	78
c. Unit Cost			
Procurement:			
FY82 Base-Year $	17.1	3.6	20.7
Then-year $	25.2	0.7	25.9
Program:			
FY82 Base-Year $	18.4	3.9	22.3
Then-year $	26.8	1.0	27.8

*Excludes FY 92 Advanced Procurement for the FY 93 Ships.

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	2165.8	2157.4	2165.8
(2) Quantity	78	78	78
(3) Unit Cost	27.8	27.7	27.8
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	37.3	37.3	193.6
Less CY Adv Proc	-36.5	-36.5	-19.9
Plus PY Adv Proc	0.0	0.0	36.5
Less OF/PD	-0.8	-0.8	-1.0
Less PY Escal	0.0	0.0	0.0
Net Total	0.0	0.0	209.2
(2) Quantity	0	0	9
(3) Unit Cost	0.0	0.0	23.2

3(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	-0.1	-445.7	-6.1	-451.9
Quantity	0.0	545.5	0.0	545.5
Schedule	0.0	33.3	0.0	33.3
Engineering	0.0	0.0	0.0	0.0
Estimating	15.1	325.3	39.8	380.2
Other	0.0	0.0	0.0	0.0
Support	0.0	39.6	0.0	39.6
Subtotal	15.0	498.0	33.7	546.7
Current Changes:				
Economic	-2.1	1.7	0.2	-0.2
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	2.8	0.0	2.8
Estimating	1.0	-10.5	-0.2	-9.7
Other	0.0	0.0	0.0	0.0
Support	0.0	15.5	0.0	15.5
Subtotal	-1.1	9.5	0.0	8.4
Total Changes	13.9	507.5	33.7	555.1
Current Estimate	35.3	2020.4	110.1	2165.8

3(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	0.0	0.0	0.0
Estimating	12.3	244.9	27.2	284.4
Other	0.0	0.0	0.0	0.0
Support	0.0	34.3	0.0	34.3
Subtotal	12.3	585.8	27.2	625.3
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	2.2	0.0	2.2
Estimating	1.2	-9.4	-0.1	-8.3
Other	0.0	0.0	0.0	0.0
Support	0.0	14.0	0.0	14.0
Subtotal	1.2	6.8	-0.1	7.9
Total Changes	13.5	592.6	27.1	633.2
Current Estimate	34.7	1616.2	85.6	1736.5

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

b. **Previous Change Explanations--**

RDT&E

Economic: Revised ASD(C) economic escalation rates.

Estimating: Revised program estimates; increase for additional program requirements.

Procurement - SCN

Economic: Revised ASD(C) economic escalation rates.

Quantity: Addition of 9 craft in FY92 and associated advance procurement.

Schedule: Transfer of a craft from FY88 to FY 90-92 and associated advance procurement.

Estimating: Revised program estimates; adjustment due to a Program Budget Decision; decrease due to program repricing; increase in contract cost growth; reduction due to Gramm Rudman cut; transfer of contract design funds to RDT&E.

Support: Additional Post Delivery and outfitting requirements associated with new craft and rescheduled craft; reduction to outfitting and Post Delivery due to Gramm Rudman cut.

3(U)Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) *RDT&E*		
ECONOMIC		
REVISED JAN 88 ECONOMIC ESCALATION RATES	0.0	-2.1
ESTIMATING		
REVISED PROGRAM ESTIMATES	1.2	1.0
2) Procurement		
ECONOMIC		
REVISED JAN 88 ECONOMIC ESCALATION RATES	0.0	1.7
ENGINEERING		
INCREASE FOR ARCTIC-CONFIGURED LCAC	2.2	2.8
ESTIMATING		
REFLECTS ACTUAL EXECUTION, REPHRASING OF LLTM AND REPRICING BASED ON FY85/86 CONTRACT AWARD	-9.4	-10.5
SUPPORT		
REFLECTS ACT. EXECUTION & INITIAL ACU4 COSAL BUY	14.0	15.5
3) MILCON		
ECONOMIC		
REVISED JAN 88 ECONOMIC ESCALATION RATES	0.0	0.2
REVISED PROGRAM ESTIMATES	-0.1	-0.2

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)								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
26.8	-5.8	0.9	0.4	0.0	4.8	0.0	0.7	1.0	27.8

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

a. (U) RDT&E -- N/A

b. (U) Procurement --

LCAC (24-33) 1/
Textron Marine Systems,
New Orleans, LA
N00024-87-C-2096, FPI,
Award: July 1, 1987
Definitized: July 1, 1987

Initial Contract Price		
Target	Ceiling	Qty
$166.6	$181.8	10

Current Contract Price			*Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$166.6	$181.8	10	$173.1	$179.7

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (11/27/87)	$-0.3	$+5.8
Net Change	$-0.3	$+5.8

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.

LCAC (15-17, 19-20, 22-23) 1/
Lockheed Shipbuilding, Company
Gulfport Marine Div., Gulfport, MS
N00024-87-C-2089, FPI,
Award: July 1, 1987
Definitized: July 1, 1987

Initial Contract Price		
Target	Ceiling	Qty
$115.2	$122.9	7

Current Contract Price			*Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$115.2	$122.9	7	$120.7	$123.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (11/29/87)	$ 0.0	$+0.6
Net Change	$ 0.0	$+0.6

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

b. (U) Procurement --

Explanation of Change: The favorable schedule variance is due to craft design materials being purchased and earned earlier than planned and ahead of schedule progress payments for the engine assemblies. The Program Manager's assessment takes into consideration the above variances.

c. (U) MILCON-- N/A

*Both Contractor and PM's estimated price at completion includes their estimated escalation for the contract.

1/ Contract N00024-84-C-2055 for Crafts 1 through 12 and LLTM (85) has been deleted as percent accomplished has exceeded 90%. Contract N00024-87-C-207 for Craft 13 and 14 has also been deleted as it does not meet the $40.0M reporting threshold.

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

a. Program Status --

(1) Percent Program Completed: 12/16 = 75.0%
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 1087.0/ 2165.8 = 50.2%
(Funds Appropriated To Date/Total Program Funding in Millions)

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

Appropriation	Current & Prior yrs	Budget Year	Balance to Complete FYDP	Beyond FYDP	Total
	(FY77-88)	(FY89)	(FY90-93)	(0)	
RDT&E	31.5	0.8	3.0	0.0	35.3
Procurement	999.3	193.6	827.5	0.0	2020.4
MILCON	56.2	1.4	52.5	0.0	110.1
Total	1087.0	195.8	883.0	0.0	2165.8

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	FY82 Base-Year Dollars: Sailaway Nonrec.	FY82 Base-Year Dollars: Sailaway Rec.	FY82 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
APPROPRIATION: RDT&E								
1977	0	0.0	0.0	0.3	0.0	0.0	0.2	2.58
1978	0	0.0	0.0	2.1	0.0	0.0	1.5	6.80
1979	0	0.0	0.0	1.9	0.0	0.0	1.5	8.40
1980	0	0.0	0.0	9.2	0.0	0.0	8.2	10.59
1981	0	0.0	0.0	4.8	0.0	0.0	4.7	10.61
1982	0	0.0	0.0	5.2	0.0	0.0	5.3	7.60
1983	0	0.0	0.0	1.0	0.0	0.0	1.1	4.90
1984	0	0.0	0.0	0.8	0.0	0.0	0.9	3.80
1985	0	0.0	0.0	1.7	0.0	0.0	2.0	3.40
1986	0	0.0	0.0	3.1	0.0	0.0	3.7	2.80
1987	0	0.0	0.0	1.6	0.0	0.0	2.0	2.70
1988	0	0.0	0.0	0.3	0.0	0.0	0.4	3.70
1989	0	0.0	0.0	0.6	0.0	0.0	0.8	3.80
1990	0	0.0	0.0	0.7	0.0	0.0	1.0	3.60
1991	0	0.0	0.0	0.7	0.0	0.0	1.0	3.30
1992	0	0.0	0.0	0.7	0.0	0.0	1.0	2.80
Subtotal	0	0.0	0.0	34.7	0.0	0.0	35.3	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	FY82 Base-Year Dollars: Sailaway Nonrec.	FY82 Base-Year Dollars: Sailaway Rec.	FY82 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
APPROPRIATION: Procurement								
1981	0	0.0	0.0	50.5	53.5	0.0	53.5	9.60
1982	3	55.0	97.6	107.1	0.0	52.5	116.8	7.50
1983	3	0.0	64.6	63.3	0.0	1.3	70.2	3.80
1984	6	0.0	119.3	150.1	34.3	0.0	169.7	3.60
1985	9	0.0	191.7	225.1	60.0	22.9	259.5	2.10
1986	12	0.0	230.8	228.8	16.7	19.8	272.9	1.20
1987	0	0.0	0.0	17.2	19.4	0.0	19.4	1.60
1988	0	0.0	0.0	29.2	37.3	0.0	37.3	3.70
1989	9	0.0	159.5	146.9	20.9	36.5	193.6	3.80
1990	12	0.0	203.9	208.3	26.2	19.9	281.8	3.60
1991	12	0.0	205.8	207.9	27.8	24.5	288.1	3.30
1992	12	0.0	192.4	176.2	2.5	25.1	249.9	2.80
1993	0	0.0	0.0	5.6	7.7	0.0	7.7	2.30
Subtotal	78	55.0	1465.6	1616.2	306.3	202.5	2020.4	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	FY82 Base-Year Dollars: Sailaway Nonrec.	FY82 Base-Year Dollars: Sailaway Rec.	FY82 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
APPROPRIATION: MILCON								
1984	0	0.0	0.0	19.2	0.0	0.0	21.9	3.80
1985	0	0.0	0.0	16.5	0.0	0.0	19.4	3.40
1986	0	0.0	0.0	12.3	0.0	0.0	14.9	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	3.70
1989	0	0.0	0.0	1.0	0.0	0.0	1.4	3.80
1990	0	0.0	0.0	14.1	0.0	0.0	19.6	3.60
1991	0	0.0	0.0	5.5	0.0	0.0	7.9	3.30
1992	0	0.0	0.0	9.2	0.0	0.0	13.4	2.80
1993	0	0.0	0.0	7.8	0.0	0.0	11.6	2.30
Subtotal	0	0.0	0.0	85.6	0.0	0.0	110.1	--
Total	78	55.0	1465.6	1736.5	306.3	202.5	2165.8	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPROPRIATION: RDT&E

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1977	0.2	0.2	0.2
1978	1.5	1.5	1.5
1979	1.5	1.5	1.5
1980	8.2	8.2	8.2
1981	4.7	4.7	4.7
1982	5.3	5.3	5.3
1983	1.1	1.1	1.1
1984	0.9	0.9	0.9
1985	2.0	2.0	2.0
1986	3.7	3.6	2.6
1987	2.0	2.0	1.2
1988	0.4	0.6	0.0
To Compl.	3.8	0.0	0.0
Total	35.3	31.6	29.2

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPROPRIATION: Procurement

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1981	53.5	53.5	50.1
1982	116.8	114.9	112.7
1983	70.2	69.9	65.5
1984	169.7	166.3	132.5
1985	259.5	242.0	121.5
1986	272.9	232.5	10.8
1987	19.4	19.4	2.3
1988	37.3	0.0	0.0
To Compl.	1021.1	0.0	0.0
Total	2020.4	898.5	495.4

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPRORRIATION: MILCON

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1984	21.9	21.9	21.0
1985	19.4	19.4	17.9
1986	14.9	14.9	12.0
1987	0.0	0.0	0.0
1988	0.0	0.0	0.0
To Compl.	53.9	0.0	0.0
Total	110.1	56.2	50.9

17(U)Production Rate Data:

a. Annual Production Rates

Fiscal Year	Production Rates (Quantity/Year) Development Estimates	Production Estimates	Current Estimates	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	12
1989	N/A	0	9	9
1990	N/A	0	12	12
1991	N/A	0	12	0
1992	N/A	0	12	0
1993	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	633.2	1736.5	0.0	1736.5
(TY $)	1610.7	555.1	2165.8	0.0	2165.8
PAUC (BY $)	18.4	3.9	22.3	0.0	22.3
(TY $)	26.8	1.0	27.8	0.0	27.8

(3)

SNR-87-046

[redacted]

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

PROGRAM: LHD 1 CLASS

N-24 LHD-1

AS OF DATE: December 31, 1987

INDEX

AS AMENDED

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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
Washington, DC 20362

PM: E. E. Shoults
Assigned: April 29, 1985
AUTOVON: 222-8511
COMM: (202) 692-8511

4. (U) Program Elements:

RDT&E: PE0603564N, PE0604526N, PE0604567N (shared funding)
PROCUREMENT: 24411N, APPN 1611, ICN 5105

5. (U) Related Programs: Landing Craft, Air Cushion (LCAC)

[redacted]

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OASD(PA) DFOISR 88-F-0703

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. Initially, 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 increase amphibious lift capability, the Navy accelerated the LHD program by moving lead ship authorization forward from 1987 to 1985. Subsequently, 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.

Baseline design of the LHD was completed in June 1982. Contract design was completed in November 1983. On 12 June 1982, the SAIP approved the LHD characteristics, which were certified by CNO on 2 December 1982. On 2 June 1983, SECNAV reviewed the LHD Program.

A detail design and construction contract was awarded to Ingalls Shipbuilding Division on 28 February 1984 for the Lead Ship in the LHD Program. Actual construction was started on the LHD 1 on 9 July 1984, two months earlier than originally planned. The LHD 1 keel laying occurred 30 May 1985, two months earlier than originally planned.

On 10 September 1986, the Navy awarded a Fixed Price Incentive (FPI) contract to Ingalls Shipbuilding Inc. for the LHD 2 with options for the LHD 3 and 4 and associated Long Lead Time Material (LLTM). The option for LHD 3 LLTM was executed on 25 November 1986.

b. (U) Significant Developments Since Last Report-- The LHD 1 was successfully launched on 4 August 1987 and christened as WASP on 19 September 1987. On 20 November 1987, the LHD 3 construction option and the LHD 4 LLTM options were exercised.

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. The LHD 1 Program is expected to meet its mission requirements.

c. (U) Changes Since "as of" Date -- None

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches:

There are currently no NDCP (dated August 15, 1985) threshold breaches.

9. (U) Schedule:

a. (U) Milestones --	Development Estimate/Approved Program	Current Estimate
(U) SAIP	Jul 82/Jul 82	Jul 82
(U) Start Contract Design	Aug 82/Aug 82	Aug 82
(U) Award Lead Ship Contract	Dec 83/Dec 83	Feb 84
(U) Launch First Ship	Aug 87/Aug 87	Aug 87
(U) Acceptance Trials (Lead Ship)	Feb 89/Feb 89	Feb 89
(U) Lead Ship Delivery	Mar 89/Mar 89	Mar 89
Material Support Date	Mar 89/Mar 89	Mar 89 (CH-1)
Naval Support Date	May 90/May 90	May 90 (CH-1)

(b)(1) [redacted]

b. (U) Previous Change Explanations --

The contract award date for the LHD 1 Class Lead Ship was updated to reflect actual date of February 28, 1984.

Original date for the Initial Operating Capability for the LHD was improperly calculated. The SAR has been updated to reflect correct data.

c. (U) Current Change Explanation --

(CH-1) Updated to reflect DAE baseline of Feb 17, 1988.

d. (U) References --

Development Estimates: Top Level Requirements (TLR) dated 8 December 1983, CNO Ser 03/C387632 dated 2 December 1982; DAE baseline dated Feb 17, 1988

Approved Program: Top Level Requirements (TLR) dated 8 December 1983, CNO Ser 03/C387632 dated 2 December 1982; FY88/89 amended Biennial Budget; DAE baseline dated Feb 17, 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Development Estimate/Approved Program	Demonstrated Performance	Current Estimate
(U) Troops	1,873/1,873	N/A	1,873
(U) Vehicle Square (ft^2)	22,900/22,900	N/A	22,900
(U) Cargo Cube (ft^3)	109,000/109,000	N/A	109,000
(U) LCAC	3/3	N/A	3
(U) Length (ft)	840/840	N/A	844
(U) Beam (ft)	106/106	N/A	106
(U) Draft (Full Load) (ft) 1/	26/26	N/A	26'8"
(U) Displacement (Full Load) 1/	39,400/39,400	N/A	40,533
(U) Offload Capability (Tons/Hr)	300/300	N/A	300
(U) Propulsion	Steam/Steam	N/A	Steam
(U) Shaft HP/No. Screws	70,000/2/70,000/2	N/A	70,000/2
(U) Medical Facilities	6 ORs/6 ORs*		6 ORs
b. (U) Operational --			
(U) Speed (Kts)	22/22	N/A	22
(b)(1) [redacted]			
(U) Armament			
- Close in Weapon System	3/3	N/A	3
- Self Defense Missile System	2/2	N/A	2

c. (U) Previous Change Explanations --

The 26/39,400 draft and displacement estimates were figures provided during the design development phase. The 26'8" and 40,533 reflects the full load weight estimate at the completion of the Contract Design.

d. (U) Current Change Explanations -- None

e. (U) References --

Development Estimate: SECNAV Memo dated 2 December 1982, subject "LHD 1 Class Amphibious Assault Ship SAIP; LHD 1 Class NDCP dated 15 August 1985.

Approved Program: DAE Baseline, 17 Feb 88.

*Operating Room (ORs)

1/ Changes in Current Estimate will not be noted unless they exceed: Draft ± 3 inches; Displacement ± 1,000 tons.

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

	Development Estimate	Changes	Current Estimate
a. Cost			
Development (RDT&E)	39.9	2.1	42.0
Procurement (SCN)	2891.9	1186.1	4078.0
(Sailaway)	(2794.9)	(1065.7)	(3849.1)
(Ship System)	(10.1)	(-10.1)	(11.5)
(Initial Spares)	(9.3)	(1.3)	(10.6)
(Outfitting/Post Delivery)	(77.6)	(129.2)	(206.8)
Total FY82 Base-Year $	2931.8	1188.2	4120.0
Escalation	1519.2	-508.2	1011.0
Development (RDT&E)	(3.7)	(-0.3)	(3.4)
Procurement	(1515.5)	(-507.9)	(1007.6)
Total Then-Year $	4451.0	680.0	5131.0*
b. Quantities			
Development (RDT&E)	0	0	0
Procurement	3	2	5
Total	3	2	5
c. Unit Cost			
Procurement:			
FY82 Base-Year $	964.0	-148.4	815.6
Then-year $	1464.1	-447.0	1017.1
Program:			
FY82 Base-Year $	977.3	-153.3	824.0
Then-year $	1483.7	-457.5	1026.2

*Excludes FY 91 and FY 92 Advanced Procurement for the FY 93 ship.

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	5131.0	5161.7	5131.0
(2) Quantity	5	5	5
(3) Unit Cost	1026.2	1032.3	1026.2
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	769.6	769.6	765.8
Less CY Adv Proc	-32.2	-32.2	0.0
Plus PY Adv Proc	35.0	35.0	32.2
Less OF/PD	-16.7	-16.7	-28.3
Less PY Escal	0.0	0.0	0.0
Net Total	755.7	755.7	769.7
(2) Quantity	1	1	1
(3) Unit Cost	755.7	755.7	769.7

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	-0.7	-1468.3	0.0	-1469.0
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	1.7	-811.7	0.0	-810.0
Other	0.0	0.0	0.0	0.0
Support	0.0	148.6	0.0	148.6
Subtotal	1.0	709.7	0.0	710.7
Current Changes:				
Economic	0.2	-6.2	0.0	-6.0
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	0.6	-22.9	0.0	-22.3
Other	0.0	0.0	0.0	0.0
Support	0.0	-2.4	0.0	-2.4
Subtotal	0.8	-31.5	0.0	-30.7
Total Changes	1.8	678.2	0.0	680.0
Current Estimate	45.4	5085.6	0.0	5131.0

3(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	1.5	-575.7	0.0	-574.2
Other	0.0	0.0	0.0	0.0
Support	0.0	94.5	0.0	94.5
Subtotal	1.5	1204.3	0.0	1205.8
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	0.6	-16.3	0.0	-15.7
Other	0.0	0.0	0.0	0.0
Support	0.0	-1.9	0.0	-1.9
Subtotal	0.6	-18.2	0.0	-17.6
Total Changes	2.1	1186.1	0.0	1188.2
Current Estimate	42.0	4078.0	0.0	4120.0

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

b. Previous Change Explanations--

RDT&E

Economic: Revised ASD(C) escalation indices.

Estimating: Revised program estimates; addition of contract design funds; repricing of program requirements.

Procurement

Economic: Revised ASD(C) escalation indices.

Estimating: Revised program estimates; adjustment due to a Program Budget Decision; CSS/CAAS reductions; favorable contract negotiations; profit reduction; reduction due to Gramm Rudman cut; repricing of the FY91 program; transfer of contract design funds from SCN to RDT&E.

Support: Repricing of outfitting and Post Delivery requirements.

13(U)Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ECONOMIC		
REVISED JAN 88 ECONOMIC ESCALATION RATES	0.0	0.2
ESTIMATING		
INCREASE IN R&D CONTRACT DESIGN EFFORT	0.6	0.6
2) Procurement		
ECONOMIC		
REVISED JAN 88 ECONOMIC ESCALATION RATES	0.0	-6.2
ESTIMATING		
REFLECTS ACT. EXECUTION, GFE AND OTHER REPRICING	-16.3	-22.9
SUPPORT		
REPRICING OF OUTFITTING REQUIREMENTS	-1.9	-2.4

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 (Then Year Dollars in Millions) Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (Current Estimate)
1483.7	-295.0	21.6	-46.8	0.0	-166.5	0.0	29.2	-457.5	1026.2

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

a. (U) RDT&E -- N/A

b. (U) Procurement --

LHD 1
Ingalls Shipbuilding, Inc.,
Pascagoula, MS
N00024-82-C-2260, FPI,
Award: February 28, 1984
Definitized: February 28, 1984

Initial Contract Price		
Target	Ceiling	Qty
$962.1	$1150.8	1

Current Contract Price			*Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$988.5	$1181.2	1	$1048.6	$1046.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-18.1	$-15.0
Cumulative Variances to Date (11/29/87)	$-28.6	$-26.7
Net Change	$-10.5	$-11.7

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 variances.

LHD 2 1/
Ingalls Shipbuilding, Inc.,
Pascagoula, MS
N0024-86-C-2005, FPI,
Award: September 10, 1986
Definitized: September 10, 1986

Initial Contract Price		
Target	Ceiling	Qty
$401.3	$453.3	1

Current Contract Price			*Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$403.0	$455.1	1	$461.0	$520.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.0	$ 0.0
Cumulative Variances to Date (11/29/87)	$-1.2	$+9.5
Net Change	$-1.2	$+9.5

Explanation of Change: The unfavorable cost variance is due to start up costs involving labor and overhead. The favorable schedule variance is a result of the progress payments for major material items being ahead of plan. The Program Manager's assessment takes into consideration the above variances.

LHD 3 1/ 2/	Initial Contract Price Target	Ceiling	Qty
Ingalls Shipbuilding, Inc., Pascagoula, MS	$380.4	$409.2	1

N0024-86-C-2005, FPI,
Award: November 20, 1987
Definitized: November 20, 1987

Current Contract Price Target	Ceiling	Qty	*Estimated Price At Completion Contractor	Program Manager
$380.4	$409.2	1	$426.6	$426.6

	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

1/ The LHD 2 and LHD 3 contracts are currently budgeted to ceiling.
2/ Added

c. (U) Milcon -- N/A

* Both Contractor and PM'S estimated price at completion includes their estimated escalation for the contract.

6(U)Program Funding Summary: (Current Estimate in Millions)

a. Program Status --

(1) Percent Program Completed: 8/15 = 53.3%
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 3120.9/ 5131.0 = 60.8%
(Funds Appropriated To Date/Total Program Funding in Millions)

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

Appropriation	Current & Prior yrs (FY81-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-93)	Balance to Complete Beyond FYDP (FY94-97)	Total
RDT&E	40.9	2.5	2.0	0.0	45.4
Procurement	3080.0	765.8	1128.1	111.7	5085.6
Total	3120.9	768.3	1130.1	111.7	5131.0

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	FY82 Base-Year Dollars: Sailaway Nonrec.	FY82 Base-Year Dollars: Sailaway Rec.	FY82 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
APPROPRIATION: RDT&E								
1981	0	0.0	0.0	0.9	0.0	0.0	0.9	10.61
1982	0	0.0	0.0	14.2	0.0	0.0	14.5	7.60
1983	0	0.0	0.0	19.2	0.0	0.0	20.6	4.90
1984	0	0.0	0.0	1.0	0.0	0.0	1.1	3.80
1985	0	0.0	0.0	2.4	0.0	0.0	2.7	3.40
1986	0	0.0	0.0	0.3	0.0	0.0	0.4	2.80
1987	0	0.0	0.0	0.5	0.0	0.0	0.6	2.70
1988	0	0.0	0.0	0.1	0.0	0.0	0.1	3.70
1989	0	0.0	0.0	1.9	0.0	0.0	2.5	3.80
1990	0	0.0	0.0	0.7	0.0	0.0	1.0	3.60
1991	0	0.0	0.0	0.4	0.0	0.0	0.5	3.30
1992	0	0.0	0.0	0.4	0.0	0.0	0.5	2.80
Subtotal	0	0.0	0.0	42.0	0.0	0.0	45.4	--

6(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	FY82 Base-Year Dollars: Sailaway Nonrec.	FY82 Base-Year Dollars: Sailaway Rec.	FY82 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
APPROPRIATION: Procurement								
1982	0	0.0	0.0	41.2	45.0	0.0	45.0	7.50
1983	0	0.0	0.0	48.5	53.8	0.0	53.8	3.80
1984	1	150.0	1073.0	1155.4	0.0	98.8	1311.4	3.60
1985	0	0.0	0.0	33.7	39.2	0.0	39.2	2.10
1986	1	0.0	721.6	688.5	0.7	39.2	825.1	1.20
1987	0	0.0	0.0	29.1	35.9	0.0	35.9	1.60
1988	1	0.0	591.5	602.7	48.9	35.0	769.6	3.70
1989	1	0.0	584.8	582.9	28.3	32.2	765.8	3.80
1990	0	0.0	0.0	38.1	50.9	0.0	50.9	3.60
1991	1	0.0	728.2	719.6	29.0	41.8	996.1	3.30
1992	0	0.0	0.0	40.6	54.3	0.0	54.3	2.80
1993	0	0.0	0.0	19.6	26.8	0.0	26.8	2.30
1994	0	0.0	0.0	34.6	48.5	0.0	48.5	2.30
1995	0	0.0	0.0	28.3	40.5	0.0	40.5	2.30
1996	0	0.0	0.0	0.0	0.0	0.0	0.0	2.30
1997	0	0.0	0.0	15.2	22.7	0.0	22.7	2.30
Subtotal	5	150.0	3699.1	4078.0	524.5	247.0	5085.6	--
Total	5	150.0	3699.1	4120.0	524.5	247.0	5131.0	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPROPRIATION: RDT&E

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1981	0.9	0.9	0.9
1982	14.5	14.5	14.5
1983	20.6	18.4	18.1
1984	1.1	1.2	1.2
1985	2.7	2.0	1.9
1986	0.4	0.4	0.3
1987	0.6	0.6	0.2
1988	0.1	0.1	0.0
To Compl.	4.5	0.0	0.0
Total	45.4	38.1	37.1

6(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPROPRIATION: Procurement

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1982	45.0	45.0	44.9
1983	53.8	53.7	52.5
1984	1311.4	1165.3	866.3
1985	39.2	39.0	34.2
1986	825.1	634.9	51.4
1987	35.9	34.1	0.5
1988	769.6	378.9	0.0
To Compl.	2005.6	0.0	0.0
Total	5085.6	2350.9	1049.8

17(U)Production Rate Data:

* Annual Production rate is less than 6 yearly Per ASD Memo dated 12 Dec. 86, Production rate information is not applicable to the program.

SAR-87-047

[redacted]

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

PROGRAM: LSD 41 CLASS

N-25 LSD-41

AS OF DATE: December 31, 1987

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1. (U) Designation/Nomenclature (Popular Name): LSD 41 Class/ Dock Landing Ship

2. (U) DOD Component: U.S. Navy

3. (U) Responsible Office and Telephone Number:

Amphibious Warfare and Strategic Sealift Program Office (PMS377)
Naval Sea Systems Command
Washington, DC

PM: E. E. Shoults
Assigned: April 29, 1985
AUTOVON: 222-8511
COMM: (202) 692-8511

4. (U) Program Elements:

RDT&E: PE0603564N, PE0603567N, PE0604567N (shared funding)
PROCUREMENT: 24411N, APPN 1611, ICN 5105

AS AMENDED

APR 14 1988

5. (U) Related Programs: LCAC

[redacted]

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OASD(PA) DFOISR 88-T-0901

6. (U) Missions and Description: To conduct sustained combat operations, to gain/maintain sea control. To project naval power ashore by transporting landing force elements, landing craft, Landing Craft, Air Cushion (LCAC) and assault amphibians to the objective area, launching preloaded assault craft and amphibians to support amphibious assault and to operate in the amphibious warfare environment. The Dock Landing Ship (LSD 41) is a twin-screw, 22 knot, diesel propelled amphibious assault ship, with an overall length of 609 feet and a maximum beam of 84 feet. It also has accommodations for a total of 917 (413 crew and 504 troops, which includes 102 surge troops).

7. (U) Program Highlights:

a. (U) Significant Historical Developments-- An Operational Requirement (OR) (OR-0863-AW) for a Dock Landing Ship (LSD 41) was established by the Chief of Naval Operations (CNO) on 2 November 1976. At Milestone I on 18 July 1977, the Ship Acquisition and Improvement Panel (SAIP) recommended and the CNO approved the LSD 41 general configuration of a wet-well, medium-speed diesel propulsion system design. On 1 November 1978 at Milestone II, the Secretary of the Navy approved the contract design characteristics. On 16 January 1981, Milestone III, for production and fleet introduction, was approved. A Ship Systems Design Support contract was awarded to Lockheed Shipbuilding (Seattle, WA) on 15 February 1980. The Lead Ship Detail Design and Construction contract was awarded to Lockheed on 9 February 1981. The contract for the first follow-ship was awarded on 26 March 1982 and the second follow-ship 27 January 1983. On 21 November 1983, the Navy competitively awarded a Fixed Price Incentive contract to Avondale Shipbuilding, Inc. for construction of the LSD 44. An option for the construction of two ships (LSD 45 & 46) was executed on 26 November 1984. The final option for construction of two ships (LSD 47 & 48) was executed on 11 December 1985.

On 8 November 1984 the LSD 41 contract was renegotiated from Cost Plus Award Fee (CPAF) to Cost Plus Fixed Fee (CPFF) with ceiling limiting the government's liability for the overrun to $38.0M. The LSD 42 contract was converted from a CPAF to Fixed Price Incentive (FPI) with a 50/50 share ratio. All remaining ships are being procured under FPI contracts.

The LSD 41 successfully completed Acceptance Trials on 7 December 1984 and was delivered to the Navy on 8 January 1985. Final Contract Trials (FCT) for the LSD 41 were successfully completed during September 1985. The LSD 42 was launched 29 June 1984 on schedule.

Builder's Trials for the LSD 42 were conducted during October 1985. Acceptance Trials were held during December 1985. The LSD 42 delivered on 1 February 1986. The LSD 43 was successfully launched on 1 February 1986. Final contract trials for the LSD 42 were successfully completed on 24 June 1986.

LSD 43 Keel was laid in June of 1983 and the ship was launched in February 1986.

LSD 44 Keel was laid in May of 1986 and the LSD 45 keel laying occurred in October 1986.

b. (U) Significant Developments Since Last Report-- The LSD 43 completed Builders and Acceptance Trials in April and May 1987, respectively, and was delivered to the Navy on 15 June 1987. The ships operating schedule was accelerated and Final Contract Trials were completed in November 1987 to support a January 1988 PSA start.

During ceremonies in New Orleans, LA, the LSD 44 was launched on 27 June 1987. The Keel for LSD 45 was laid without ceremony on 23 March 1987.

The LSD 41 program is proceeding and delivery of the first of 5 ships, being built by Avondale Industries, is expected in the coming year.

LSD 42 successfully completed OT III Testing in April 1987. No additional DT&E is required. The LSD 41 program is expected to meet its mission requirements.

c. (U) Changes Since "as of" Date -- None

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no NDCP (dated March 1985) threshold breaches.

9. (U) Schedule:

a. (U) Milestone --	Production Estimate/Approved Program	Current Estimate
(U) SAIP Approval	Nov 78/Nov 78	Nov 78
(U) Approval For Production	Jan 81/Jan 81	Jan 81
(U) Lead Ship Award	Feb 81/Feb 81	Feb 81
(U) Launch Lead Ship	Jun 83/Jun 83	Jun 83
(U) Acceptance Trials (Lead Ship)	Oct 84/Oct 84	Dec 84
(U) Delivery Lead Ship	Nov 84/Nov 84	Jan 85
Material Support Date	Jan 85/Jan 85	Jan 85 (CH-1)
Naval Support Date	Feb 86/Feb 86	Feb 86 (CH-1)
*(U) Initial Operational Capability	Nov 85/Nov 85	Feb 86

*IOC - reflects date the lead ship is ready for operational deployment.

b. (U) Previous Change Explanations --

Delay in acceptance trials from 8 October 1984 to 7 December 1984 and delivery from 30 November 1984 to 8 January 1985 resulted from the shipbuilder overrunning his production man-hours to complete the ship.

Delay in IOC of two months is the result of 2 month late delivery of the Lead Ship, coupled with extension of SCN period to conduct Shock Test, and LCAC/LSD interface trials, which delayed PSA start date.

c. (U) Current Change Explanation -- None

(CH-1) Updated to reflect DAE baseline of Feb 17, 1988

d. (U) References --

Production Estimate: Revised NDCP, dated March 1985,subject LSD 41 Class.

Approved Program: Revised NDCP, dated March 1985,subject LSD 41 Class; FY88/89 amended Biennial Budget; DAE baseline dated Feb 17, 1988.

10. [redacted] Technical/Operational Characteristics:

a. (U) Technical --	Production Estimate/Approved Program	Demonstrated Performance	Current Estimate
(U) Accommodations			
(1) Troops	338/338	338	338
(2) Crew	413/413	413	413
(3) Staff	166/166	166	166
(U) Vehicle Square ft	12,800/12,800	12,800	12,800
(U) Marine Cargo (Cubic ft)	5,000/5,000	5,000	5,000
(U) Helicopter Spots (CH-46)	1 + 1/1 + 1	1 + 1	1 + 1
(U) Landing Craft	4 LCAC/4 LCAC	4 LCAC	4 LCAC
(U) Length (ft)	609/609	609	609
(U) Beam (ft)	84	84	84
(U) Draft (ft)	19'5"/19'5"	19'5"	19'5"
b. [redacted] Operational --			
(U) Speed (kts)	22/22	22	22

(b)(1)

[redacted]

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

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

e. (U) References --

Production Estimate: Revised NDCP, dated March 1985 subject LSD 41 Class.

Approved Program: Revised NDCP, dated March 1985 subject LSD 41 Class; FY88/89 amended Biennial Budget; DAE baseline dated Feb 17, 1988.

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

	Production Estimate	Changes	Current Estimate
a. Cost			
Development (RDT&E)	46.9	4.1	51.0
Procurement (SCN)	3177.0	-1162.8	2014.2
(Sailaway)	(3021.8)	(-1138.5)	(1883.3)
(Ship System)	(5.3)	(0.0)	(5.3)
(Initial Spares)	(3.5)	(-0.2)	(3.3)
(Outfitting/Post Delivery)	(146.4)	(-24.1)	(122.3)
Total FY82 Base-Year $	3223.9	-1158.7	2065.2
Escalation	1626.0	-1207.1	418.9
Development (RDT&E)	(2.6)	(-6.5)	(-3.9)
Procurement	(1623.4)	(-1200.6)	(422.8)
Total Then-Year $	4849.9	-2365.8	2484.1
b. Quantities			
Development (RDT&E)	0	0	0
Procurement	12	-4	8
Total	12	-4	8
c. Unit Cost			
Procurement:			
FY82 Base-Year $	264.8	-13.0	251.8
Then-year $	400.0	-95.4	304.6
Program:			
FY82 Base-Year $	268.7	-10.6	258.1
Then-year $	404.2	-93.7	310.5

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	2484.1	2524.5	2484.1
(2) Quantity	8	8	8
(3) Unit Cost	310.5	315.6	310.5
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	17.8	17.8	32.2
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Less OF/PD	-17.8	-17.8	-32.2
Less PY Escal	0.0	0.0	0.0
Net Total	0.0	0.0	0.0
(2) Quantity	0	0	0
(3) Unit Cost	0.0	0.0	0.0

13(U)Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (Pde)	49.5	4800.4	0.0	4849.9
Previous Changes:				
Economic	-0.2	-526.2	0.0	-526.4
Quantity	0.0	-1476.4	0.0	-1476.4
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	-2.2	-262.5	0.0	-264.7
Other	0.0	0.0	0.0	0.0
Support	0.0	-57.9	0.0	-57.9
Subtotal	-2.4	-2323.0	0.0	-2325.4
Current Changes:				
Economic	-4.3	-0.4	0.0	-4.7
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	-6.3	0.0	-6.3
Estimating	4.3	-16.3	0.0	-12.0
Other	0.0	0.0	0.0	0.0
Support	0.0	-17.4	0.0	-17.4
Subtotal	0.0	-40.4	0.0	-40.4
Total Changes	-2.4	-2363.4	0.0	-2365.8
Current Estimate	47.1	2437.0	0.0	2484.1

13(U)Cost Variance Analysis (Continued):

a. Summary -- (FY 1982 (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (Pde)	46.9	3177.0	0.0	3223.9
Previous Changes:				
Quantity	0.0	-928.5	0.0	-928.5
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	-1.6	-166.3	0.0	-167.9
Other	0.0	0.0	0.0	0.0
Support	0.0	-35.1	0.0	-35.1
Subtotal	-1.6	-1129.9	0.0	-1131.5
Current Changes:				
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	-5.0	0.0	-5.0
Estimating	5.7	-14.2	0.0	-8.5
Other	0.0	0.0	0.0	0.0
Support	0.0	-13.7	0.0	-13.7
Subtotal	5.7	-32.9	0.0	-27.2
Total Changes	4.1	-1162.8	0.0	-1158.7
Current Estimate	51.0	2014.2	0.0	2065.2

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

b. **Previous Change Explanations--**

RDT&E

Estimating: Revised program estimates; reduction due to repricing of ship design.

Procurement

Economic: Revised ASD(c) escalation indices.

Estimating: Revised program estimates; adjustment due to a Program Budget Decision; program repricing; reduction due to Gramm Rudman cut.

Support: Repricing of Post Delivery and outfitting requirements; reduction due to Gramm Rudman cut.

13(U)Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ECONOMIC REVISED JAN 88 ECONOMIC ESCALATION RATES	0.0	-4.3
ESTIMATING REVISED PROGRAM ESTIMATES	5.7	4.3
2) Procurement		
ECONOMIC REVISED JAN 88 ECONOMIC ESCALATION RATES	0.0	-0.4
ENGINEERING SHIP CONSTRUCTION STAGE PROHIBITS LOW-SMOKE CABLE INSTALLATION	-5.0	-6.3
ESTIMATING REFLECTS ACT. EXECUTION & REPRICING OF PROG. EST	-13.8	-16.3
SUPPORT REFLECTS ACT. EXECUTION & REPRICING OF OUTFITTING & POST DELIVERY REQUIREMENTS	-13.7	-17.4

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)
404.2	-66.4	17.5	0.0	-0.8	-34.6	0.0	-9.4	-93.7	310.5

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

a. (U) RDT&E -- N/A

b. (U) Procurement --

LSD 44 CONSTRUCTION
Avondale Industries, Inc.,
New Orleans, LA
N00024-84-C-2027, FPI,
Award: November 21, 1983
Definitized: November 21, 1983

Initial Contract Price		
Target	Ceiling	Qty
$166.6	$202.3	1

Current Contract Price			*Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$198.4	$211.0	1	$226.3	$228.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-15.0	$-7.9
Cumulative Variances to Date (12/31/87)	$-24.0	$-9.2
Net Change	$- 9.0	$-1.3

Explanation of Change: The majority of the unfavorable cost variance is due to engineering with growth occurring in production, labor and overhead. The unfavorable schedule variance is due to construction being behind schedule. The Program Manager's assessment takes into consideration the above variances.

LSD 45/46 CONSTRUCTION
Avondale Industries, Inc.,
New Orleans, LA
N00024-84-C-2070, FPI,
Award: November 26, 1984
Definitized: November 26, 1984

Initial Contract Price		
Target	Ceiling	Qty
$304.8	$394.9	2

Current Contract Price			*Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$321.2	$396.7	2	$338.6	$356.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+ .9	$-14.2
Cumulative Variances to Date (12/31/87)	$+19.9	$-25.8
Net Change	$+19.0	$-11.6

Explanation of Change: The favorable cost variance is due to material savings. The unfavorable schedule variance is related to production labor and overhead. The Program Manager's assessment takes into consideration the above variances.

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

b. (U) Procurement --

LSD 47/48 CONSTRUCTION
Avondale Industries, Inc.,
New Orleans, LA
N00024-84-C-2027, FPI,
Award: December 11, 1985
Definitized: December 11, 1985

Initial Contract Price		
Target	Ceiling	Qty
$297.9	$386.0	2

Current Contract Price			*Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$317.3	$392.4	2	$333.9	$368.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+ .07	$ 0
Cumulative Variances to Date (11/30/85)	$+12.4	$-24.5
Net Change	$+12.3	$-24.5

Explanation of Change: The favorable cost variance is due to material savings. The unfavorable schedule variance is related to production labor and overhead. The Program Manager's assessment takes into consideration the above variances.

* Both Contractor and PM's estimated price at completion includes their estimated escalation for the contract.

c. (U) MILCON -- N/A

6(U)Program Funding Summary: (Current Estimate in Millions)

a. Program Status --

(1) Percent Program Completed: 8/15 = 53.3%
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 2420.8/ 2484.1 = 97.5%
(Funds Appropriated To Date/Total Program Funding in Millions)

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

Appropriation	Current & Prior yrs (FY81-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-93)	Balance to Complete Beyond FYDP (FY94-	Total
RDT&E	47.1	0.0	0.0	0.0	47.1
Procurement	2373.7	32.2	31.1	0.0	2437.0
Total	2420.8	32.2	31.1	0.0	2484.1

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

c. Annual Summary --

Fiscal Year	Qty	FY82 Base-Year Dollars: Sailaway Nonrec.	Sailaway Rec.	Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate %
APPROPRIATION: RDT&E								
1977	0	0.0	0.0	5.1	0.0	0.0	3.7	2.58
1978	0	0.0	0.0	13.1	0.0	0.0	10.3	6.80
1979	0	0.0	0.0	7.3	0.0	0.0	6.3	8.40
1980	0	0.0	0.0	10.1	0.0	0.0	9.7	10.59
1981	0	0.0	0.0	5.8	0.0	0.0	6.1	10.61
1982	0	0.0	0.0	3.3	0.0	0.0	3.6	7.60
1983	0	0.0	0.0	3.2	0.0	0.0	3.7	4.90
1984	0	0.0	0.0	1.8	0.0	0.0	2.1	3.80
1985	0	0.0	0.0	0.7	0.0	0.0	0.9	3.40
1986	0	0.0	0.0	0.6	0.0	0.0	0.7	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	3.70
Subtotal	0	0.0	0.0	51.0	0.0	0.0	47.1	--

(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	FY82 Base-Year Dollars: Sailaway Nonrec.	FY82 Base-Year Dollars: Sailaway Rec.	FY82 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
APPROPRIATION: Procurement								
1980	0	0.0	0.0	37.2	41.0	0.0	41.0	9.90
1981	1	22.9	304.8	340.3	46.9	41.0	387.2	9.60
1982	1	0.0	290.4	256.6	0.1	46.9	301.0	7.50
1983	1	0.0	289.0	323.6	41.0	0.0	385.7	3.80
1984	1	0.0	247.7	317.7	102.6	36.8	386.3	3.60
1985	2	0.0	362.2	389.4	114.2	80.0	485.1	2.10
1986	2	0.0	343.4	281.7	5.0	82.4	362.5	1.20
1987	0	0.0	0.0	5.9	7.1	0.0	7.1	1.60
1988	0	0.0	0.0	14.1	17.8	0.0	17.8	3.70
1989	0	0.0	0.0	24.7	32.2	0.0	32.2	3.80
1990	0	0.0	0.0	21.5	29.0	0.0	29.0	3.60
1991	0	0.0	0.0	1.5	2.1	0.0	2.1	3.30
1992	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Subtotal	8	22.9	1837.5	2014.2	439.0	287.1	2437.0	--
Total	8	22.9	1837.5	2065.2	439.0	287.1	2484.1	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPROPRIATION: RDT&E

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1977	3.7	3.7	3.7
1978	10.3	10.3	10.3
1979	6.3	6.3	6.3
1980	9.7	9.7	9.7
1981	6.1	6.1	6.1
1982	3.6	3.6	3.6
1983	3.7	3.7	3.7
1984	2.1	2.1	2.1
1985	0.9	0.9	0.9
1986	0.7	0.7	0.7
1987	0.0	0.0	0.0
1988	0.0	0.0	0.0
To Compl.	0.0	0.0	0.0
Total	47.1	47.1	47.1

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPROPRIATION: Procurement

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1980	41.0	41.0	40.9
1981	387.2	387.2	385.9
1982	301.0	301.0	296.7
1983	385.7	372.4	343.6
1984	386.3	379.1	284.3
1985	485.1	438.0	277.7
1986	362.5	322.7	73.3
1987	7.1	7.1	4.3
1988	17.8	0.1	0.0
To Compl.	63.3	0.0	0.0
Total	2437.0	2248.6	1706.7

17(U)Production Rate Data:

* Annual Production rate is less than 6 yearly Per ASD Memo dated 12 Dec. 86, Production rate information is not applicable to the program.

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

b. **Previous Change Explanations--**

RDT&E

Estimating: Revised program estimates; reduction due to repricing of ship design.

Procurement

Economic: Revised ASD(c) escalation indices.

Estimating: Revised program estimates; adjustment due to a Program Budget Decision; program repricing; reduction due to Gramm Rudman cut.

Support: Repricing of Post Delivery and outfitting requirements; reduction due to Gramm Rudman cut.

SAR-87-092

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

Program: Peacekeeper

AF-26 PEACEKEEPER

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name): LGM-118A/Land Based ICBM (Peacekeeper)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

Program Manager
Ballistic Missile Office
Norton AFB, CA 92409-6468

Col Thomas J. Speed, III
Assigned: Mar 87
AV 876-3356; COMM (714) 382-3356

4. Program Elements/Procurement Line Items:

RDT&E: PE 64312F (Shared Funding)

PROCUREMENT: APPN 3020 PE 11215F ICN MMXOLG,MMXYO

MILCON: PE 11215F

~~Classified by: Multiple Sources~~
~~Declassify on: OADR~~

NOT RELEASABLE TO FOREIGN NATIONALS

R E S T R I C T E D D A T A
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MAR 23 [illegible] 18
DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

5. Related Programs: Small ICBM, Rail Garrison Basing Mode

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 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 vertical multiple protective structures as the basing mode. The President, in 1979, approved M-X Full Scale Engineering Development of a SALT verifiable system based in horizontal multiple protective structures. The missile chosen for development was the 92-inch diameter missile. Additionally, a dash capability was to be provided. After initiation of Full-Scale Engineering Development, the engineering baseline was changed. Separate missile transporters and launchers replaced the transporter erector launcher and the size of the shelters was reduced. System Design Reviews for the system were completed in 1980 and the first Preliminary Design Review was held in 1981 prior to cancellation. In addition, construction of flight test facilities at Vandenberg AFB was begun, and assembling and check out planning for deployment was started. IOC was achieved in December 1986.

In 1981, the horizontal multiple protective shelter basing mode was terminated and the President directed production of 100 M-X missiles and interim deployment of 40 missiles in existing Minuteman and Titan silos while long-term basing options including deep basing, defended fixed basing, defended deceptive basing and continuous patrol aircraft were studied. In early 1982, study on the continuous patrol aircraft option was discontinued. In late 1982, Minuteman silo basing was not approved and the President directed Closely Spaced Basing at F.E. Warren AFB, Wyoming, for which 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. Deployment activities are on schedule for a Full Operational Capability by December 1988. IOC was achieved in December 1986.

b. Significant Developments Since Last Report — The sixteenth and seventeenth flight tests were successfully conducted from Vandenberg AFB. The final three tests are planned for FY 1988 and FY 1989. The incremental Program Management Responsibility Transfer (PMRT) process started in December 1987 with the transfer of the Transportation and Handling (T&H) System.

7. Program Highlights (Cont'd):

b. Significant Developments Since Last Report (cont'd) — The Scientific Advisory Board (SAB) completed a review of the Peacekeeper program in October 1987. The report stated "From all of the data that were examined, the Committee concluded that the Peacekeeper system has achieved accuracies better than the requirement at maturity" and "The current estimate of the Peacekeeper guidance system reliability is better than that predicted for this point in the program." SAB recommendations were accepted and should be completed by mid-1988. Deliveries for new inertial measurement units (IMUs) from Northrop Electronics Division (NED) continue to lag contract delivery requirements. However, deliveries are meeting the BMO recovery schedule established in March 1987. The failure rate of missile guidance and control sets (MGCSs) is as predicted. The IMU without Government Furnished Equipment (GFE) is 43% better than expected. However, a mechanism within the IMU, namely its accelerometer has failed more often than expected. The accelerometer (Specific Force Integrating Receiver [SFIR]), which is a GFE instrument, is inside the IMU. The SFIR manufactured by Honeywell Inc. is achieving only 43% of its predicted mean time between failure (MTBF) and is driving the repair cycle turnaround time. Failure analysis and corrective actions are still underway. FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional Actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

The Peacekeeper ICBM system is expected to fulfill all mission requirements.

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

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are no SDDM (dated 14 Feb 80) threshold breaches.

9. Schedule:

a. Milestones —

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/ NA	Feb 80*
Preliminary Design Review	Aug 80/ NA	Aug 80*
Stage Destruct Test Complete	Jul 82/ NA	Jul 82*
Ordnance Induced Shock Tests Complete	Dec 82/ NA	Dec 82*
First Flight	Jan 83/Jun 83 (Ch-1)	Jun 83*
Structure Load Tests Complete	Jun 83/ NA	Jun 83*
First Production Contract Award	Jan 84/Jan 84	Jan 84*
Propulsion Flight Proof Tests Complete	Apr 84/ NA	Jul 84*
Initial Operational Capability (IOC)	Dec 86/Dec 86	Dec 86*
Full Operational Capability (FOC)	- /Dec 88(Ch-1)	Dec 88(Ch-1)

*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. Schedule (Cont'd):

c. Current Change Explanations —

(Ch-1) Added FOC milestone: Reflects USD(A) baseline approval.

d. References: Development Estimate: SecDef Memorandum, dated February 14, 1980.
Approved Program: PMD 0075(15), dated 14 Sep 83 as amended by DEPSECDEF Memo dated 5 May 87; USD(A) memo, 9 Feb 1988.

10. (S-RD) Technical/Operational Characteristics:

a. (S-FRD) Technical —	Dev Est/ 1/ App Pgm	Demonstrated Performance	Current Estimate
(U) Payload	-/10MK-21RVs(Ch-2)		10MK-21RVs(Ch-2)
(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)			
(U) Max Range (km)	-/11000 (Ch-2)		11000 (Ch-2)
(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/flight reliability has resulted from test results and analysis of additional flight test data.

d. (U) Explanation of Changes:

(U) (Ch-1) 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.
(U) (Ch-2) Reflects USD(A) baseline approval.

e. (U) References: Development Estimate - SDDM, dated February 14, 1980.
Approved Program - PMD 0075(15), dated 14 Sep 83.

1/ (U) The approved program directs only the MEF. Subelements are provided to explain how the MEF is derived.

[redacted]

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

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.

7/ (U) Demonstrated performance is based on mean.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars) 1/

	Development Estimate	Changes	Current Estimate
a. (U) Cost —			
Development (RDT&E)	$6018.2	$-243.3	$5774.9
Procurement	10292.0	+320.6	10612.6
Total Flyaway	(6645.9)	(+1332.9)	(7978.8)
Other Weapon System Costs	(2546.2)	(-1589.6)	(956.6)
Initial Spares	(304.2)	(+215.5)	(519.7)
Support	(795.7)	(+361.8)	(1157.5)
Construction (MILCON) 2/	324.7	-118.7	206.0
Total FY 82 Base-Year $	16634.9	-41.4	16593.5
Escalation	5045.3	+307.3	5352.6
Development (RDT&E)	(878.9)	(-188.2)	(690.7)
Procurement	(4086.2)	(+534.5)	(4620.7)
Construction (MILCON)	(80.2)	(-39.0)	(41.2)
Total Then-Year $	$21680.2	+265.9	21946.1
b. (U) Quantities — 3/			
Development (RDT&E)	20	0	20
Procurement	223	12	235
Total	243	12	255
c. (U) Unit Cost —			
Procurement:			
FY 82 Base Year $	46.152	-0.992	45.160
Then-Year $	64.476	+0.347	64.823
Program:			
FY 82 Base Year $	68.456	-3.383	65.073
Then-Year $	89.219	-3.156	86.063

d. (U) Approved Design to Cost Goal — N/A

e. (U) Foreign Military Sales — None

(b)(1) [redacted]

1/ (U) The total costs identify the $16.6B estimate (FY 82 dollars), which equates to $21.9B 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.

11. (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 Year		Budget Year
	SAR Current Estimate (Dec 87 SAR)	UCER Baseline Estimate (Dec 86 SAR)	UCR Baseline Estimate (Dec 87 SAR)
a. Program Acquisition —			
(1) Cost	21946.1	22020.2	21946.1
(2) Quantity	255	255	255
(3) Unit Cost	86.063	86.354	86.063
b. Current Procurement —	(FY 1988)	(FY 1988)*	(FY 1989)
(1) Cost	873.7	873.7	808.7
Less CY Adv Proc	-	-	-
Plus PY Adv Proc			
Net Total	873.7	873.7	808.7
(2) Quantity	12	12	12
(3) Unit Cost	72.808	72.808	67.392

*Differs from the December 1986 SAR due to the 1988 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	-142.5	-774.2	-4.7	-921.4
Quantity		377.6		377.6
Schedule		767.7		767.7
Engineering			-97.1	-97.1
Estimating	-273.0	2040.5	7.3	1774.8
Other				0.0
Support	-0.8	-1501.4	-59.4	-1561.6
Subtotal	-416.3	910.2	-153.9	340.0
Current Changes:				
Economic	-11.9	52.1	-1.3	38.9
Quantity				
Schedule		167.3		167.3
Engineering				
Estimating	-3.3	-399.6	-2.5	-405.4
Other				
Support		125.1		125.1
Subtotal	-15.2	-55.1	-3.8	-74.1
Total Changes	-431.5	855.1	-157.7	265.9
Current Estimate	6465.6	15233.3	247.2	21946.1

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	-240.1	1342.8	4.8	1107.5
Other				0.0
Support	-1.3	-1083.4	-49.2	-1133.9
Subtotal	-241.4	513.4	-116.9	155.1
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-1.9	-263.9	-1.8	-267.6
Other				
Support		71.1		71.7
Subtotal	-1.9	-192.8	-1.8	-196.5
Total Changes	-243.3	320.6	-118.7	-41.4
Current Estimate	5774.9	10612.6	206.0	16593.5

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.

Procurement

Economic: Revised economic escalation indices.

Quantity: Increased missile buy quantity by 12 to support Rail Garrison basing.

13. 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.

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.

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.

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.

13. Cost Variance Analysis (Cont'd):

Revised buy schedule for Instrumentation and Flight Safety System, lower estimates for mechanical, support equipment, and engineering support.

Construction

Economic: Revised economic escalation indices.

Estimating: Revised estimate for storage facilities. Adjustment for current and prior year escalation.

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.

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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)	-	-11.9
Adjustment for current and prior year inflation (Estimating)	10.2	11.9
Congressional action in FY 88 will cause increased risk and corresponds to reduced buy in FY 88 (9) and FY 89 (9) (Estimating)	-12.1	-15.2
(2) Procurement		
Revised economic escalation indices (Economic)	-	52.1
Adjustment for delay in purchase of 19 missiles (9 in FY 88, 9 in FY 89 and 1 in FY 95) to FY 96 (Schedule)	-	167.3
Adjustment for current and prior year escalation (Estimating)	2.7	3.1
Adjustment for FY 90 and beyond escalation (Estimating)	-29.5	-46.9
Budget adjustment in cost for FY 96 buy of 19 missiles (Estimating)	-108.4	-188.3
Congressional reduction in FY 86 caused an increase in program risk (Estimating)	-78.5	-103.9
Reduction of prior years estimate to reflect actuals based on Nov 87 Financial Review (Estimating)	-50.2	-63.6
Adjustment to reschedule the purchase of IFSS from FY 89 to FY 96 (Support)	-	18.8
Adjustment for current and prior year escalation (Support)	4.8	6.2
Adjustment for FY 90 and beyond escalation (Support)	-4.1	-6.3
Budget cut caused a shortage in the estimated cost of IFSS in FY 96 (Support)	-18.2	-31.6
Increased cost for Logistics and General Support for FY 96 (Support)	62.9	109.3
Refinement of estimate for support based on the Nov 87 Financial Review (Support)	25.7	28.8
(3) MILCON		
Revised economic escalation indices (Economic)	-	-1.3
Adjustment for current and prior year escalation (Estimating)	1.0	1.2
Congressional reduction in FY 88 corresponds to reduced buy in FY 88 (9) and FY 89 (9) (Estimating)	-2.8	-3.7

d. References —

Development Estimate: Report of the President's Commission on Strategic Forces, April 1983, and President's letter, 19 April 1983, transmitting Strategic Forces Technical Assessment.

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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	-3.461	-2.718	3.667	-0.381	5.370	0.000	-5.633	-3.156	86.063

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

	Initial Contract Price		
Assembly, Test & System Support:	Target	Ceiling	Qty
Martin Marietta, Denver, CO F04704-84-C-0048, CPIF/AF Award: June 14, 1984 Definitized: June 14, 1984	$671.6	N/A	N/A

This contract was reported in the Dec 86 SAR and is now over 90 percent complete and no longer being reported.

	Initial Contract Price		
Guidance and Control, FY 84	Target	Ceiling	Qty
Rockwell International, Autonetics, Anaheim, CA F04704-84-C-0025, FPIF Award: March 5, 1984 Definitized: March 5, 1984	$233.0	$249.6	33

This contract was reported in the Dec 86 SAR and is now over 90 percent complete and no longer being reported.

	Initial Contract Price		
Reentry Systems/Reentry Vehicle, FY 84	Target	Ceiling	Qty
AVCO, Wilmington, MA F04704-84-C-0132, FPIF Award: August 31, 1984 Definitized: December 14, 1984	$253.8	$280.1	233

This contract was reported in the Dec 86 SAR and is now over 90 percent complete and no longer being reported.

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

Basing Operational Support Equip.:	Initial Contract Price Target	Ceiling	Qty
Boeing, Seattle, WA F04704-85-C-0050, FPIF Award: February 1, 1985 Definitized: October, 17, 1985	$221.6	$240.7	33

This contract was reported in the Dec 86 SAR and is now over 90 percent complete and no longer being reported.

Inertial Measurement Unit	Initial Contract Price Target	Ceiling	Qty
Northrop Electronics Division, Hawthorne, CA F04704-84-C-0041, FPIF Award: April 1, 1984 Definitized: October 1, 1984	$262.4	$282.0	52

This contract was reported in the Dec 86 SAR and is now over 90 percent complete and no longer being reported.

a. RDT&E

None

b. PRODUCTION

Canister Procurement:	Initial Contract Price Target	Ceiling	Qty
Westinghouse Electric Corp. (Marine Division) Sunnyvale, CA F04704-85-C-0067, FPIF Award: August 7, 1985 Definitized: August 7, 1985	$120.5	$133.8	33

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$197.3	$215.7	54	$196.7	$196.41

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/31/87)	$+2.3	$-0.8
Net Change	$+2.3	$-0.8

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

Explanation of Change: This is the first time for this contract to be in the SAR. The favorable cost variance is due to implementation of a more efficient process development for the canister tube and lower material costs for the lateral support group due to greater than planned quantity discounts. The schedule variance is due to late material deliveries. 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.

Guidance and Control, FY 86	Initial Contract Price		
	Target	Ceiling	Qty
Rockwell International, Autonetics, Anaheim, CA	$165.0	$175.4	25
F04704-86-C-0029, FPIF			
Award: June 14, 1987			
Definitized: June 14, 1987			

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$165.0	$175.4	25	$180.0	$180.01

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date (12/31/87)	$ +0.7	$ -2.0
Net Change	$ +0.7	$ -2.0

Explanation of Change: This is the first time for this contract to be included in the SAR. The cost variance is due to favorable indirect rates and lower than expected material costs. The schedule variance is due to late receipt of subcontracted extended core memories and plated wire memories. 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.

Stage I, FY 86-87:	Initial Contract Price		
	Target	Ceiling	Qty
Morton Thiokol, Brigham City, UT	$144.3	$154.2	26
F04704-86-C-0091, FPIF			
Award: May 27, 1987			
Definitized: May 26, 1987			

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

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$144.3	$154.2	26	$145.9	$144.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ N/A	$ N/A
Cumulative Variances To Date (12/31/87)	$ -0.3	$ +3.1
Net Change	$ -0.3	$ +3.1

Explanation of Change: This is the first time for this contract to be included in the SAR. The cost variance is insignificant. The schedule variance is due to early delivery of material. No program or contract impact.

Peculiar Support Equipment:	Initial Contract Price		
	Target	Ceiling	Qty
Martin Marietta, Denver, CO F04704-85-C-0064, FPIF Award: May 7, 1985 Definitized: August 14, 1985	$206.0	$233.0	N/A

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$410.0	$463.6	N/A	$427.0	$419.21

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+14.1	$ -9.7
Cumulative Variances To Date (12/31/87)	+11.0	-1.0
Net Change	$ -3.1	$ +8.7

Explanation of Change: The cost variance change is due to increases in overhead rates, additional support travel requirements, and added labor costs for program management, transportation and handling equipment (T&H) manufacturing and in-flight safety system (IFSS) manufacturing. The schedule variance improved due to completion of various T&H tasks and early delivery of materials by IFSS subcontractors. 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.

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

	Initial Contract Price		
Assembly & Checkout:	Target	Ceiling	Qty
Boeing, Seattle, WA F04704-85-C-0053, FPIF/AF Award: February 15, 1985 Definitized: February 15, 1985	$ 47.3	$ 56.3	N/A

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$147.7	$174.8	N/A	$156.2	$143.41

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/31/87)	$+1.0	$+0.4
Net Change	$+1.0	$+0.4

Explanation of Change: This is the first time for this contract to be included in the SAR. The cost variance is due to lower than planned material costs resulting from favorable negotiations with suppliers. The schedule variance is insignificant. No program or contract impact.

	Initial Contract Price		
Inertial Measurement Unit, FY 85:	Target	Ceiling	Qty
Northrop Electronics Division, Hawthorne, CA F04704-85-C-0082, FPIF Award: June 1, 1986 Definitized: July 1, 1986	$158.8	$168.4	30

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$158.7	$168.3	30	$160.1	$159.21

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances To Date (12/31/87)	$-3.5	$-17.3
Net Change	$-3.5	$-17.3

Explanation of Change: This is the first time for this contract to be included in the SAR. The cost variance is due to a retroactive indirect rate change for 1987 and labor inefficiencies caused by material shortages. The schedule variance is due to delays in release of material caused by piece part shortages. Failure to meet contract delivery dates resulted in withholding of progress payments.

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

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.

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

a. Program Status —

(1) Percent Program Completed: 42.9% (6/14)

(2) Percent Program Cost Appropriated: 64.8% (14219.5/21946.1)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY83-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Balance to Complete Beyond FYDP (FY93-96)	Total
RDT&E	6390.4	40.0	29.2	6.0	6465.6
Procurement	7600.9	808.7	3244.2	3579.5	15233.3
MILCON	228.2	6.5	12.5	0.0	247.2
Total	14219.5	855.2	3285.9	3585.5	21946.1

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars) 1/

c. Annual Summary -- 4/

Fiscal Year	3/ Qty	FY 82 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate %
Appropriation: RDT&E								
1983				1787.5			1912.6	4.9
1984				1768.1			1962.6	3.8
1985				1326.7			1520.4	3.4
1986				569.2			668.8	2.8
1987				238.9			290.0	2.7
1988				28.6			36.0	3.7
1989				30.6			40.0	3.8
1990				11.0			14.8	3.6
1991				5.3			7.4	3.3
1992				4.9			7.0	2.8
1993				4.1			6.0	2.3
Subtotal	20			5774.9			6465.6	
Appropriation: Procurement								
1984	21	222.6	988.2	1719.9			2143.1	8.0
1985	21	7.8	750.6	1875.9			2399.3	3.4
1986	12	0.0	600.4	791.7			1048.2	2.8
1987	12	0.0	592.3	828.4			1136.6	2.7
1988	12	0.0	546.9	614.8			873.7	3.7
1989	12	0.0	514.2	550.9			808.7	3.8
1990	21	0.0	645.0	764.5			1155.2	3.6
1991	21	0.0	599.2	698.1			1082.0	3.3
1992	21	0.0	569.4	634.9			1007.0	2.8
1993	21	0.0	580.7	615.5			998.4	2.3
1994	21	0.0	486.5	508.0			842.7	2.3
1995	21	0.0	391.2	411.7			699.1	2.3
1996	19	0.0	483.8	598.3			1039.3	2.3
Subtotal	235	230.4	7748.4	10612.6			15233.3	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars) 1/

Appropriation: MILCON 2/

1983			15.0			16.7	4.9	
1984			27.2			31.2	3.8	
1985			81.3			95.7	3.4	
1986			43.8			53.1	2.8	
1987			20.6			25.9	2.7	
1988			4.3			5.6	3.7	
1989			4.8			6.5	3.8	
1990			7.6			10.5	3.6	
1991			1.4			2.0	2.8	
Subtotal			206.0			247.2		
Total	255		16593.5			21946.1		

1/ The total costs identify the $16.6B estimate (FY 82 dollars), which equates to $21.9B 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.

4/ FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Cont'd): 1/

d. Obligations and Expenditures —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
Appropriation: RDT&E			
1983	1912.6	1912.6	1877.3
1984	1962.6	1945.0	1877.6
1985	1520.4	1510.6	1462.6
1986	668.8	663.7	573.5
1987	290.0	144.2	54.9
1988	36.0	5.7	0.3
To Complete	75.2	N/A	N/A
Total	6465.6	6181.8	5846.2
Appropriation: Procurement 2/			
1984	2143.1	2052.8	1880.8
1985	2399.3	2230.2	1300.2
1986	1048.2	619.7	155.4
1987	1136.6	679.4	59.9
1988	873.7	30.9	0
To Complete	7632.4	N/A	N/A
Total	15233.3	5613.0	3396.3
Appropriation: MILCON			
1983	16.7	12.1	12.0
1984	31.2	27.4	27.1
1985	95.7	57.5	55.9
1986	53.1	32.1	30.0
1987	25.9	6.1	4.3
1988	5.6	0	0
To Complete	19.0	N/A	N/A
Total	247.2	135.2	129.3

1/ Obligation and Expenditure figures reflect program office records as of 24 Dec 87.

2/ Obligation and Expenditure figures reflect only funds issued to BMO. They do not include initial spares, OSD/AF/AFSC withholds, or funds issued to other agencies.

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 associated contractors.

Fiscal Year	Production Rates (Quantity/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	43.0
1989	48.0	48.0	12.0	
1990		48.0	21.0	
1991		48.0	21.0	
1992			21.0	
1993			21.0	
1994			21.0	
1995			21.0	
1996			19.0	

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	-	16593.5	2271.9	14321.6
	(TY $)	20907.9	-	21946.1	3429.5	18516.6
PAUC	(BY $)	66.503	-	65.073	9.910	55.163
	(TY $)	86.041	-	86.063	13.449	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		1/84	N/A	1/84
Duration (in Months)	101		180	121	59
End Date (Mo/Yr) 2/	5/93		12/98	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	32/18 3/

3/ While 32 launch facilities have been turned over to the Strategic Air Command, only 18 are available for alert due to unavailability of missile guidance and control sets.

18. Operating and Support Costs: N/A

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SAR-87-090

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: OVER-THE-HORIZON BACKSCATTER RADAR (OTH-B)

AS OF DATE: December 31, 1987

AF-25 OTH-B

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SAR

88-0129

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 — Program Director: Col James A. Lee
   Electronic Systems Division — Assigned June 19, 1985
   Hanscom AFB, MA 01731-5000 — Autovon 478-5980, MITRE Ext 5387

4. Program Elements:

   RDT&E: PE 12417F
   PROCUREMENT: PE 12417F APPN 3080 ICN 83312D
   MILCON: PE 12417F

CLEARED

5. Related Program: NONE

6. Mission and Description:
The OTH-B radar system satisfies requirements for tactical early warning of an attack on North America by bombers and air-to-surface missiles. It will detect and track airborne vehicles at ranges between approximately 500-1800 nautical miles from the radar. OTH-B increases warning time for survival of retaliatory forces and provides decision time for the National Command Authority consistent with ballistic missile warning requirements. The OTH-B will provide surveillance coverage of the East, West, Northwest and Southern approaches to North America. The OTH-B does not replace any existing radar systems.

~~CLASSIFIED BY: OTH-B Security Classification Guide 30 APR 86~~
~~DECLASSIFY ON: OADR~~

~~SECRET~~

OASD(PA) DFOISR 98-T-0588

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 sites 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. The final Environmental Impact Statements for ARS and CRS were filed on 30 January 1987 and 22 May 1987.

b. Significant Developments Since Last Report --

FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional Action and FY89 Program Budget decisions. Proper adjustments will be completed and reported in a future SAR.

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.

The OTH-B Radar Program is expected to satisfy mission requirements.

c. Changes Since 'As Of' Date --

Started RPV testing in mid Jan 88. Test program proceeding on schedule and achieving test objectives.

8. **Decision Coordinating Paper (DCP) Threshold Breaches:** There are currently no DCP (dated 18 Janunary 1982) threshold breaches.

9. (U) Schedule:

(U) Milestones --	Development Estimate/ Approved Program	Current Estimate
(U) System Definition Complete	Nov 73/Nov 73	Nov 73
(U) Prototype Contract Award	Mar 75/NA	Mar 75
(U) Initiate Program Restructure	Dec 76/NA	Dec 76
(U) Conclude Technical Feasibility Test	Feb 81/Feb 81	Feb 81
(U) Conclude IOT&E	Jun 81/Jun 81	Jun 81
(U) AFSARC Review	Nov 81/NA	Nov 81
(U) Development Decision	Jan 82/NA	Jan 82
(U) Development Contract Award	Jun 82/NA	Jun 82
(U) SAF/AL Program Review	Dec 83/NA	Dec 83
(U) Award First Production Contract (ECRS)	May 84/May 84	May 84
(U) SAF/AL Program Review	Dec 85/NA	Dec 85
(U) Award WCRS Production Contract	Jul 86/Dec 86	Dec 86
(U) Start of limited operations	Dec 87/Dec 87	Dec 87
(U) Start RPV testing	Jan 88 NA	Jan 88 (CH-1)

(b)(1)

(U) IOC

(b)(1)

b. (U) Previous Change Explanations --

(U) Congressional action to defer initial procurement of WCRS from FY85 to FY86 caused a slip in WCRS and CRS IOC dates. The ARS was added to the OTH-B program in 1984.

(b)(1)

(U) Milestones added since 31 December 1984 -- SAF/AL Program Review and Award WCRS Production Contract.

(b)(1)

(U) West Coast contract award was changed from Jul 86 to Dec 86 due to receipt of only one proposal and the resulting additional time required to complete pricing analysis and negotiations on a single source basis.

(b)(1)

(U) Milestone added since 31 Dec 86 -- reflects the start of limited operations. Provides early operational use of system capability in advance of final system completion.

(b)(1)

c. (U) Current Change Explanations --

(U) (CH-1) Milestone added since 30 Jun 87 -- reflects the start of RPV testing

(b)(1)

(U) (Ch-3) Reflects USD(A) Baseline approval

d. (U) References --

(U) Development Estmate: DCP #49, Revision 2, dated 18 January 1982, Subject: "CONUS OTH-B Radar Program".

(U) Approved Program: Same as Development Estimate, USD(A) Memo, 9 Feb 88

10. (U) Technical/Operational Characteristics:

a. (U) Technical --

	Dev Estimate/ Appr Program	Demonstrated Performance 2/	Current Estimate
(U) Detection/Tracking Range (nm)	500-1800/ 500-1800	500-1800	500-1800

(b)(1)

1/ (U) rms = root mean square.

2/ (U) The better than expected performance of operational and technical characteristics is derived from Experimental Radar System (ERS) test program results.

b. (U) Operational --

(b)(1)

(U) Mean Time Between Failures (hrs)	40/40	--	41

3/ (U) Probability/confidence level.

c. (U) Previous change explanations -- Absolute Accuracy, Speed Resolution and Mean Time Between Failure current estimate values are based on analysis of East Coast Radar System performance capabilities.

d. (U) Current Change Explanations -- Ch-1 Reflects USD(A) Baseline Approval

e. Reference --
Development Estimate: DCP #49, Revision 2, dated 18 January 1982, Subject: "CONUS OTH-B Radar Program".

Approved Program: Same as Development Estimate, USD(A) Memo, 9 Feb 1988

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

a. Cost--	Development Estimate	Changes	Current Estimate
Development (RDT&E)	$327.3	$+73.5	$400.8
Procurement	710.9	+641.4	1352.3
East Coast	(199.0)	(-14.8)	(184.2)
West Coast	(263.0)	(+24.0)	(287.0)
Central	(184.8)	(+174.8)	(359.6)
Alaskan	(---)	(+219.9)	(219.9)
P^3I **	(7.2)	(+178.9)	(186.1)
Spares	(56.9)	(+58.6)	(115.5)
Construction (MILCON)	107.1	+21.7	128.8
Total FY82 Base Year $	1145.3	+736.6	1881.9
Escalation	274.1	+303.2	577.3
Development (RDT&E)	(51.1)	(+20.4)	(71.5)
Procurement	(191.3)	(+269.9)	(461.2)
Construction (MILCON)	(31.7)	(+12.9)	(44.6)
Total Then-Year $	$1419.4	$+1039.8	$2459.2
b. Quantities--			
Development (RDT&E)	1		1
Procurement	7	+4	11
Total	8	+4	12
c. Unit Cost * --			
Procurement:			
FY 82 Base-Year $	$101.557	$+21.379	$122.936
Then-Year $	128.886	+35.978	164.864
Program:			
FY 82 Base-Year $	143.163	+13.662	156.825
Then-Year $	$177.425	$+27.508	$204.933

* Portion of the cost of a sector is determined by the specific site conditions

** Preplanned Product Improvement (P^3I)

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

d. Approved Design to Cost Goal -- None

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

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 87 SAR	Dec 86 SAR	Dec 87 SAR
	(1) Cost	2459.2	2494.8	2459.2
	(2) Quantity	12	12	12
	(3) Unit Cost *	204.933	207.900	204.933
b.	Current Procurement--	(FY 1988)	(FY 1988) **	(FY 1989)
	(1) Cost	134.3	134.3	172.7
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	20.0	20.0	0
	Net Total	154.3	154.3	172.7
	(2) Quantity	1	1	1
	(3) Unit Cost *	154.300	154.300	172.700

* Portion of the cost of a sector is determined by the specific site conditions

** Adjusted to reflect FY87 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	-10.1	-73.4	-10.9	-94.4
Quantity	-	+540.4	+147.4	+687.8
Schedule	-	+36.1	+1.5	+37.6
Engineering	+54.5	+223.2	-	+277.7
Estimating	+56.6	+54.2	-36.2	+74.6
Other	-	-	-	-
Support	-	+88.7	-	+88.7
Subtotal	+101.0	+869.2	+101.8	+1072.0
Current Changes:				
Economic	- 0.7	+12.0	+ 0.3	+11.6
Quantity	-	-	-	-
Schedule	-	+14.0	+ 3.6	+17.6
Engineering	-	-18.0	-	-18.0
Estimating	- 6.4	+32.1	-71.1	-45.4
Other	-	-	-	-
Support	-	+ 2.0	-	+ 2.0
Subtotal	- 7.1	+42.1	-67.2	-32.2
Total Changes	+ 93.9	+911.3	+34.6	+1039.8
Current Estimate	472.3	1813.5	173.4	2459.2

(FY 1982 Constant Dollars (Base-Year) 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	+148.8	-	+186.3
Estimating	+41.0	+36.7	-34.8	+42.9
Other	-	-	-	-
Support	-	+57.0	-	+57.0
Subtotal	+78.5	+629.1	+72.2	+779.8
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-12.3	-	-12.3
Estimating	- 5.0	+23.0	-50.5	-32.5
Other	-	-	-	-
Support	-	+ 1.6	-	+ 1.6
Subtotal	- 5.0	+12.3	-50.5	-43.2
Total Changes	+73.5	+641.4	+21.7	+736.6
Current Estimate	400.8	1352.3	128.8	1881.9

b. Previous Change Explanations--

(1) RDT&E

Economic:	revised escalation indices
Estimating:	increased costs associated with 4 additional radar sectors, operating the Program Office for 2 additional years, reductions due to Congressional actions and escalation change on prior years
Engineering:	Change in P3I efforts towards improved small target detection capabilities and a one time correction to the 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
Estimating:	increased costs due to cost area factors for the ARS, escalation changes on prior years, and a one time correction to previous SAR, 31 Dec 1984 decrease in costs due to WCRS negotiated contract
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, a one time correction to previous SARs 31 Dec 1984 and 31 Dec 86 decrease in costs due to reduced spare requirements and escalation change on prior 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
Estimating:	reduction in West Coast Radar System facilities cost and the CRS from two to one operation centers inreased costs due to revised estimates for a technical support facilities and escalation change on prior years

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)	N/A	-0.7
Reductions due to Congressional actions resulted in deferred development in system sensitivity improvements (Estimating)	-5.5	-7.1
Adjustment for current and prior years escalation (Estimating)	+0.9	+1.1
Adjustment for FY90 and beyond escalation (Estimating)	-0.4	-0.4
(2) Procurement		
Revised economic escalation indices (Economic)	N/A	+12.0
Budget constraints caused deferral of CRS acquisition (Schedule)	N/A	+9.6
Budget constraints caused a rephasing of P3I from FY88-91 into FY92 (Schedule)	N/A	+4.4
Transfer from P^3I to Radar Hardware		
(Engineering) (P3I)	-12.3	-18.0
(Estimating) (PME)	+12.3	+18.0
Increased cost estimates due to negotiated engineering change proposals for WCRS (Estimating)	+16.6	+22.5
Adjustment for current and prior years escalation	-0.7	-0.9
(Estimating)	(-0.6)	(-0.8)
(Support)	(-0.1)	(-0.1)
Increased initial spare requirements (Support)	+2.4	+3.1
Adjustment for FY90 and beyond escalation	-6.0	-8.6
(Estimating)	(-5.3)	(-7.6)
(Support)	(-0.7)	(-1.0)

(3) MILCON --

Revised economic escalation indices (Economic)	N/A	+0.3
Budget constraints caused rephasing of ARS power plant from FY89 to FY90 (Schedule)	N/A	+3.6
Due to revised estimates, reductions and downscoping of facilities for the ARS and CRS (Estimating)	-50.4	-70.9
Adjustment for current and prior years escalation (Estimating)	+0.2	+0.3
Adjustment for FY90 and beyond escalation (Estimating)	-0.3	-0.5

d. Reference: Development Estimate FY85 President's Budget, January 1984.

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

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

PAUC (Initial SAR/ Development Estimate	Changes (Then-Year Dollars in Millions)								PAUC (Current Estimate
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
177.425	-6.900	-1.825	+4.600	+21.642	+2.433	+7.558		+27.508	204.933

15. Contractor 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	$84.5	$86.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances (As of 03 May 87)	$+8.4	$-6.2
Cumulative Variances to Date (As of 29 Nov 87)	$+7.8	$-5.7
Net Change	$-0.6	$+0.5

Explanation of Change: The cost and schedule variance changes from last year are insignificant. The overall favorable cost variance is due to efficiencies in the performance of contract management tasks, production acceptance testing, antenna installation and assembly, and logistics and systems engineering tasks. The unfavorable schedule variance is due to delays in technical support, integration and test, and radar performance testing.

There is no impact to contract cost or to program at completion.

c. Procurement (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 03 May 87)	$+0.7	$-0.2
Cumulative Variances to Date (As of 29 Nov 87)	$+0.7	$+1.3
Net Change	$+0.0	$+1.5

Explanation of Change: The cost variance change from last year is insignificant. The favorable cost variance is due to efficiencies in performance of program management tasks and site preparation efforts. The favorable schedule variance reflects the early delivery of prime mission equipment.

There is no impact on program or contract at completion.

d. Procurement (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 03 May 87)	$ 0.0	$ 0.0
Cumulative Variances to Date (As of 29 Nov 87)	$+0.8	$-0.7
Net Change	$+0.8	$-0.7

Explanation of Change: The small favorable cost variance noted is due to efficiencies in the performance of program management tasks, integration and management tasks, and transmit site construction efforts. The small unfavorable schedule variance noted reflects minor delays in receive site clearing and grading efforts.

There is no impact on program or contract at completion.

e. Procurement

(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

Variances: First time reported in SAR.
There is no contract performance report available for reporting in this SAR.

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

a. Program Status --

(1) Percent Program Completed: 53.85% (7yrs/13yrs)

(2) Percent Program Cost Appropriated: 43.31% 1065.2/2459.2

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93-94)	Total
RDT&E	373.5	19.2	49.2	30.4	472.3
Procurement	650.2	172.7	889.3	101.3	1813.5
MILCON	41.5	17.5	114.4	0.0	173.4
Total	1065.2	209.4	1052.9	131.7	2459.2

c. Annual Summary --

FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional Action and FY89 Program Budget decisions. Proper adjustments will be completed and reported in a future SAR.

c. Annual Summary -- * see page 12

Fiscal Year	Qty	FY 82 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E								
1982				16.3			16.7	9.2
1983				72.1			77.2	4.9
1984				86.9			96.5	3.8
1985				53.0			60.7	3.4
1986				50.6			59.4	2.8
1987				26.1			31.7	2.7
1988				24.9			31.3	3.7
1989				14.7			19.2	3.8
1990				15.2			20.5	3.6
1991				10.2			14.2	3.3
1992				10.2			14.5	2.8
1993				10.3			15.0	2.3
1994				10.3			15.4	2.3
Subtotal	1			400.8			472.3	
Appropriation: Procurement								
1984	1		81.5	86.4			98.7	3.8
1985	1		102.7	108.9			128.6	3.4
1986	1		130.5	144.3	40.0		175.7	2.8
1987	1		84.6	89.5		20.0	112.9	2.7
1988	1		93.0	102.8		20.0	134.3	3.7
1989	1		119.3	127.9			172.7	3.8
1990	2		218.3	236.1			328.4	3.6
1991	2		190.5	212.6			303.4	3.3
1992	1		159.5	176.2			257.5	2.8
1993			50.4	61.1			91.3	2.3
1994			6.5	6.5			10.0	2.3
Subtotal	11		1236.8	1352.3	40.0	40.0	1813.5	
Appropriation: MILCON								
1983				1.1			1.2	4.9
1984				8.7			10.1	3.8
1985								3.4
1986				7.1			8.6	2.8
1987				11.4			14.3	2.7
1988				5.6			7.3	3.7
1989				13.0			17.5	3.8
1990				59.1			81.9	3.6
1991				22.8			32.5	3.3
1992								2.8
1993								2.3
1994								2.3
Subtotal				128.8			173.4	
Total	12		1236.8	1881.9	40.0	40.0	2459.2	

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

d. Obligations and Expenditures * --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation: RDT&E		
1982	16.7	16.7	16.7
1983	77.2	77.2	77.2
1984	96.5	96.5	92.6
1985	60.7	60.7	58.5
1986	59.4	59.4	45.1
1987	31.7	22.1	16.8
1988	31.3	9.3	1.5
To Complete	98.8	0.0	0.0
Total	472.3	341.9	308.4
	Appropriation: Procurement		
1984	98.7	98.7	77.3
1985	128.6	125.6	91.4
1986	175.7	168.3	43.9
1987	112.9	95.8	22.3
1988	134.3	58.7	2.3
To Complete	1163.3	0.0	0.0
Total	1813.5	547.1	237.2
	Appropriation: MILCON		
1983	1.2	1.2	1.2
1984	10.1	10.1	10.1
1985	-	-	-
1986	8.6	6.8	6.4
1987	14.3	11.5	0.0
1988	7.3	0.0	0.0
To Complete	131.9	0.0	0.0
Total	173.4	29.6	17.7

*Reflects Program's Office Records as of 3 Feb 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:** N/A

SAR-87-108

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823) (U)
PROGRAM: Remotely Piloted Vehicle (RPV)

A-21 RPV

AS OF DATE: December 31, 1987

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1. (U) Designation and Nomenclature (Popular Name): YMQM-105 Tactical Airborne Remotely Piloted Vehicle/Drone Systems (AQUILA).

2. (U) DoD Component: U.S. Army.

3. (U) Responsible Office and Telephone Number:

Office of the Project Manager Tactical
Airborne Remotely Piloted Vehicle/
Drone Systems (RPV)
U.S. Army Missile Command
Redstone Arsenal, Alabama 35898-5791

COL Stanley J. Souvenir
Assigned: 01 Sep 87
AV 746-3945;
Comm (205) 876-3945

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

RDTE: PE 63725A Project DK61 (Shared Funding-sunk)
PE 64730A Project D040
PE 64730A Project D041
PE 64705A Project D207

PROCUREMENT: APPN 2035 SSN A02900 (Shared Funding)

5. (U) Related Programs: None.



[redacted]

[redacted]

DAGD(PA) DFOISR 88-T-0730

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6. (U) Mission and Description:

This program's mission is to develop a Remotely Piloted Vehicle (RPV) system with both daylight (TV) and Forward Looking Infrared (FLIR) sensors to perform target acquisition, designation, aerial reconnaissance, artillery adjustment and battlefield post-strike assessment. Laser designation will be provided for all Army and Air Force laser-guided munitions. The RPV system designation will extend the attack capability of commanders beyond the forward line of troops to the full range of artillery and close air support weapons. It focuses on the area beyond 5km where forward observers, ground systems and helicopters are ineffective and the risk to manned systems is high because of the enemy's sophisticated air defense systems.

7. (U) Program Highlights:

a. (U) Significant Historical Developments:

Funding for RPV was initiated in FY74 and AD was completed in FY78. A DA IPR gave Milestone II approval in Sep 78 and an FSD contract was awarded in Aug 79. The FLIR payload, the first of RPV preplanned product improvements completed AD in FY82. A complete FSD RPV system including MICNS and a daylight payload began flight test in Dec 83. Excessive flight failures led to a review of the program by a Blue Ribbon Panel in Apr 84. A series of ASARC reviews culminated in approval of a restructured program in Dec 84. The restructured program provided for extension of FSD from 70 to 79 months. The system entered prototype qualification testing in Jan 85 and DT II began in May 85. After critical performance problems surfaced in testing, a Red Team was convened in May 85. Red Team findings in Aug 85 concluded that required performance was not demonstrated, inadequate quantities of available hardware precluded completion of necessary testing and substantial effort would be required to improve logistics and training. On 26 Aug 85, the RPV program was transitioned from the U.S. Army Aviation Systems Command (AVSCOM) to the U.S. Army Missile Command (MICOM). DT II was halted in Sep 85 and the program was again restructured. In order to prove that AQUILA was ready for DT II, Lockheed proposed a flight demonstration program at no cost to the Government. The restructured program, to address Red Team issues and to incorporate the Lockheed Demonstration, was approved and FSD was extended from 79 months to 92 months. The Lockheed demonstration was successfully completed in Jan 86 and the Army concluded that Red Team issues had been sufficiently resolved to continue FSD. DT II was completed 10 May 86. OT II began in Nov 86. Technical changes to the day payload resulted in impacts to the FLIR payload and restructure of the RPV program necessitated a FLIR program restructure. FY87 funding was reduced below the level required to restructure the FLIR program so a DA directed Red Team was formed to consider options for achieving a 24-hour AQUILA capability.

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

b. (U) Significant Developments Since Last Report:

Operational Testing (OT) II was completed in Mar 87. The results of these tests raised issues on target detection and launch timeline. To address these issues Force Development Test and Experimentation (FDTE) was added to the program and a launch timeline improvement program was added to the Reliability Growth Program (RGP). The FDTE was completed in Dec 87. The first portion of the RGP demonstration was successfully completed in Dec 87. Total System Mission Reliability (TSMR) exceeded the .75 system requirement. During 1987, efforts continued to restructure the FLIR program. A restructure proposal was received from Ford Aerospace in May 87 but fluctuations in the FY88 appropriation process cast doubt on the future of AQUILA funding. Production proposals were also received but the OT issues combined with affordability issues and instability in the FY88 funding status prevented award of a production contract. The FY88 Appropriations Act terminated funding for AQUILA. Congress directed that OSD develop an integrated program to meet the needs of all services for unmanned aerial vehicles (UAV) and FY88 funding was provided for OSD to support this effort. The Joint Appropriations Conference language stated "The conferees agree that $25,000,000 in unobligated fiscal year 1987 AQUILA funds shall be used for additional efforts on the AQUILA program. The remaining prior year procurement funds are rescinded. The conferees also agree that the AQUILA program shall be considered as part of the remotely piloted vehicle consolidated program office".

c. (U) Changes since "As of Date":

The Army has worked closely with OSD and other services to support the Congressional direction on UAVs. The request to reprogram $25.0M has been instituted. The funds are required in order for the Army to meet Congressional requirements with an aggressive management program to oversee the close out of the AQUILA program, to use AQUILA assets for technical and operational test activities for DOD UAV and transition the assets to the consolidated program. This strategy allows the services to realize a return on past AQUILA capital investments in datalinks, payloads and software.

No funds are programmed for AQUILA beyond FY87. Per the requirements of DODI 7000.3, paragraph F.3.e., AQUILA satisfies the criteria for termination of the SAR. This is the final SAR submission on the AQUILA program.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches:

There are currently no DCP (draft dated May 81) threshold breaches.

9. (U) Schedule:

a. (U) Milestones--

RPV System with Day Mission Payload Subsystem (MPS) Only

	Development Estimate/ Approved Program	Current Estimate
Milestone II (DA IPR)	Sep 78/Sep 78	Sep 78
FSD Contract Award	Aug 79/Aug 79	Aug 79
First Flight	Nov 83/Nov 83	Nov 83
DT/OT-II Complete	Mar 85/Mar 87	Mar 87
ASARC III	Jun 85/NA	NA (Ch-1)
Type Class Std	Jun 85/NA	NA (Ch-1)
Milestone III (JRMB)	Jun 85/NA	NA (Ch-1)
Prod Cont Awd	Jul 85/NA	NA (Ch-1)
Initial Operational Capability	Sep 87/NA	NA (Ch-1)

RPV FLIR System with Day and FLIR MPS Capability

Milestone II (IPR)	Feb 84/Feb 84	Feb 84
FSD Contract Awd (FMPS Only)	Apr 84/Apr 84	Apr 84
Milestone IIIA (ASARC)	Dec 86/NA	NA (Ch-1)
DT/OT-II Completed	Apr 87/NA	NA (Ch-1)
ASARC	Jul 87/NA	NA (Ch-1)
Type Class Std	Jul 87/NA	NA (Ch-1)
Prod Cont Awd	Aug 87/NA	NA (Ch-1)
Initial Operational Capability	Mar 89/NA	NA (Ch-1)

b. (U) Previous Change Explanations --

RPV system with MPS: All changes represented a revised FSD schedule first from 70 to 79 months as approved by the VCSA in Dec 84 and a subsequent revision from 79 months to 92 months. Difficulties were encountered in collective training and the ASARC principals directed that it be extended and OT II not be started until training was completed and software upgrades validated with troop flights. This caused program milestones to slip an additional 2-3 months.

RPV FLIR System: All changes were implemented due to a number of replanning and reprogramming exercises. These actions were the result of either a direct reduction in FSD funds by higher headquarters, or PMO management decisions related to the overall program.

c. (U) Current Change Explanations --

(Ch-1) Funding for RPV was terminated by Congressional direction. See Paragraph 7.b.

d. (U) References --

Development Estimate: HQ DA (DAMO-FDI) Action Memorandum, 16 Aug 83, subject: Remotely Piloted Vehicle (RPV), Organizational and Operational (O&O) Concept.

Approved Program: FY 88/89 Amended President's Budget

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10. (U) Technical/Operational Characteristics:

	Dev Est/ Appr Pgm	Demonstrated Performance	Current Estimate	
a. (U) Technical				
(b)(1)				
b. (U) Operational				
(b)(1)				
(2) (U) Reliability System				
Flight (Catastrophic)	0.91/NA	0.97	NA	(Ch-1)
TADARS Mission (3 hr)	0.82/NA	0.91	NA	(Ch-1)
(3) (U) Maintainability				
Org. (90% of failure):	0.50hr/NA	.65hr	NA	(Ch-1)
Dir Support (10% of failure):	2.00hr/NA	TBD	NA	(Ch-1)
(4) (U) Availability:	0.89/NA	TBD	NA	(Ch-1)
(5) (U) Manning (Direct)	975MY/NA	TBD	NA	(Ch-1)

c. (U) Previous Change Explanation --

Previous changes reflect revision of the ROC, or revisions to more accurately reflect the operational scenario of the system.

d. (U) Current Change Explanation --

(Ch-1) Funding for RPV was terminated by Congressional direction. See Paragraph 7.b.

e. (U) References--

Development Estimate: ROC, dated Sep 78, revised
Approved Program: FY 88/89 Amended President's Budget

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

a. (U) Cost --	Development Estimate	Change	Current Estimate
Development (RDT&E)	$ 1012.0	$-196.4	$ 815.6
RPV Day Program	(470.9)	(+119.6)	(590.5)
MICNS Datalink	(86.0)	(- 20.0)	(66.0)
RPV-Payload-FLIR	(90.9)	(- 16.8)	(74.1)
RPV-Drones Adv Dev	(142.7)	(- 57.7)	(85.0)
Preplanned Prod Improvement	(221.5)	(-221.5)	(0)
Procurement	1119.9	-1082.0	37.9
Air Vehicle	(158.4)	(-158.4)	0
Mission Payload (Day TV)	(71.0)	(- 71.0)	0
Ground Control Station	(90.7)	(- 90.7)	0
Launch Subsystem	(22.4)	(- 22.4)	0
Recovery Subsystem	(21.7)	(- 21.7)	0
Air Data Terminal	(111.4)	(-111.4)	0
Ground Data Terminal	(62.1)	(- 62.1)	0
Mission Payload (FLIR)	(136.0)	(-136.0)	0
Maintenance Shelter	(11.8)	(- 11.8)	0
Training Interface Unit	(10.2)	(- 10.2)	0
Inert Air Vehicle	(0.9)	(- 0.9)	0
Common GFE	(42.0)	(- 42.0)	0
Total Flyaway	738.6	-738.6	0
Other Wpn Sys Cost	(255.4)	(-225.3)	(30.1)
Initial Spares	(125.9)	(-118.1)	(7.8)
Construction (MILCON)	16.2	- 12.5	3.7
Total FY84 Base-Year $	2148.1	-1290.9	857.2
Escalation	261.9	-307.3	-45.4
Development (RDT&E)	(7.4)	(- 58.4)	(-51.0)
Procurement	(252.0)	(-246.3)	(5.7)
Construction (MILCON)	(2.5)	(- 2.6)	(- 0.1)
Total Then-Year $	$2410.0	$-1598.2	$ 811.8
b. (U) Quantities --1/			
Development (RDT&E)	1.4	0	1.4
Procurement	16.0	- 16.0	0
Total	17.4	- 16.0	1.4
c. (U) Unit Cost --			
Procurement:			
FY 84 Base-Year $	$ 70.0	NA	NA
Then-Year $	$ 85.7	NA	NA
Program:			
FY 84 Base-Year $	$ 123.4	$+488.9	$ 612.3
Then-Year $	$ 138.5	$+441.4	$ 579.9

1/ Equivalent Battery Sets (Number of Ground Control Stations Divided by five).

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

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

	(Average Unit Flyaway Cost) Dev Estimate/ Appr Program 1/	Current Estimate	Latest Approved Threshold
@ Qty: 16.0			
@ Peak Rate: 15 AV/2 GS			
FY 84 Base-Year $	46.2/46.2	NA	NA
Then-Year $	56.5/56.5	NA	NA

1/ This cost represents a weighted unit flyaway including war reserves, training attrition and training base. A typical RPV battery costed for only equipment that is indigenous to that battery $26.4M (84 $ DE) - 5 Ground Control Stations, 5 Ground Data Terminals, 13 Air Vehicles, 13 Air Vehicle Containers, 9 FLIR Mission Payload Subsystems, 5 Daylight (TV) Mission Payload Subsystems; 13 Air Data Terminals, 2 Launcher Subsystems, 2 Recovery Subsystems, 1 Maintenance Shelter and one set of Common Support Equipment.

e. (U) Foreign Military Sales -- None.

f. (U) Nuclear Costs -- None.

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

		Current Year		Budget Year
		Current Estimate (DEC 87 SAR)	UCR Baseline Estimate (DEC 86 SAR)	UCR Baseline Estimate (DEC 87 SAR)
a. (U)	Program Acquisition			
(1) (U)	Cost	811.8	2119.5	811.8
(2) (U)	Quantity	1.4	12.0	1.4
(3) (U)	Unit Cost	579.9	176.6	579.9
b. (U)	Current Procurement --	(FY 1988)	(FY 1988 Appn)	(FY 1989)
(1) (U)	Cost	0	0	0
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	0	0	0
	Net Total	0	0	0
(2) (U)	Quantity	0	0	0
(3) (U)	Unit Cost	0	-	-

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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	1019.4	1371.9	18.7	2410.0
Previous Changes:				
Economic	- 20.0	- 62.1	- 1.1	- 83.2
Quantity		-188.2		-188.2
Schedule	+ 18.3	+ 42.9	+ 1.4	+ 62.6
Engineering	-110.6			-110.6
Estimating	- 42.8	+ 47.6	+ 0.9	+ 5.7
Other				
Support		+ 29.1	- 5.9	+ 23.2
Subtotal	-155.1	-130.7	- 4.7	-290.5
Current Changes:				
Economic				
Quantity		-1122.8		-1122.8
Schedule				
Engineering				
Estimating				
Other	- 99.7		-10.4	- 110.1
Support		- 74.8		- 74.8
Subtotal	- 99.7	-1197.6	-10.4	-1307.7
Total Changes	-254.8	-1328.3	-15.1	-1598.2
Current Estimate	764.6	43.6	3.6	811.8

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1012.0	1119.9	16.2	2148.1
Previous Changes:				
Quantity		-226.9		-226.9
Schedule	+ 11.6	+ 7.4		+ 19.0
Engineering	- 16.7			- 16.7
Estimating	-109.2	+ 57.2	+ 0.6	- 51.4
Other				
Support		+ 20.1	- 5.0	+ 15.1
Subtotal	-114.3	-142.2	- 4.4	-260.9
Current Changes:				
Quantity		-880.6		-880.6
Schedule				
Engineering				
Estimating				
Other	- 82.1		- 8.1	- 90.2
Support		- 59.2		- 59.2
Subtotal	- 82.1	-939.8	- 8.1	-1030.0
Total Changes	-196.4	-1082.0	-12.5	-1290.9
Current Estimate	815.6	37.9	3.7	857.2

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

b. (U) Previous Change Explanations --

RDT&E
Economic: Revised escalation rates.
Schedule: Program restructure due to Congressional funding cuts and reprofile of RDTE activities.
Engineering: Producibility Enhancement Initiative dropped; future enhancements added and later dropped
Estimating: Revised estimate for data link (MICNS) and restructure of FSD program. Removal of shared funding (SKYEYE).

Procurement
Economic: Revised escalation rates.
Quantity: Programmatic perturbation caused deployed quantity fluctuation from 13 batteries to 4 batteries to 9 batteries.
Schedule: Program slipped to FY87 start due to restructure of FSD program and variation in production schedules to accommodate quantity changes.
Estimating: Re-evaluation of program requirements when RPV was reassigned to MICOM, addition of UAV funding and subsequent deletion, and impact of FY86 BCE.
Support: Variation in spares to match quantity changes. FY86 BCE impact.

MILCON
Economic: Revised escalation rates.
Schedule: Shifting of MCA projects to out years.
Estimating: Added company admin and supply bldg at Fort Hood and revised estimate of MCA requirements.

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
Termination of FY88 and Out funds by Congressional direction.(Other)	- 82.1	- 99.7
(2) (U) Procurement		
Termination of FY88 and out fundings and rescission of FY87 funds:		
Major Item (Quantity)	-880.6	-1122.8
Spares (Support)	- 59.2	- 74.8
(3) (U) MILCON		
Deletion of MCA Projects due to program termination (Other)	- 8.1	- 10.4

d. (U) References --

Development Estimate: FY 85 President's Budget, Dec 83.

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

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

PAUC (Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
138.5	-59.4	+646.5	+44.7	-79.0	+ 4.1	- 71.2	- 44.3	+441.4	$ 579.9

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

a. (U) RDT&E --

Lockheed Missile and Space Company
Sunnyvale, CA
DAAK50-79-C-0025, CPIF
Award: 31 August 1979
Definitized: 31 August 1979

Initial Contract Price		
Target	Ceiling	Qty
$290.9	$290.9	1.4

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$359.2	$359.2	1.4	$358.6	$358.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-4.1	$-4.4
Cumulative Variances to Date	$-4.1	$-4.4
Net Change	$ 0	$ 0

Lockheed Missile and Space Company
Sunnyvale, CA
DAAK50-79-C-0025A, CPIF
Award: 10 April 1986
Definitized: 18 July 1986

Initial Contract Price		
Target	Ceiling	Qty
$20.45	$ 22.1	0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$26.8	$ 26.4	0	(b)(1)	

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$(4.2)	$(1.9)
Cumulative Variances to Date	$(1.7)	$ 0
Net Change	$ 2.5	$ 1.9

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

Explanation of Change: Lockheed bore all costs from 31 Aug 85 to 31 Aug 86 when the Lockheed demonstration was completed. An addition to the contract was negotiated for effort after 31 Jan 86. The cost of this additional work was to be shared 50/50 by Lockheed and the Government. The target price shown above reflects only the Government's share of the contract cost. The estimated price at completion for both the contractor and program manager reflect the total cost of the contract i.e., both the contractors share and the Government's share. Lockheed agreed to report this shared work seperately from the contract cost through 31 Jan 86. To facilitate reporting, this shared effort will be designated as contract DAAK50-79-C0025A. Award date reflects the modification date to the basic contract. This contract was completed in Oct 87; therefore, the schedule variance became zero resulting in the improvement of $1.9M in the schedule variance for the period. During the past year, this contract was restructured to a 98 month program. The $2.5M improvement in cost variance reflects the performance of Lockheed versus the restructured program.

Ford Aerospace and Comm Corp.
Aeronutronic Division
Newport Beach, CA 92660
DAAK20-84-C-0404, FPI
Award: May 1984
Definitized: May 1984

Initial Contract Price		
Target	Ceiling	Qty
$40.8	$51.8	9

Current Contract Price		
Target	Ceiling	Qty
$40.8	$51.8	9

Estimated Price At Completion

Contractor	Program Manager
(b)(1)	

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$(.8)	$(1.6)
Cumulative Variances to Date	$(4.9)	$(2.2)
Net Change	$(4.1)	$(0.6)

Explanation of Change: Ford submitted a request to rebaseline to the Government in the Feb-Mar 87 time frame. The baseline on the CPR was rebaselined in anticipation of a favorable response by the Government. Although the request for rebaselining was denied, there was considerable delay in conveying the need to re-establish the original baseline to Ford. Considering the delay, an agreement was reached to allow Ford to continue to report to the new baseline. The net change in variances reflect performance against the new baseline. The unfavorable net change in both cost and schedule variance can be attributed primarily to poor performance by Honeywell, a subcontractor to Ford. Manufacturing effort to repair system 3 and increased effort to build systems 4-9 were the principal factors contributing to the unfavorable variances generated by Honeywell.

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

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 Completed: 100% (15 yrs/15 yrs)

(2) (U) Percent Program Cost Appropriated: 100% ($786.8/$786.8)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY74-88)	Budget Year (1989)	Balance to Complete FYDP (FY90-93)	Beyond FYDP (1994-1996)	Total
RDT&E	764.6	0	0	0	764.6
Procurement	43.6	0	0	0	43.6
MILCON	3.6	0	0	0	3.6
Total	811.8	0	0	0	811.8

c. (U) Annual Summary --

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1974				1.9			.9	
1975				10.3			5.5	
1976				21.0			12.0	
197T				3.7			2.2	
1977				9.2			5.5	

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

c. (U) Annual Summary --

Fiscal Year	Qty	FY84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E (Cont'd)								
1978				12.5			8.1	
1979				29.9			20.9	
1980				70.4			54.3	
1981				72.0			61.4	
1982				104.4			95.8	
1983				111.4			107.3	
1984				141.9			145.0	3.8
1985				98.9			104.2	3.4
1986				70.2			76.4	2.9
1987				57.9			65.1	3.1
Subtotal	1.4			815.6			764.6	
Appropriation: Procurement								
1986				8.7			9.8	2.9
1987				21.4			25.0 1/	3.1
Subtotal	0	0	0	30.1			34.8	

1/ $25.0M remains in FY87 OPA but is being reprogrammed by Congressional direction. See Paragraph 7.b.

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16. (U) Program Funding Summary (Cont'd): (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	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement (Spares)								
1986				7.8			8.8	2.9
Subtotal				7.8			8.8	
Appropriation: MILCON								
1982				2.7			2.5	
1983								
1984								
1985				1.0			1.1	
Subtotal				3.7			3.6	
Total	12.0			857.2			811.8	

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

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
83	107.3	105.5	105.5
84	145.0	143.7	140.6
85	104.2	104.2	97.0
86	76.4	75.7	66.2
87	65.1	60.4	25.0
Total	498.0	491.0	434.3
Appropriation: Procurement			
86	9.8	9.8	1.2
Appropriation: Procurement (Spares)			
86	8.8	8.8	0

17. (U) Production Rate Data: All production funding terminated

18. (U) Operating and Support Costs: N/A

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SAR-87-010

(4)

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: Aircraft Carrier Inner Zone Anti-Submarine Warfare Helo (SH-60F)

A-10 CV HELO

AS OF DATE: December 31, 1987

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1. **Designation and Nomenclature (Popular Name):** Aircraft Carrier Inner Zone Anti-Submarine Warfare Helo (SH-60F)

2. **DoD Component:** U.S. Navy

[redacted] APR 1 8 1988 11 AS AMENDED

3. **Responsible Office and Telephone Number:**

Commander, Naval Air Systems Command
Naval Air Systems Command Headquarters
PMA-266
Washington, DC 20361-1266

PM: CAPT R. B. Harrison
Assigned: May 23, 1984
AV 286-1534; COMM (202)746-1534

4. **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)

[redacted]

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OASD(PA) DFOISR 88-M-0837

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.

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 protection (up to 50 NM). This vehicle will replace the aging SH-3H. Primary mission is Inner Zone ASW. Secondary missions include: Anti Air Warfare (CHAFF); Command, Control and Communication; Fleet Support Operations (including plane guard, MEDEVAC and Search and Rescue); logistics support and surveillance. All mission requirements are satisfied.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- From the full and open competition held in FY 1984, Sikorsky Aircraft Division of United Technologies was selected as the prime contractor for the CV Inner Zone ASW Helo. A letter contract for the acquisition was signed on February 28, 1985. That contract consists of Not-To-Exceed (NTE) prices for development and options for five lots of production aircraft. The firm fixed price contract for the development portion was definitized August 1986.

b. (U) Significant Developments Since Last Report -- 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 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 (AUTEC) (DT-IIE/Phase 2 and OT-IIB combined). On completion of TECHEVAL in November 1987, the SH-60F was certified ready to proceed to OPEVAL.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP, (dated January 13, 1988) or SDDM (dated February 22, 1985) threshold breaches.

9. (U) Schedule:

a. (U) Milestones	Development Estimate/ Approved Program	Current Estimate
(U) Justification for Major System New Start (JMSNS) Submitted	Aug 82/Aug 82	Aug 82
(U) SECDEF Approved FY 1984 New Start	Aug 82/Aug 82	Aug 82
(U) Milestone I (DSARC)	Jun 83/Jun 83	Jun 83
(U) SECDEF Decision Memoradum (SDDM) MS I Approval	May 84/May 84	May 84
(U) Request for Proposal Release	Jun 84/Jun 84	Jun 84
(U) Proposals Received	Aug 84/Aug 84	Aug 84
(U) Milestone II (DSARC)	Jan 85/Jan 85	Jan 85
(U) SDDM Milestone II Approval	Feb 85/Feb 85	Feb 85
(U) Contract Award for SH-60F	Feb 85/Feb 85	Feb 85
(U) Award Production Lots I & II Long Lead Contracts	Jan 86/Jan 86	Jan 86
(U) Award Lot I/II and Lot III Long Lead Contract	Jan 87/Jan 87	May 87 (Ch-1)
(U) Operational Evaluation	Nov 87-Dec 87/ Nov 87-Dec 87	Nov 87- (Ch-2) Jan 88
(U) Milestone III DAB	Mar 88/Mar 88	Mar 88

(b)(1)

b. (U) Previous Change Explanations --

Definitization of Lots I/II contract delayed from January 1987 to March 1987 due to prolonged negotiations.

c. (U) Current Change Explanations --

Ch-1 Definitization of Lots I/II contract delayed from January 1987 to May 1987 due to prolonged negotiations.
Ch-2 Operational Evaluation was extended through January 1988 due to insufficient fleet services in December 1987.

d. (U) References --

Development Estimate: SDDM, dated May 2, 1984, subject, "Carrier (CV) Inner Zone Helicopter Progam." SDDM, dated February 22, 1985, subject, "Inner Zone Helo Program."

Approved Program: FY 88/89 Amended President's Budget.

10. (U) Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. (U) Technical --			
(U) Weight (Lbs)(Maximum Gross)	21,884/21,884	21,884	21,884
(U) Dimensions			
(U) Length (Ft)			
Overall	64.8/64.8	64.8	64.8
Folded	41.1/41.1	41.1	41.1
(U) Width (Ft)			
Normal (W/O Main Rotor)	14.3/14.3	14.3	14.3
Folded	10.8/10.8	10.8	10.8
(U) Height (Ft)			
Normal	17.2/17.2	17.2	17.2
Folded	13.3/13.3	13.3	13.3
(b)(1)			
b. (U) Operational --			
(b)(1)			
(U) Prob of Completing 4 Hr Mission W/O Critical Failure	.8/.8		.8
(U) MFHBCF	18/18		18
(U) MTTR Airframe (Hrs)	2.0/2.0		2.0
(U) MTTR Engine (Hrs)	4.8/4.8		4.8
(U) MTTR Avionics (Hrs)	1.0/1.0		1.0
(U) MTTR Sonar (Hrs)	3.0/3.0		3.0
(U) DMMH/FH (Hrs)	16.0/16.0		16.0
(U) Availability A_o	.8/.8		.8

c. (U) Previous Change Explanations -- Not Applicable.

d. (U) Current Change Explanations -- Technical characteristics observed during TECHEVAL. Operational characteristics will be available upon completion of COMOPTEVFOR OPEVAL Final Report (due MAY 88).

e. (U) References --

Development Estimate: SDDM, dated May 2, 1984, subject, "Carrier (CV) Inner Zone Helicopter Progam." SDDM, dated February 22, 1985, subject, "Inner Zone Helo Program."

Approved Program: FY 88/89 Amended President's Budget.

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

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E,N)	$56.4	-2.1	$54.3
Procurement	2277.1	+103.6	2380.7
Airframe	(1569.3)	(-45.4)	(1523.9)
Engine	(142.0)	(+0.9)	(142.9)
Avionics	(56.7)	(-9.2)	(47.5)
Total Flyaway	(1768.0)	(-53.7)	(1714.3)
Other Wpn Sys Cost	(440.4)	(+66.9)	(507.3)
Initial Spares	(68.7)	(+90.4)	(159.1)
Construction (MILCON)	19.8	+3.8	23.6
Total FY 85 Base-Year	2353.3	+105.3	2458.6
Escalation	722.9	-7.7	715.2
Development (RDT&E,N)	(1.6)	(-0.6)	(1.0)
Procurement	(715.7)	(-5.6)	(710.1)
Construction (MILCON)	(5.6)	(-1.5)	(4.1)
Total Then-Year $	3076.2	+97.6	$3173.8
b. Quantities --			
Development (RDT&E,N)	-	-	-
Procurement	175	-	175
Total	175	-	175
c. Unit Cost --			
Procurement:			
FY 85 Base-Year $	$13.0	+0.6	13.6
Then-Year $	17.1	+0.6	17.7
Program:			
FY 85 Base-Year $	$13.4	+0.6	14.0
Then-Year $	17.6	+0.5	18.1

d. 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.

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

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

	Current Year		Budget Year
	SAR Current Estimate Dec 87	UCR Baseline Estimate Dec 86	UCR Baseline Estimate Dec 87
a. Program Acquisition --			
(1) Cost	3173.8	3153.4	3173.8
(2) Quantity	175	175	175
(3) Unit Cost	18.1	18.0	18.1
b. Current Procurement --	(FY 1988) APPN ACT	(FY 1988) APPN ACT	(FY 1989)
(1) Cost	330.3	330.3	385.6
Less CY Adv Proc	-29.6	-29.6	-30.8
Plus PY Adv Proc	+22.0	+22.0	+29.6
Net Total	322.7	322.7	384.3
(2) Quantity	18	18	18
(3) Unit Cost	17.9	17.9	21.4

13. (U) Cost Variance Analysis:

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

	RDT&E,N	PROC	MILCON	TOTAL
Development Estimate	58.0	2992.8	25.4	3076.2
Previous Changes:				
Economic	-0.4	-34.4	-	-34.8
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-3.9	-21.6	-0.7	-26.2
Other	-	-	-	-
Support	-	+138.2	-	+138.2
Subtotal	-4.3	+82.2	-0.7	+77.2
Current Changes:				
Economic	-0.1	+5.1	+0.1	+5.1
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+1.7	-69.1	+2.9	-64.5
Other	-	-	-	-
Support	-	+79.8	-	+79.8
Subtotal	+1.6	+15.8	+3.0	+20.4
Total Changes	-2.7	+98.0	+2.3	+97.6
Current Estimate	55.3	3090.8	27.7	3173.8

13. (U) Cost Variance Analysis (Cont'd):
(FY 85 Constant (Base-Year) Dollars in Millions)

	RDT&E,N	PROC	MILCON	TOTAL
Development Estimate	56.4	2277.1	19.8	2353.3
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-3.7	-26.6	+1.4	-28.9
Other	-	-	-	-
Support	-	+117.3	-	+117.3
Subtotal	-3.7	+90.7	+1.4	+88.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+1.6	-47.7	+2.4	-43.7
Other	-	-	-	-
Support	-	+60.6	-	+60.6
Subtotal	+1.6	+12.9	+2.4	+16.9
Total Changes	-2.1	+103.6	+3.8	+105.3
Current Estimate	54.3	2380.7	23.6	2458.6

b. Previous Change Explanations --

(1) RDT&E,N
Economic: revised escalation indices
Estimating: revised cost estimates

(2) Procurement - APN
Economic: revised escalation indices
Estimating: breakouts from prime contractor will reduce costs
Support: refinement of support equipment and spares; refinement of estimates for pubs/technical data

(3) MILCON
Estimating: revised cost estimates

c. Current Changes Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E,N		
Revised escalation indices. (Economic)	N/A	-0.1
Revised cost estimates. (Estimating)	+1.6	+1.7
(2) Procurement - APN		
Revised escalation indices. (Economic)	N/A	+5.1
Refinement of prior estimates based on additional procurement history and data. (Estimating)	-47.7	-69.1
Refinement of estimates for support equipment and spares; refinement of estimates for support equipment and pubs/technical data. (Support)	+60.6	+79.8
(3) MILCON		
Revised escalation indices. (Economic)	N/A	+0.1
Revised cost estimates. (Estimating)	+2.4	+3.0

d. References --

Development Estimate: SDDM, dated May 2, 1984, subject "Carrier (CV) Inner Zone Helicopter Program." SDDM, dated February 22, 1985, subject "Inner Zone Helo Program."

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	
17.6	--	--	--	--	--	--	--	--	17.6

b. Current Baseline Estimate to Current Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
17.6	-0.2	--	--	--	-0.5	--	+1.2	+0.5	18.1

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	$226.0	$226.0

Cost/Schedule Variance is not applicable to fira fixed price contract.

Airframe:	Initial Contract Price Target	Ceiling	Qty
Sikorsky Aircraft Division, Stratford CT, N00019-85-C-0148, Lot III	$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
$17.2 *	N/A	N/A	$247.9	$247.9

Cost/Schedule Variance is not applicable to firm fixed price contract.

* 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: 29.4% (5 yrs/17 yrs)
(2) Percent Program Cost Appropriated: 18.9% (598.3/3173.8)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93-00)	Total
RDT&E,N	55.3	-	-	-	55.3
Procurement	525.8	385.6	723.4	1,456.0	3,090.8
MILCON	17.2	8.8	1.7	-	27.7
Total	598.3	394.4	725.1	1,456.0	3,173.8

c. Annual Summary --

Fiscal Year	Qty	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E,N								
1984		18.6		18.6			18.4	3.8
1985		18.8		18.8			19.1	3.4
1986		11.2		11.2			11.6	2.8
1987		5.7		5.7			6.2	2.7
Subtotal		54.3		54.3			55.3	
Appropriation: Procurement								
1986				27.2	30.5		30.5	2.8
1987	7	16.8	102.9	146.4	22.0	30.5	165.0	2.7
1988	18		180.6	283.5	29.6	22.0	330.3	3.7
1989	18		175.4	320.3	30.8	29.6	385.6	3.8
1990	18		171.0	248.8	23.1	30.8	308.3	3.6
1991	12		118.3	162.2	23.9	23.1	206.4	3.3
1992	12		117.6	160.3	25.4	23.9	208.7	2.8
1993	12		116.2	170.3	26.3	25.4	226.8	2.3
1994	12		114.9	150.3	24.8	26.3	204.9	2.3
1995	11		105.1	159.5	53.6	24.8	222.9	2.3
1996	24		216.3	246.2	55.0	53.6	351.5	2.3
1997	24		210.6	205.0	17.6	55.0	298.6	2.3
1998	7		68.6	72.7		17.6	108.2	2.3
1999				14.2			21.6	2.3
2000				13.8			21.5	2.3
Subtotal	175	16.8	1697.5	2380.7	362.6	362.6	3090.8	
Appropriation: MILCON								
1988		14.9		14.9			17.2	3.7
1989		7.3		7.3			8.8	3.8
1990		1.4		1.4			1.7	3.6
Subtotal		23.6		23.6			27.7	
TOTAL				2458.6			3173.8	

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E,N			
1984	18.4	18.4	15.7
1985	19.1	19.1	17.7
1986	11.6	11.6	10.2
1987	6.2	6.2	4.3
To Complete	N/A	N/A	N/A
Total	55.3	55.3	47.9
Appropriation: APN			
1986	30.5	30.5	27.0
1987	165.0	164.1	109.2
1988	330.3	6.2	0.4
To Complete	2565.0	N/A	N/A
Total	3090.8	200.8	136.6
Appropriation: MILCON			
1988	17.2	0.0	0.0
To Complete	10.5	N/A	N/A
Total	27.7	0.0	0.0

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
1987	7	N/A	7	60
1988	18	N/A	18	60
1989	18	N/A	18	60
1990	18	N/A	18	60
1991	12	N/A	12	60
1992	12	N/A	12	60
1993	12	N/A	12	60
1994	12	N/A	12	60
1995	11	N/A	11	60
1996	24	N/A	24	60
1997	24	N/A	24	60
1998	7	N/A	7	60

17. (U) 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
Prog Acq Cost (BY $)	N/A	N/A	2458.6	N/A	N/A
(TY $)	N/A	N/A	3173.8	N/A	N/A
PAUC (BY $)	N/A	N/A	14.0	N/A	N/A
(TY $)	N/A	N/A	18.1	N/A	N/A

c. Schedule Variance --

Item	Production Estimate	Variance (CE Less PdE)	Current Estimate	Variance (CE Less Max)	Maximum
Start Date (mo/yr)	N/A	N/A	7/87	N/A	N/A
Duration (in months)	N/A	N/A	149	N/A	N/A
End Date (mo/yr)	N/A	N/A	12/99	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E,N	N/A
Procurement	2/2

18. Operating and Support Costs:

a. Assumptions and Ground Rules --

This O&S estimate is based on each aircraft flying 660 hours, or an operational squadron, of 6 aircraft, flying 3960 hours a year. The maintenance concept for both the SH-60F and the antecedent system is for organic support at all three levels of maintenance. Estimates for the SH-60F avionics assume a 50% increase in the reliability of the AQS-13F over the AQS-13E onboard the SH-3H.

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.

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

b. Costs --

(FY 1985 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per SH-60F Squadron	Avg Annual Cost Per SH-3H Squadron (Antecedent)
Personnel	6.657	7.462
O&S Consumables	1.332	2.017
Direct Depot Maintenance	1.689	2.098
Sustaining Investment	.581	.718
Other Direct Costs		
Indirect Costs	.313	.321
Total	10.572	12.616

Source: SH-60F: Naval Air Systems Command Cost Analysis Division Operating and Support Cost Estimates for SH-60F dated January 21, 1988.
SH-3H: NADC Report "Carrier Inner Zone ASW Helicopter System (CV-Helo) Operating and Support Cost Estimate" of May 7, 1985.

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)
PROGRAM: SINGLE CHANNEL GROUND AND AIRBORNE RADIO SYSTEM
(SINCGARS)

AS OF DATE: December 31, 1987

A-23 SINCGARS

87-016

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CLEARED
MAR 23 1988

1. Designation/Nomenclature (Popular Name):

AN/PRC-119()(V); AN/VRC-87()(V) thru AN/VRC-92()(V) and AN/ARC-201() / Single Channel Ground and Airborne Radio System (SINCGARS)

2. DoD Component: U.S. Army

3. Responsible Office and Telephone Number:

Project Manager, SINCGARS
PEO, Communications Systems
Fort Monmouth, NJ 07703

PM: COL Domenic F. Basile
Assigned: 1 August 1986
AUTOVON: 995-3063
Commercial: 201-544-3063

4. Program Elements/Procurement Line Items:

RDTE:	PE 63746A	Project D555	(Shared Funding)
	PE 64805A	Project D282	(Shared Funding)
PROCUREMENT:	APPN 2031	SSN AZ3500	
	APPN 2031	SSN AA0974	(Shared Funding)
	APPN 2035	SSN B00500	
	APPN 2035	SSN BA950A	(Shared Funding)
	APPN 2035	SSN B45500	(Shared Funding)
	APPN 2035	SSN B00508	
	APPN 2035	SSN T99500	(Shared Funding)
	APPN 2035	SSN Z16800	(Shared Funding)

5. Related Programs: None.

SECURITY CLASSIFICATION
PUBLIC RELEASE
16 MAR 1988
SECURITY REVIEW, OASD(PA)

OASD(PA) DFOISR 88-F-0735

6. Mission and Description:

The SINCGARS system will replace the current AN/VRC-12 family, AN/PRC-77, and /ARC-114 radios. The new family of radios will provide the primary means of command and control for Infantry, Armor and Artillery Units, and will be capable of transmission of voice, tactical data and record traffic. Manpack, vehicular and airborne configurations will be securable with VINSON or other COMSEC devices and will be capable of operating in an electronic warfare environment.

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. 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 current strategy was approved and documented in 12 Feb 87 SDDM and is to independently select and manage a second source. A new BCE was briefed to the CAIG on 5 Jun 87. A Baseline Document for SINCGARS was signed by the Army Acquisition Executive on 24 Jul 87. A Request for Proposal (RFP) for the second source was released to industry on 11 Sep 87.

b. Significant Developments Since Last Report -- Program funding and quantities reflect the FY88/89 Presidents Budget, except as adjusted for FY88 Congressional direction and FY89 amended Budget Decisions. The revised SINCGARS TEMP was submitted to HQ DA in Dec 87 for full review and approval. To date 310 early production Receiver/Transmitters (RTs) have been delivered to the Army for use in testing and to support the fielding to the DMZ forces in Korea which took place in Dec 87. ITT will maintain and retrofit these models to final production configuration. The ITT rebaselining modification was signed on 20 Nov 87. Production Reliability Acceptance Test (PRAT) was officially passed for the ground radio in Nov 87 and ground First Article Test (FAT) verification is expected to be completed in Jan 88 with the Airborne FAT continuing on schedule. FOTE site has been identified as Fort Sill, Ok and is scheduled to be conducted from Apr to May 88. The SINCGARS Second Source proposals were received 30 Nov 87 and are currently being evaluated. The ITT Integrated COMSEC (ICOM) proposal was received and will be evaluated for incorporation into the production contract. Due to the infeasibility of using FY 85 funds for incorporating ICOM into 2000 RTs, a request for change in scope of the FY 86 funds will be prepared for submission to Congress. The SINCGARS is expected to satisfy mission requirements.

c. Changes since "As of" Date -- First Article Testing on the Ground Radio system was completed 12 Jan 88 and accepted on 29 Jan 88. Deliveries of fully compliant production radios began with the shipment of 50 radios for the FOT&E and monthly ramp-up of production deliveries now begin. DA approved the SINCGARS TEMP on 9 Feb 88.

8. Decision Coordinating Paper (DCP) Threshold Breaches:

Approved Decision Coordinating Paper (DCP) #156, Cover Sheet #2, dated 5 Jul 84. A 30 Sep 87 quarterly SAR was submitted to notify OSD of an anticipated breach in schedule milestone for IOC milestone.

9. Schedule:

a. Milestones --

	Production Estimate/ Approved Program	Current Estimate
Milestone 0 (ROC Approval)	Dec 74/NA	Dec 74
ASARC I	Oct 75/NA	Oct 75
Milestone I (DSARC I)	Feb 76/NA	Feb 76
DA Program Review (DAPR)	Jun 77/NA	Jun 77
Award AD Contracts	Apr 78/NA	Apr 78
DAPR	Dec 81/NA	Dec 81
Final Design Reviews	Apr 82/NA	Apr 82
Complete DT/OT - I/II	Dec 83/NA	Dec 83
Begin Limited DT/OT	Aug 82/NA	Aug 82
Complete Limited DT/OT	Dec 82/NA	Dec 82
Begin Maturity DT/OT	Jul 83/NA	Jul 83
Complete Maturity DT/OT	Dec 83/NA	Dec 83
Milestone IIIA (ASARC III)	Sep 83/Sep 83	Sep 83
Initial Production Contract Award	Dec 83/Dec 83	Dec 83
First Article Test Complete	Jun 85/Jan 88	Jan 88
Production Delivery Begins	Aug 85/Jan 88	Jan 88
Initial Ground Second Source Award	N/A /Feb 88	May 88 1/
Complete Follow-on Evaluation		
Operational Test: Start	N/A /Mar 88	Apr 88 2/
Complete	N/A /May 88	May 88
Milestone IIIB (DAB)	N/A /Sep 88	Sep 88
Third Ground Radio Option Award	N/A /Jan 89	Mar 89 1/
Second Source (SS) Option 1 Award	N/A /Dec 89	Aug 90 1/
IOC (1st Division Equipped)	Oct 87/Jul 90	Jul 90
SS First Article Test Complete	N/A /Aug 90	May 91 1/
SS Production Delivery Begins	N/A /Sep 90	Jun 91 1/

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 Dec 86 JRMB. Four milestones were added to reflect the revised program. As a result of the contract rebaselining modification signed in November 1987, hardware delivery schedules were revised causing the IOC to be rescheduled from Dec 89 to Jul 90.

c. Current Change Explanations --

1/ A request for approval to change the SINCGARS Program Baseline consistent with the PM estimate is being developed for approval by the AAE and DAE.

2/ FTE start changed at request of OTEA to allow for completion of test documentation, approval of TEMP and identification of participating test units.

9. Schedule: (Continued)

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: Single Channel Ground and Airborne Radio System (SINCGARS) Production Baseline, approved 26 February 1988.

10. Technical/Operational Characteristics: 1/

a. Technical --	Prod Estimate/ Appr Program	Demonstrated Performance 2/	Current Estimate
Frequency Band	30-87.975 MHz/ 30-87.975 MHz	30-87.975 MHz 3/	30-87.975 MHz
Number of Channels	2320/2320	2320 3/	2320
Channel Spacing	25 KHz/25 KHz	25 KHz 3/	25 KHz
Weight (Manpack w/COMSEC)	22.5 Lbs/22.5 Lbs	22.5 Lbs	22.5 Lbs
Power Requirements	28 Vdc/28 Vdc	28 Vdc 3/	28 Vdc
Communications Range:			
(Voice & Data @ 16 Kbps @ 10^{-4} Ber)			
Manpack	8 KM/8 KM	8 KM 4/	8 KM
Vehicular	35 KM/35 KM	27.5 KM 5/	35 KM
Airborne	TBD/35 KM	60 KM 6/	35 KM
(Data @ 16 Kbps @ 10^{-3} Ber)			
Manpack	4.5 KM/4 KM	2 KM 7/	4 KM
Vehicular	17.5 KM/17 KM	27 KM 8/	17 KM
Airborne	TBD/NA	9/	17 KM
b. Operational --			
Mean Time Between Failure (MTBF):			
Ground 10/ 11/	1250 Hrs/N/A		
Non-ICOM (less ECCM,DRA)	N/A /1250 Hrs	1250 Hrs 12/	1250 Hrs
ICOM	N/A /1250 Hrs	1/	1/
Airborne	750 Hrs/ 750 Hrs	9/	750 Hrs
ECCM	3500 Hrs/NA	2228 Hrs 12/	3500 Hrs
Mean Time To Repair (MTTR):			
Organizational Level	15 Min/15 Min	4.2 Min 13/	15 Min
Intermediate Direct Support (IDS) 11/			
Non-ICOM	N/A /60 Min 14/	52.2 Min 13/	45 Min/60 Min 14/
ICOM	N/A /45 Min 14/	1/	1/
General Support (GS)	2 Hrs/NA	1.78 Hrs 12/	2 Hrs

c. Previous Change Explanations -- Demonstrated performance of development models will be displayed until completion of 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).

10. Technical/Operational Characteristics: (Continued)

Approved Program: Single Channel Ground and Airborne Radio System (SINCGARS). Production Baseline, approved 26 February 1988.

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 will be available subsequent to completion of First Article Tests and Follow-on Evaluation.

3/ First Article Test (FAT) models were used.

4/ Fire Support Team - Vehicle (FIST-V)/SINCGARS Test (Jul 85) using Modified Advanced Development Model (MADM) radios. This was maximum range tested.

5/ SINCGARS Operational Assessment (Aug-Sep 84) using MADM radios. Operational Assessment testing was limited to 27.5 KM due to path restrictions. Development testing successfully completed links in excess of 40 KM (no line-of-sight restrictions).

6/ Demonstrated in Limited DT (Feb-Nov 86) at Fort Monmouth, NJ in a Huey aircraft.

7/ Maturity Development Test (MDT) (Jul-Dec 83) using ADM radios. Although these results are not indicative of later model radios, this test is not scheduled to be rerun until production radios are available.

8/ Demonstrated in the Operational Assessment by ADEA at Ft. Lewis, WA, Sep 87.

9/ No test results are available at this time for either development or production models of the airborne radio.

10/ Since both Manpack and Vehicular have the same MTBF, they have been combined and designated as Ground.

11/ Updated to reflect approved Production Baseline.

12/ First Article Test (FAT) demonstrated Production Readiness Acceptance Test (PRAT) of 1250 hours.

13/ Demonstrated in the Maintainability Demonstration (M-Demo) at Ft. Wayne, IN, Jun 87.

14/ This value was changed from 45 to 60 minutes, for the Non ICOM radio when it was recognized that the current version of the TMDE required excessive manual intervention during the diagnostic process. It remains 45 minutes for the ICOM radio. Automatic Test Equipment will be used for the ICOM radio, which is not currently available for the non ICOM version.

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

a. Cost --	Production Estimate	Changes	Current 1/ Estimate
Development (RDT&E)	154.4 2/	+53.9	208.3
Procurement	4013.3	-356.7	3656.6
Weapon System	(3609.5)	(+27.1)	(3636.6)
Flyaway	(3583.6)	(+28.9)	(3612.5)
Major System Equip	(3151.8)	(+100.0)	(3251.8)
Ancillary Equip	(431.8)	(-71.1)	(360.7)
Other Weapon System	(25.9)	(-1.8)	(24.1)
Initial Spares	(403.8)	(-383.8)	(20.0)
Construction (MILCON)	0.0	0.0	0.0
Total FY 84 Base-Year $	4167.7	-302.8	3864.9
Escalation	1444.0	-104.0	1340.0
Development (RDT&E)	(-19.0)	(+9.7)	(-9.3)
Procurement	(1463.0)	(-113.7)	(1349.3)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	5611.7	-406.8	5204.9

1/ Current estimate reflects Army requirements only. Other service requirements have been included in the SINCGARS Baseline Cost Estimate, Jun 87, and are reflected below:

	Quantity (RTs)	FY 84 Base-YR $	Then-Year $
USAF	4,476	40.1	55.1
USMC	33,382	298.7	411.1
USN	2,216	19.8	27.3
Total	40,074	358.6	493.5

Does not match initial SAR due to pre-base year amounts included as actuals, not base year dollars in initial SAR.

b. Quantities --			
Development (RDT&E)	62	+61 3/	123
Procurement	292,853	-1,329	291,524
Total	292,915	-1,268	291,647

3/ Of the 61 unit increase, 53 are new prototypes under the integrated COMSEC effort. The other 8 units, first reported in the 31 Dec 84 SAR, were actually a correction to the Production Estimate (PdE). The dollars associated with the 8 prototypes were included in the PdE but the development quantity did not include these units.

c. Unit Cost --			
Procurement:			
FY 84 Base Year $	.0137	-.0012	.0125
Then Year $	.0187	-.0015	.0172
Program:			
FY 84 Base Year $	.0142	-.0009	.0133
Then Year $	.0192	-.0014	.0178

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

		Current Year		Budget Year
		Current Est (Dec 87 SAR)	UCR Baseline (Sep 87 SAR)	UCR Baseline (Dec 87 SAR)
a.	Program Acquisition --			
	(1) Cost	5204.9	5169.8	5204.9
	(2) Quantity	291,647	291,647	291,647
	(3) Unit Cost	.0178	.0177	.0178
b.	Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
	(1) Cost	38.2	38.2	303.1
	Less CY Adv Proc	0	0	0
	Plus PY Adv Proc	0	0	0
	Net Total	38.2	38.2	303.1
	(2) Quantity	720	720	17100
	(3) Unit Cost	.0531	.0531	.0177

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

	RDT&E	PROC	TOTAL
Production Estimate	135.4	5476.3	5611.7
Previous Changes:			
Economic	-1.0	-444.2	-445.2
Quantity	+11.3	-49.8	-38.0
Schedule	--	+598.0	+598.0
Engineering	+16.3	--	+16.3
Estimating	+36.2	-72.1	-35.9
Other	--	--	--
Support	--	-537.1	-537.1
Subtotal	+62.8	-504.7	-441.9
Current Changes			
Economic	+0.8	+9.8	+10.6
Quantity	--	--	--
Schedule	--	--	--
Engineering	--	--	--
Estimating	--	+24.5	+24.5
Other	--	--	--
Support	--	--	--
Subtotal	+0.8	+34.3	+35.1
Total Changes	+63.6	-470.4	-406.8
Current Estimate	199.0	5005.9	5204.9

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	--	--	--
Schedule	--	--	--
Engineering	--	--	--
Estimating	--	--	--
Other	--	--	--
Support	--	--	--
Subtotal	--	--	--
Total Changes	+53.9	-356.7	-302.8
Current Estimate	208.3	3656.6	3864.9

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.
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.

13. Cost Variance Analysis: (Continued)

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)	--	+0.8
(2) PROCUREMENT		
Revised escalation indices (Economic)	--	+9.8
Adjustment in FY98 for changes to FY85-89 budget (Estimating)		+24.5

d. References --

Production Estimate: Draft Decision Coordinating Paper (DCP) #156, dated September 1983, for the Single Channel Ground and Airborne Radio System (SINCGARS).

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then Year Dollars)
Initial SAR Estimate to Current Estimate --

PAUC (Production Estimate)	CHANGES								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
.0192	-.0014	-.0001	+.0020	.0000	-.0001	-.0018	.0000	-.0014	.0178

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

a. RDT&E --
SINCGARS Development:

ITT Corp., A/OD, Ft. Wayne, IN,
DAAB07-78-C-0150, CPIF,
Award: 4 April 1978

Initial Contract Price		
Target	Ceiling	Qty
$5.4	N/A	43

Definitized: N/A since scope of contract continues to change.

Current Contract Price 1/			Estimated Price at Completion 1/	
Target	Ceiling	Qty	Contractor	Program Manager
$64.7	N/A	39	$64.7	$64.7

	Cost Variance 2/	Schedule Variance 2/
Previous Cum Variances	0	0
Cumulative Variances to Date (12/31/87)	0	0
Net Change	0	0

Explanation of Change: N/A

15. Contract Information: (Continued)

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
$221.6	N/A	12,100	$221.6	$221.6

1/ Price includes $2M negative fee. This contract is Cost Plus Incentive Fee and includes a negative fee with maximum liability of $2M. The cost sharing portion began at $6M and was "shared" in the ratio of 60(PM)/40(contractor) up to a maximum negative liability of $2M. After that point, any additional cost growth is 100(PM)/0(contractor) sharing. The negative fee ceiling was reached in 1980.

2/ Costs of work scheduled, performed and paid have been the same; therefore, there has not been a variance reported in the CPR.

3/ Cost Performance Report (CPR) is not required for FFP contracts; therefore, there is no variance analysis.

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

a. Program Status --

(1) Percent Program Completed : 58.3% (14 yrs/24 yrs)

(2) Percent Program Cost Appropriated: 10.7% ($551.3M/$5169.8M)

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

Appropriation	Current & Prior Years (FY 76-88)	Budget Year (FY 89)	Balance to Complete FYDP (FY 90-93)	Balance to Complete Beyond FYDP (FY 94-98)	Total
RDT&E	154.2 1/	9.4 2/	35.4	0.0	199.0
Procurement	397.1 1/	303.1	1896.5	2409.2	5005.9
APA	19.1	0	0	0	19.1
OPA	378.0	303.1	1896.5	2409.2	4986.8
Total	551.3	312.5	1931.9	2409.2	5204.9

1/ Adjusted to actuals. Includes below threshold reprogrammings.

2/ Includes requested below threshold reprogramming.

16. Program Funding Summary: (Continued)

c. Annual Summary -- (Note: Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.)

Fiscal Year	Qty 1/	FY 84 Base Year Dollars			Then Year Dollars			Escl Rate
		Flyaway		Total	Adv Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1976	0			.9			.5	6.6
1977	0			.3			.2	2.9
1977	0			3.3			2.0	5.5
1978	0			9.9			6.3	6.8
1979	0			18.1			12.5	8.4
1980	0			26.5			20.3	10.6
1981	0			29.5			25.0	10.6
1982	8			14.8			13.6	7.6
1983	54			12.4			12.1	4.9
1984	0			10.4			10.4	3.8
1985	8			10.0			10.5	3.4
1986	0			11.3			12.2	2.8
1987	0			13.1			14.7	2.7
1988	0			11.9			13.9	3.7
1989	34			7.8			9.4	3.8
1990	19			16.0			19.9	3.6
1991	0			12.1 2/			15.5 2/	3.3
1992	0			0			0	N/A
Subtotal	123			208.3			199.0	

FOOTNOTES:

1/ RDT&E units cannot be identified to a specific fiscal year's funds and are therefore shown in the year of delivery.

2/ FY91 funding is for SRCU and Preplanned Product Improvement efforts with no RT deliveries.

16. Program Funding Summary: (Continued)

Fiscal Year	Qty	FY 84 Base Year Dollars			Then Year Dollars			Escl Rate
		Flyaway		Total	Adv Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement (APA) 1/								
1985	2/ 150	5.5	8.4	17.5			19.1	3.4
Subtotal	150	5.5	8.4	17.5			19.1	

FOOTNOTES:

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.

2/ Reflects the planned quantity for the dollars cited in the FY 88/89 President's Budget.

16. Program Funding Summary: (Continued)

Fiscal Year	Qty	FY 84 Base Year Dollars			Then Year Dollars			Escl Rate
		Flyaway		Total	Adv Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement (OPA) 1/								
1983	175	4.4	13.0	18.4			18.7	4.9
1984	1325	0.1	66.7	70.3			70.3	3.8
1985	10268	0.1	125.4	129.6			2/ 141.6	3.4
1986	400	4.3	72.5	88.6			2/ 100.2	2.8
1987	0	0.0	4.6	7.7			9.0	2.7
1988	720	0.0	27.9	31.7			38.2	3.7
1989	17100	1.8	237.0	242.8			303.1	3.8
1990	17885	0.9	310.4	315.5			405.3	3.6
1991	27851	4.5	389.1	398.1			524.6	3.3
1992	24468	0.2	353.8	358.9			484.1	2.8
1993	25895	0.1	346.2	349.7			482.5	2.3
1994	28548	0.1	357.5	361.1			509.7	2.3
1995	24062	4.2	265.7	272.7			393.6	2.3
1996	33000	0.2	303.7	305.1			450.7	2.3
1997	33000	0.2	278.2	279.1			421.8	2.3
1998	46677	0.1	408.9	409.8			633.4	2.3
Subtotal	291374	21.2	3560.6	3639.1	0.0	0.0	4986.8	
Total Proc	291524	26.7	3569.0	3656.6	0.0	0.0	5005.9	
Total Program	291647	26.7	3569.0	3864.9	0.0	0.0	5204.9	

FOOTNOTE:

1/ Includes only those funds for KGV-10 (T99500) and BECS (Z16800) required to support the SINCGARS program.

2/ FY 85 funds were previously to be used for incorporating the ICOM Module into FY85 SINCGARS Ground Radios. Since FY85 funds have expired, approval is being sought to use FY86 funds for this effort.

16. Program Funding Summary: (Continued)

d. Obligations and Expenditures --

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1976	0.5	0.5	0.5
197T	0.2	0.2	0.2
1977	2.0	2.0	2.0
1978	6.3	6.3	6.3
1979	12.5	12.5	12.5
1980	20.3	20.3	20.3
1981	25.0	25.0	25.0
1982	13.6	13.6	13.6
1983	12.1	12.1	12.1
1984	10.4	10.4	10.3
1985	10.5	10.5	9.2
1986	12.2	12.2	9.7
1987	14.7	14.7	8.2
1988	13.9	3.5	.2
To Complete	44.8	N/A	N/A
Total	199.0	143.8	130.1

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: Procurement (APA)			
1985	19.1	19.0	8.6
To Complete	0.0	N/A	N/A
Total	19.1	19.0	8.6

16. Program Funding Summary: (Continued)

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: Procurement (OPA)			
1983	18.7	18.7	18.0
1984	70.3	70.3	68.5
1985	141.6	141.6	43.5
1986	100.2	6.7	1.4
1987	9.0	5.3	1.7
1988	38.2	0.0	0.0
Complete	4608.8	N/A	N/A
Total	4986.8	242.6	133.1

17. 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	1450	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

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.

17. 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 (100)	33000
1990	N/A	33000	17725 (1290)	33000
1991	N/A	33000	26875 (874)	33000
1992	N/A	33000	32950 (10682)	33000
1993	N/A	33000	33000 (9505)	33000
1994	N/A	33000	33000 (8353)	33000
1995	N/A	0	33000 (8938)	33000
1996	N/A	0	33000	33000
1997	N/A	0	33000	33000
1998	N/A	0	3/ 33000	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.

17. 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	$ -302.8	$ 3864.9	0.0	$ 3864.9
(TY $)	5611.7	-406.8	5204.9	0.0	5204.9
PAUC (BY $)	$ .0142	$ +.0009	$.0133	.0000	$ .0133
(TY $)	.0192	-.0014	.0178	.0000	.0178

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 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	05/85
Duration (in Months)	121	+ 8 mo	129	+15 mo	114
End Date (Mo/Yr)	01/95	+13 mo	02/96	+15 mo	11/94

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	12/83
Duration (in Months)	150	+52 mo	202	+52 mo	150
End Date (Mo/Yr)	06/96	+52 mo	10/00	+52 mo	06/96

d. Deliveries (Plan/Actual) --
Planned deliveries are prior to rebaselining of production contracts. Modifications have been signed which change planned delivery schedule to equal current actual.

	To Date
RDT&E	70/70
Procurement	19,135/310

18. Operating and Support Costs: N/A

SAR-87-060

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

PROGRAM: STANDARD Missile (SM-2 MR/ER)

AS OF DATE: December 31, 1987

N-36 STD MSL 2

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AS AMENDED

APR 11 1988

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) and STANDARD Missile 2 Block II Extended Range (TERRIER)-(SM-2 Blk II ER (TERRIER)/RIM-67C).

2. DoD Component: Department of the Navy

3. Responsible Office and Telephone Number:

Director, Guided Missile Division
Program Office (PMS 422)
Naval Sea Systems Command
Department of the Navy
Washington, DC 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. 24229N, APPN 1507
Standard MR SM-2 ICN 2233
Standard ER SM-2 2234
2239

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.

~~Classified by OPNAVINST S-5513.B~~
~~Declassify on: OADR~~

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OASD(PA) DFOISR 88-T-0661

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 a 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 Cruisers, and AEGIS DDG-51 Destroyers.

(U) The STANDARD Missile Extended Range (SM-2) Block I (ER) (67B produced FY 1976 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 ARC 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 source selection of the GC&A was awarded to Raytheon Company of 6 June 1986.

b. Significant Developments Since Last Report — Second sources have been selected for all STANDARD Missile components and will be competitively procured in FY 88 except the MK 30, which will remain single source due to small procurement quantities. Second sources being qualified are 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.

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

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are no threshold breaches to AEGIS DCP #16 Rev 2, dated May 1978.

9. Schedule:

SM-2 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/May 86	May 86
(U) (Lot #3) ALP	Apr 86/May 86	May 86
(b)(1)		
(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.
Approval for Full Production Slipped from September 86, the last reported approved program, to Dec 86 due to rescheduling of the ARB to October 86 and completion of the NPDM in December 86.

(b)(1)

d. References —

Production Estimate: Milestone IIIE NPDM of 17 December 1986.
Approved Program: FY 1988/1989 Amended Biennial Budget.
DAE Baseline of 10 September 1987.

SM-2 ER (RIM-67C)

a. Milestones —

(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
(U)	(Lot #3) Approval for Limited Production	Mar 85/Mar 85	Mar 85
(U)	FOT&E USS MAHAN DDG 42	Mar 85/Mar 85	Mar 85
(U)	(Lot #4) Approval for Limited Production	Apr 86/May 86	May 86
(b)(1)			
(U)	Milestone IIIE (AFP)	Dec 84/Dec 86	Dec 86

b. Previous Change Explanations —
Lot #4 ALP slipped from April 86 to May 86 due to ASN scheduling.
FOT&E in USS BIDDLE slipped from December 86 to December 87 due to ship designation changes resulting in delayed 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.

(b)(1)

d. References —

Production Estimate: Milestone IIIE NPDM of 17 December 1986.
Approved Program: FY 1988/1989 Amended Biennial Budget.
DAE Baseline of 10 September 1987.

10. Technical/Operational Characteristics:

SM-2 MR*	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical —			
(b)(1)			
b. Operational —			
(b)(1)			

c. Previous Change Explanations — None.

d. Current Change Explanations — None.

e. References —

Production Estimate: Milestones IIIE NPDM of 17 December 1986.
Approved Program: FY 1988/1989 Amended Biennial Budget.
DAE Baseline of 10 September 1987.

10. Technical/Operational Characteristics:

SM-2 ER *	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical —			
(b)(1)			
b. Operational —			
(b)(1)			

* Block II only. Technical/operational characteristics for Blocks III, IIIA, and IV will be included in first SAR submission after USD(A) approval of baseline element additions.

c. Previous Change Explanations —

Pilot production missiles fired 26 February-1 March 1985 in USS MAHAN DDG 42. Simulations verify production estimate; demonstrated minimum range performance of 8.5NM is result of final data analysis.

Demonstrated flight reliability performance of 81% in ground and flight tests.

d. Current Change Explanations — None.

e. References —

Production Estimate: Milestone IIIE NPDM of 17 December 1986.
Approved Program: FY 1988/1989 Amended Biennial Budget.
DAE Baseline of 10 September 1987.

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

SM-2 MR/ER

	Prod Estimate/ Appr Program	Changes	Current Estimate
a. Cost —			
Development (RDT&E)	$ 648.4	$ 283.5	$ 931.9
Procurement	5923.1	851.2	6774.3
GC&A	(2916.7)	(366.7)	(3283.4)
Propulsion	(893.6)	(208.0)	(1101.6)
Fuze	(368.6)	(411.5)	(780.1)
Other (Hardware)	(331.6)	(- 232.9)	(98.7)
Other (Proc Support)	(500.0)	(186.1)	(686.1)
TOTAL FLYAWAY	(5010.5)	(939.3)	(5949.8)
Non-Recurring Prod Support	(388.9)	(- 7.4)	(381.5)
Fleet Support	(330.9)	(- 4.4)	(326.5)
Initial Spares	(192.8)	(- 76.3)	(116.5)
Construction	-	-	-
Total: FY 84 Base-Year $	6571.5	1134.7	7706.2
Escalation	1481.3	- 349.3	1132.0
Development (RDT&E)	(53.2)	(33.4)	(86.6)
Procurement	(1428.1)	(- 382.7)	(1045.4)
Construction	-	-	-
Total Then-Year $	$ 8052.8	$ 785.4	$ 8838.2
b. Quantities —			
Development (RDT&E)	88	0	88
Procurement	10,778	3,899	14,677
Total	10,866	3,899	14,765
c. Unit Cost —			
Procurement:			
FY 84 Base-Year $	$ 0.549	$ -0.087	$ 0.462
Then-Year $	0.682	-0.149	0.533
Program:			
FY 84 Base-Year $	$ 0.604	$ -0.082	$ 0.522
Then-Year $	0.741	-0.142	0.599

d. 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.

e. Foreign Military Sales — None.

f. Nuclear Costs — None.

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

SM-2 MR/ER	Current Year Current Estimate Dec 87 SAR	Current Year UCR Baseline Dec 86 SAR	Budget Year UCR Baseline Dec 87 SAR
a. Program Acquisition —			
(1) Cost	8838.2	9381.2	8838.2
(2) Quantity	14765	14765	14765
(3) Unit Cost	0.599	0.635	0.599
b. Current Procurement	(FY 1988)	(FY 1988) 1/	(FY 1989)
(1) Cost	598.5	598.5	700.5
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	598.5	598.5	700.5
(2) Quantity	1310	1310	1635
(3) Unit Cost	0.457	0.457	0.428

1/ Reflects the FY 1988 Appropriated Program

Cost Variance Analysis:

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

SM-2 MR/ER

	RDT&E	PROC	TOTAL
Production Estimate	701.6	7351.2	8052.8
Previous Changes:			
Economic	- 35.5	- 875.7	- 911.2
Quantity	-	+2398.5	+2398.5
Schedule	-	- 311.0	- 311.0
Engineering	+ 305.9	+ 70.4	+ 376.3
Estimating	+ 68.8	- 365.2	- 296.4
Other	-	-	-
Support	-	+ 72.2	+ 72.2
Subtotal	+ 339.2	+ 989.2	+1328.4

13. Cost Variance Analysis (Cont'd):

Current Changes:			
Economic	+ .7	+ 49.7	+ 50.4
Quantity	-	-	-
Schedule	-	+ 303.3	+ 303.3
Engineering	-	-	-
Estimating	- 23.0	- 717.6	- 740.6
Other	-	-	-
Support	-	- 156.1	- 156.1
Subtotal	- 22.3	- 520.7	- 543.0
Total Changes	+ 316.9	+ 468.5	+ 785.4
Current Estimate	1018.5	7819.7	8838.2

13. Cost Variance Analysis (Cont'd): (FY 1984 Constant (Base Year) Dollars in Millions)

SM-2 MR/ER (Cont'd)

	RDT&E	PROC	TOTAL
Production Estimate	648.4	5923.1	6571.5
Previous Changes:			
Economic	-	-	-
Quantity	-	+1848.7	+1848.7
Schedule	-	- 375.2	- 375.2
Engineering	+ 263.1	+ 56.6	+ 319.7
Estimating	+ 40.6	- 262.9	- 222.3
Other	-	-	-
Support	-	+ 32.6	+ 32.6
Subtotal	+ 303.7	+1299.8	+1603.5
Current Changes:			
Economic	-	-	-
Quantity	-	-	-
Schedule	-	+ 267.6	+ 267.6
Engineering	-	-	-
Estimating	- 20.2	- 595.1	- 615.3
Other	-	-	-
Support	-	- 121.1	- 121.1
Subtotal	- 20.2	- 448.6	- 468.8
Total Changes	+ 283.5	+ 851.2	+1134.7
Current Estimate	931.9	6774.3	7706.2

b. Previous Change Explanations --

(1) RDT&E

Economic: Revised escalation rates.

Engineering: Increase reflects program restructuring caused by decision to pursue AEGIS ER missile.

(2) Procurement

Economic: Revised escalation rates.

Quantity: Increase reflects addition of program year as a continuing program.

Schedule: Decrease due to a shift of FY88 - FY91 missiles to FY92.

Estimating: Decrease associated with Graham/Rudman budget cuts, NIF and DPSB reductions.

Support: Decrease due to annualization and realignment of support costs.

c. Current Change Explanations --

(1) RDT&E

	(Dollars in Millions) Base-Year	Then-Year
Revised escalation rates. (Economic)	N/A	+ .7
Decrease associated with congressional marks. (Estimating)	- 20.2	- 23.0

(2) Procurement

Revised escalation rates. (Economic)	N/A	+ 49.7
Schedule adjustment was due to accelerated procurement of 160 missiles in FY88; FY92 was reduced by 160 missiles. (Schedule)	- 0.0	- 23.4
Decrease associated with reduced hardware cost due to competition for all major missile components in FY88 and out. (Estimating)	-327.5	-390.9
Decrease associated with reduction of initial spares requirements and cost savings on initial hardware component spares. (Support)	-121.1	-156.1
Correct previous categorization error: Dec 86 SAR		

Schedule: (result of recalculation of MR "Old Cum Qty"). SAR Audit	+267.6	+326.7
Estimating: (result of recalculation of MR "Old Cum Qty"). SAR Audit	-267.6	-326.7

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

SM-2 MR/ER

a. Initial SAR Estimate to Current Baseline Estimate -- N/A

b. Current Baseline Estimate to Current Estimate --

PAUC (Prog Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
.741	-0.058	-0.032	-0.001	+0.025	-0.070	0.00	-0.006	-0.142	0.599

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

a. PROCUREMENT --

SM-2 FY 86 GC&A Production	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, California N00024-86-C-5301, FFP1/ Award: 23 September 1986 Definitized: 23 September 1986	$332.5	N/A	1071

Current Contract Price Target	Ceiling	Qty	Estimated Price At Completion Contractor	Program Manager
$332.5	N/A	1071	N/A	N/A

Explanation of Change: Initial Target Price change due to error: Target Cost was reported in previous report.

1/ Variances not required for FFP contracts.

SM-2 FY 85 GC&A Production	Initial Contract Price Target	Ceiling	Qty
General Dynamics Pomona, California N00024-85-C-5501, FPI Award: 4 September 1985 Definitized: 4 September 1985 Percent Complete: 85	$248.1	$279.9	730

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$249.1	281.1	730	$250.9	$281.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances:	+ 8.1	+ 6.8
Cumulative Variances To Date:	- 8.4	-10.9
Net Change:	-16.5	-17.7

Explanation of Change: Overall variances caused by late purchased parts due to poor supplier performance, parts failing required testing and excess parts usage in some assemblies. The program manager's assessment is at the ceiling price and is within approved funding.

Reference: CPR as of 11/87

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

SM-2 FY87 GC&A Production
General Dynamics
Pomona, California
N00024-87-C-5300 FPI
Award: 18 December 1987
Definitized: 18 December 1987

Initial Contract Price		
Target	Ceiling	Qty
$336.5		1194

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$336.5		1194	$336.5	$336.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances:	0	0
Cumulative Variances To Date:	0	0
Net Change:	0	0

Explanation of Change: N/A

SM-2 FY 88 AUR Production
Raytheon Company
Bristol, Tennessee
N00024-88-C-5301, FPI
Award: 15 January 1988
Definitized: 15 January 1988

Initial Contract Price		
Target	Ceiling	Qty
$134.3		528

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$134.3		528	$134.3	$134.3

	Cost Variance	Schedule Variance
Previous Cumulative Variances:	0	0
Cumulative Variances To Date:	0	0
Net Change:	0	0

Explanation of Change: N/A
Reference: Basic Contract

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

SM-2 FY 88 AUR Production
General Dynamics
Pomona, California
N00024-88-C-5300, FPI
Award: 15 January 1988
Definitized: 15 January 1988

Initial Contract Price		
Target	Ceiling	Qty
168.1		801

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$168.1		801	$168.1	$168.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances:	0	0
Cumulative Variances To Date:	0	0
Net Change:	0	0

Explanation of Change: N/A
Reference: Basic Contract

SM-2 FY86/87 MK 104 Production
Morton Thiokol, Inc.
Brigham City, UT
N00024-87-C-5331, FPI
Award: 30 September 1987
Definitized: 30 September 1987

Initial Contract Price		
Target	Ceiling	Qty
$167.4		1594

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$167.4		1594	$167.4	$167.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances:	0	0
Cumulative Variances To Date:	0	0
Net Change:	0	0

Explanation of Change: N/A

Reference: Basic Contract

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

SM-2 MR/ER

a. Program Status —
(1) Percent Program Completed: 76% or 13 out of 17 years
(2) Percent Program Cost Appropriated: 52.3% or 4,622.1/8,838.2

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY76-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93)	Total
RDT&E	601.9	152.8	263.8	-	1018.5
Procurement	4020.2	700.5	3099.0	-	7819.7
Total	4622.1	853.3	3362.8	-	8838.2

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

SM-2 MR/ER

c. Annual Summary —

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
				Appropriation: RDT&E				
1982	88		-	324.1			305.0	7.6
1983	-		-	23.6			23.2	4.9
1984	-		-	17.0			17.3	3.8
1985	-		-	27.8			29.2	3.4
1986	-		-	56.9			61.4	2.8
1987	-		-	65.4			72.8	2.7
1988	-		-	80.5			93.0	3.7
1989	-		-	127.6			152.8	3.8
1990	-		-	113.3			140.3	3.6
1991	-		-	52.8			67.4	3.3
1992	-		-	42.9			56.1	2.8
Subtotal	88		-	931.9			1018.5	

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

SM-2 MR/ER

c. Annual Summary —

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
		Appropriation: PROCUREMENT						
1976	22	53.9	92.5			48.4		6.59
1977	36	60.4	73.8			42.9		3.78
1978	40	61.3	74.3			48.2		6.8
1979	40	51.8	65.3			46.8		8.72
1980	85	63.0	81.9			64.6		11.8
1981	345	156.2	198.1			174.3		11.6
1982	495	229.7	286.8			273.9		14.3
1983	500	292.6	398.1			402.0		9.0
1984	490	312.7	385.4			405.1		8.0
1985	784	394.2	442.0			479.7		3.4
1986	1271	577.7	657.5			737.0		2.8
1987	1194	503.9	601.5			698.8		2.7
1988	1310	450.6	497.3			598.5		3.7
1989	1635	526.8	563.1			700.5		3.8
1990	1940	627.5	666.2			853.1		3.6
1991	2315	814.2	854.5			1122.3		3.3
1992	2175	773.3	836.0			1123.6		2.8
Subtotal	14677	5949.8	6774.3			7819.7		
Total	14765	5949.8	7706.2			8838.2		

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

SM-2 MR/ER

d. Obligations and Expenditures —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1982	305.0	305.0	305.0
1983	23.2	23.2	23.2
1984	17.3	17.3	17.3
1985	29.2	29.2	29.2
1986	61.4	61.4	48.7
1987	72.8	72.6	41.7
1988	93.0	51.6	0.5
1989	152.8	-	-
1990	140.3	-	-
1991	67.4	-	-
1992	56.1	-	-
Subtotal	1018.5	560.3	465.6

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

SM-2 MR/ER

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: PROCUREMENT		
1976	48.4	48.4	48.4
1977	42.9	42.8	41.4
1978	48.2	48.1	46.8
1979	46.8	47.3	45.8
1980	64.6	64.7	63.3
1981	174.3	174.2	171.6
1982	273.9	274.0	263.3
1983	402.0	402.1	367.7
1984	405.1	403.2	343.0
1985	479.7	475.2	346.6
1986	737.0	732.6	230.5
1987	698.8	545.7	49.8
1988	598.5	385.0	0.2
1989	700.5	-	-
1990	853.1	-	-
1991	1122.3	-	-
1992	1123.6	-	-
Subtotal	7819.7	3643.3	2018.4
Total	8838.2	4203.6	2484.0

17. Production Rate Data:

SM-2 MR/ER

a. Annual Production Rates -- 1/

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate 2/	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	1635	1635
1990			1940	1940
1991			2315	2315
1992			2175	2175

b. Cost Variance --

Item		Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum
Prog Acq Cost	(BY $)	6571.5	1134.7	7706.2	0	7706.2
	(TY $)	8052.8	785.4	8838.2	0	8838.2
PAUC	(BY $)	0.604	- 0.082	0.522	0	0.522
	(TY $)	0.741	-0.142	0.599	0	0.599

c. Schedule Variance --

SM-2 MR

Item	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum
Start Date (Mo/Yr)	7/83	N/A	7/83	N/A	7/83
Duration (in Months)	96 mos.	50 mos.	146 mos	0	146 mos.
End Date (Mo/Yr)	7/91	N/A	7/95	N/A	7/95

17. Production Rate Data:

SM-2 MR/ER (cont'd)

c. Schedule Variance --

SM-2 ER

Item	Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum
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	2742/2742

Note: Production is above the minimum economic rate and less than the maximum rate for facilitization.

18. Operating and Support Costs: N/A.

1/ Block II only. Delivery period is 12 months from 1st delivery to last.
2/ Quantity shown is budget quantity; figures do not include lead time. Producing at maximum economic rate.

SAR-87-007

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N-2 AN/BSY-1

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

PROGRAM: AN/BSY-1 Submarine Combat System (U)

AS OF DATE: December 31, 1987

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AS AMENDED

[redacted]

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 Submarine Combat System Project, PMS417
Naval Sea Systems Command
Washington, D.C. 20362

CAPT Ronald L. Koontz
Assigned: July 1987
Area Code 202-746-0029
AUTOVON 286-0029

4. (U) Program Elements:

[redacted]

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

[redacted]

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OASD(PA) DFOISR 88-T-0916

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6. (U) Mission and Description:

a. (U) Mission Area -- The SSN 688 Submarine Combat System supports the SSN mission to conduct prompt and sustained combat operations. The fundamental warfare tasks supporting this mission are: Anti-Submarine Warfare (ASW), Anti-Surface Warfare, Strike Warfare and Mine Warfare. Supporting warfare tasks for the SSN are: Special Warfare; Ocean Surveillance; Intelligence/Reconnaissance; Command, Control, and Communications (C^3); and Electronic Warfare.

(b)(1)

7. (U) Program Highlights (Since Last Report):

a. (U) The first Phase I (Delivery Configuration) AN/BSY-1 Combat System Acceptance Test was completed and the system was accepted by the Navy in May 1987. This system was delivered and installed on SSN 751 during December 1987.

b. (U) The second Delivery Configuration AN/BSY-1 Combat System was tested and accepted by the Navy in December 1987. A Physical Configuration Audit was also conducted by the Navy on this shipset.

c. (U) Weapon Compatibility Testing for the Mk 48 torpedo was conducted by the Navy in December 1987.

d. (U) Changes since December 31, 1987 - 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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9. (U) SCHEDULE:	PLANNING ESTIMATE	APPROVED PROGRAM	CURRENT ESTIMATE	
a. (U) Milestones --				
(U) Program Initiated (MENS Approved)	-	Nov 80	Nov 80	
(U) DSARC I Approve Design Definition SUBACS A and Concept Development SUBACS B	-	Sep 83	Sep 83	
(U) DSARC II Approve FSD SUBACS BASIC	-	Sep 83	Sep 83	
(U) Award FSD Contract SUBACS BASIC	-	Oct 83	Dec 83	
AN/BSY-1(V) Program Status Review	N/A	Oct 86	Oct 86	
AN/BSY-1(V) Program Status Review	N/A	Oct 87	Oct 87	
AN/BSY-1(V) Program Status Review	N/A	Oct 88	Oct 88	
SSN 751 System Delivery	N/A	Apr 87	Apr 87	CH-1
SSN 752-754 System Delivery	N/A	Sep 88	Sep 88	CH-1
SSN 755-758 System Delivery	N/A	Jun 89	Jun 89	CH-1
SSN 759-766 System Delivery	N/A	Sep 90	Sep 90	CH-1
SSN 767-769 System Delivery	N/A	Sep 91	Sep 91	CH-1
SSN 770-771 System Delivery	N/A	Sep 92	Sep 92	CH-1
Start TECH/OPEVAL AN/BSY-(V)	N/A	Jan 89	Oct 89	CH-1
(U) DSARC III Review of TECH/OPEVAL Results	N/A	Oct 89	Oct 90	CH-1

(b)(1)

b. Previous Change Explanations: Previous changes reflect shipyard and program slip for AN/BSY-1(V).

c. (U) Explanation of Current Changes:

CH-1 reflects Shipyard and program slip for the AN/BSY-1(V).

d. (U) References -- Planning Estimate: NDCP SUBACS BASIC, dated 15 Nov 1985;

Approved Program: FY88/89 Amended Biennial Budget
DAE Baseline, 17 Feb 88

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V):*

a. (C) TECHNICAL --	PLANNING ESTIMATE/ APPROVED PROGRAM	CURRENT ESTIMATE	NOTES
(b)(1)			

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V): (Cont'd)

a. (U) TECHNICAL -- (Cont'd)	PLANNING ESTIMATE/ APPROVED PROGRAM	CURRENT ESTIMATE	NOTES
(b)(1)			

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V): (Cont'd)

	PLANNING ESTIMATE/ APPROVED PROGRAM	CURRENT ESTIMATE	NOTE
a.	(b)(1)	(b)(1)	1

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1: (Cont'd)

a. (U) TECHNICAL -- (Cont'd)	PLANNING ESTIMATE/ APPROVED PROGRAM	CURRENT ESTIMATE	NOTES
(b)(1)			1

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1: (Cont'd)

(b)(1)

ES

10. (U) TECHNICAL/OPERATIONAL CHARACTERISTICS AN/BSY-1(V): (Cont'd)

(b)(1)

b

(b)(1)

11. Program Acquisition: (Current Estimate in Millions of FY1984 Dollars)

a. Cost --	Development 1/ Estimate	Changes	Current Estimate
Development (RDT&E)	2027.5	- 892.2	1135.3
Procurement (OPN)	944.9	- 625.8	319.1
Construction	---	---	---
Total: Constant FY84 $	2972.4	- 1518.0	1454.4
Escalation			
Development	319.4	- 246.6	72.8
Procurement	535.8	- 443.9	91.9
Construction	---	---	---
TOTAL THEN-YEAR $ 2/	3827.6	- 2208.5	1619.1

b. Quantities -- N/A

c. Unit Cost -- N/A

d. Approved Design-to-Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

1/ Planning 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 SAR. Support equipment procurement is reported in this SAR.

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

a. Program Acquisition	SAR CURRENT ESTIMATE DEC 87 SAR	UCR BASELINE ESTIMATE DEC 86 UCR	UCR BASELINE ESTIMATE DEC 87 UCR
(1) Cost	1619.1	1722.0	1619.1
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A
b. Current Procurement	(FY 1988)	(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

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
Baseline Estimate	2346.9	1480.7	-	3827.6
Previous Changes:				
Economic	- 48.2	- 40.1	-	- 88.3
Quantity	- 62.1*	+ 108.9	-	+ 46.8
Schedule	+ 15.5	+ 9.5	-	+ 25.0
Engineering	+ 32.2	+ 49.7	-	+ 81.9
Estimating	- 25.9	+ 105.9	-	+ 80.0
Other	- 1050.9	- 1586.7	-	- 2637.6
Support	-	+ 386.6	-	+ 386.6
Subtotal	- 1139.4	- 966.2	-	- 2105.6

* 62.1 is correct. There was an error in the December 1986 SAR.

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13. Cost Variance Analysis (Cont'd):

Current Changes			
Economic	- 1.2	+ 4.1	+ 2.9
Quantity	-	-	-
Schedule	-	-	-
Engineering	+ 1.8	-	+ 1.8
Estimating	-	- 107.6	- 107.6
Other	-	-	-
Support	-	-	-
Subtotal	+ 0.6	- 103.5	- 102.9
Total Changes	- 1138.8	- 1069.7	- 2208.5
Current Estimate	1208.1	411.0	1619.1

(FY84 Constant Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate	2027.5	944.9		2972.4
Previous Changes:				
Economic	-	-		-
Quantity	- 57.0	+ 82.1		+ 25.1
Schedule	+ 13.2	+ 12.4		+ 25.6
Engineering	+ 28.0	+ 37.4		+ 65.4
Estimating	- 11.5	+ 70.5		+ 59.0
Other	- 866.5	- 1051.5		- 1918.0
Support		+ 309.6		+ 309.6
Subtotal	- 893.8	- 539.5		- 1433.3
Current Changes:				
Economic	-	-		-
Quantity	-	-		-
Schedule	-	-		-
Engineering	+ 1.6	-		+ 1.6
Estimating		- 86.3		- 86.3
Other	-	-		-
Support	-	-		-
Subtotal	+ 1.6	- 86.3		- 84.7
Total Changes	- 892.2	- 625.8		- 1518.0
Current Estimate	1135.3	319.1		1454.4

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 Transmit 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

13. Cost Variance Analysis (Cont'd):

Estimating:	Software, Basic Operator Trainer (BOT) and Weapons Launch System Operator Trainer (WLSOT) cost growth; 21M correction from previous SAR for administrative effort; CC/A, TG and HFT overrun projections.
Other:	Separation of the AN/BSY-1 from the AN/BSY-2

Procurement

Economic:	Revised Escalation Indices
Schedule:	Change of backfit equipment and earlier deliveries to meet accelerated ship building 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.
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		
o Revised January 1988 economic escalation rates. (Economic)	-	- 1.2
o Increased OPEVAL support (Engineering)	+ 1.6	+ 1.8
(2) Procurement		
o Revised January 1988 economic escalation rates (Economic)	-	+ 4.1
o Loss of Software Maintenance Facility due to budget cuts; decrease in number of spares for MAMS and I&C (Estimating)	- 86.3	-107.6

d. References -- Development Estimate: SDDM, dated October 5, 1983, subject "Submarine Advanced Combat System (SUBACS) DSARC I/IIA Decision Memorandum."

-- Approved Program: FY1989 Approved Biennial Budget

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

a. Initial SAR Estimate to current Baseline Estimate -- N/A

b. Current Baseline Estimate to Current Estimate -- N/A

* 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 N00024-83-C-6083, CPIF (Cost Capped), Award: December 2, 1982 (CC/A Mod awarded December 22, 1983) Definitized: December 2, 1982 (CC/A mod definitized December 22, 1983)	$89.0	N/A	3.0

Current Contract Price Target	Ceiling	Quantity	Estimated Price at Completion Contractor	Program Manager
$1034	$1034	5.0	$1034	$1034

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ - 14.1	$ - 55.6
Cumulative Variances To Date (10/16/87)	$ - 33.5	$ - 37.8
Net Change	$ - 19.4	$ + 17.8

Explanation of Change: Unfavorable change in cost variance is due to additional technical support to contend with late, out-of-spec hardware and GFM/GFE, additional program management support, and an increase in General and Administrative expenses. Favorable change in schedule variance is due to adjustments to the Hughes Weapons Launch System (WLS) subcontract data, adjustments to the recurring hardware data, receipt of overdue material in recurring hardware, and completion of FSD requirements on Engineering Evaluation Models (EEMs) 1 and 2. The program manager's estimated price at completion remains at the ceiling price and is within approved funding.

* Represent the FSD portion of the 6083 contract. Definitized in February 1986, capped at $1034.0M.

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

SADS TG FSD:	Initial Contract Price Target	Ceiling	Qty
Raytheon Co., Portsmouth, RI, N00024-81-C-6236, CPAF, Award: June 30, 1981 Definitized: June 30, 1981	$54.2	N/A	3.0

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$129.8	N/A	6.0	$146.2	$140.1

	Cost Variance	Schedule Variance
Previous Cumulative Variance	$ - 14.6	$ - 1.2
Cumulative Variances to Date (09/27/87)	$ - 17.2	$ - 2.2
Net Change	$ - 2.6	$ - 1.0

Explanation of Change: Unfavorable change in cost variance is due to higher material costs than planned an increase in General and Administrative expenses, increased System Design Certification Test (SDCT) test bay support system integration cost growth resulting from schedule stretch-out and retest activities, procurement of additional Format B modules to replace non-repairable modules for the FY83 Buy PP/TCU, and further definition of Environmental Qualification Test (EQT) and required test facilities. Unfavorable change in schedule variance is due to budget adjustments for redesign of the Aperture Switching Assembly (ASA), upgrade of PP/TCU #1, and installation delays. The contractor's and program manager's estimated price at completion are within approved funding.

b. Procurement -- N/A
c. MILCON -- N/A

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

a. (U) Program Status --

(1) Percent Program Completed: 50% (8/16 years)

(2) Percent Program Cost Appropriated: 76% ($1226.2/$1619.1)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current and Prior Years	Budget Year	Balance to Complete FYDP	Beyond FYDP	Total
RDT&E	1092.3	89.2	26.6	-	1208.1
Procurement	133.9	5.0	216.6	55.5	411.0
MILCON					
Total	1226.2	94.2	243.2	55.5	1619.1

c. (U) Annual Summary --

Fiscal Year	Qty	FY84 Base-Year Dollars: Sailaway Nonrec	Sailaway Rec	Sailaway Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
				Appropriation: RDT&E				
PRIOR	-	-	-	251.0	-	-	237.5	-
FY84	-	-	-	126.3	-	-	129.2	3.8
FY85	-	-	-	174.1	-	-	183.1	3.4
FY86	-	-	-	184.1	-	-	199.4	2.8
FY87	-	-	-	188.5	-	-	209.9	2.7
FY88	-	-	-	115.3	-	-	133.2	3.7
FY89	-	-	-	74.5	-	-	89.2	3.8
FY90	-	-	-	19.9	-	-	24.6	3.6
FY91	-	-	-	1.6	-	-	2.0	3.3
Subtotal				1135.3			1208.1	

Fiscal Year	Qty	FY84 Base-Year Dollars: Sailaway Nonrec	Sailaway Rec	Sailaway Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
				Appropriation: OPN				
FY86	-	-	-	.5	-	-	.6	2.8
FY87	-	-	-	61.9	-	-	72.0	2.7
FY88	-	-	-	50.9	-	-	61.3	3.7
FY89	-	-	-	4.0	-	-	5.0	3.8
FY90	-	-	-	11.0	-	-	14.0	3.6
FY91	-	-	-	83.3	-	-	109.5	3.3
FY92	-	-	-	63.9	-	-	86.0	2.8
FY93	-	-	-	5.2	-	-	7.1	2.3
FY94	-	-	-	0	-	-	0	2.3
FY95	-	-	-	34.6	-	-	49.9	2.3
FY96	-	-	-	3.8	-	-	5.6	2.3
Subtotal				319.1			411.0	-
Total				1454.4			1619.1	

d.

Fiscal Year	Total	Obligated	Expended
	Appropriation: OPN		
FY86	.6	.6	-
FY87	72.0	51.2	4.4
FY88	61.3	9.2	-
To Complete	277.1	N/A	N/A
Total	411.0	61.0	4.4

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16. (Cont'd) Obligations and Expenditures

Fiscal Year	Total	Obligated	Expended
	Appropriation: RDT&E		
PRIOR	237.5	200.4	198.4
FY84	129.2	129.2	127.8
FY85	183.1	183.1	180.5
FY86	199.4	199.4	188.9
FY87	209.9	208.5	196.7
FY88	133.2	68.9	1.5
To Complete	115.8	N/A	N/A
Total	1208.1	989.5	893.8

17. Production Rate Data: N/A

Production Systems for new construction ships are procured under the SCN appropriation and are reported in the SSN SAR. Only support equipment procurement is reported in this SAR.

18. Operating and Support Cost

a) Assumptions and Grounds Rules - N/A
b) Cost - N/A

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[redacted]

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

PROGRAM: TOW 2

87-019

AS OF DATE: December 31, 1987

A-25 TOW 2

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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

PM: COL Thomas M. Devanney
Assigned: July 1, 1987
AUTOVON 746-7194

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:

Not Applicable

[redacted]

[redacted]

OASD(PA) DFOISR 88-T-0787

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 --

(b)(1)

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

As an interim fix for launch motor ruptures, a prototype ballistic blanket was developed and released through the Materiel Release Review Board (MRRB) in May 1987. The Failure Investigative Team (FIT) determined the most probable cause of the launch motor ruptures was case deterioration caused by stress corrosion. A launch motor replacement program began in June 1987 by personnel at Anniston Army Depot. In July 1987 MACOMs were authorized to fire from all exposed platforms using standard range missiles with new launch motors.

At the direction of the Under Secretary of the Army and in accordance with FY 87 Congressional language to develop a TOW second source versus multiyear proposal, a MICOM team conducted a comparative analysis of the acquisition process for the FY87 competitive solicitation for a second source. Results of the comparative analysis were briefed to AMC, DA and Under Secretary of the Army in September 1987. The Secretary of the Army determined that a second source producer for TOW missiles is not effective, therefore, resulting in a planned implementation for a FY88-92 multiyear missile contract with Hughes Aircraft Company (HAC) during January 1988.

7. (U) Program Highlights (Cont):

An ECP (Missile Integration Implementation TOW 2A) was approved establishing a new missile configuration for the U.S. Army. Production of TOW 2A began in April 1987, first lot successfully passed Fly-to-Buy testing in June 1987 and fielding began in September 1987.

A TOW 2B development contract was awarded to HAC on 24 September 1987. Key tasks are to design, build and test new warheads and target sensors for a fly-over-shoot-down missile configuration; integrate the new armament section, warhead/sensor, to existing TOW 2 missile and develop software to fly the missile on the offset trajectory.

Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted by FY88 Congressional direction and FY89 amended budget decisions.

c. (U) Changes Since "As of" Date -- The multi-year contract with Hughes Aircraft Co. is currently scheduled for award April, 1988 after certification of the economic effectiveness of multiyear versus second source by the Secretary of Defense as required by the National Defense Appropriation Act for 1988/1989 (published Congressional Record 21 Dec 1987).

8.(U) Decision Coordinating Paper (DCP) Threshold Breaches: None.

9.(U) Schedule:

a. (b)(1) Milestones	Production/Approved Estimate /Program	Current Estimate	
TOW 2 IOC	Sep 83/Sep 83	Sep 83	
TOW 2A IOC	Aug 87/Aug 87	Aug 87	
TOW 2B RDT&E Contract Award (b)(1)	Aug 87/Aug 87	Sep 87	
TOW 2B DT/OT Complete	Jul 89/Jul 89	Apr 90	
DA IPR	N/A /Aug 89	Aug 89	(Ch 1)
TOW 2B Warhead ECP Cut-In	N/A /Aug 89	Aug 89	(Ch 1)

(b)(1)

b. (U) Explanation of Changes - Baseline milestones for IOC changes caused by delays in awarding TOW 2B development contract.

A request for approval to change the TOW Program Baseline consistent with the PM current estimate is being developed for approval.

(Ch 1) Program Baseline Addition

c. (U) Reference - (1) (U) Production Estimate: IPR approved by HQDA Message, DAMA-WSM-S, dated 9 Oct 1981.

(2) (U) Approved Program: FY 88-89 President's Budget as amended.

(3) (U) Approved Program Baseline: 26 February 1988

10. Technical/Operational Characteristics:

a.(U) Technical	Production/Approved Estimate /Program	Demonstrated Performance	Current Estimate
1.(U) System Ready to Fire Ground Mount System Weight (lbs) (Launcher in Tripod & 1 Missile)	276/NA	276	276
2.(U) a. Missile Weight (in lbs.) (Tactical missile in Container)	63.4/NA	63.4	63.4
b. Launcher Weight (in lbs.)	216/NA	216	216
b. Operational			
1.(U) Range (meters)			
a. (U) Minimum	65M/65M	65M	65M
b. (U) Maximum	3.75KM/3.75KM	3.75KM	3.75KM
2.(U) System Reliability (%)MSL	N/A/94	94	94 (Ch 1)
(U) System Reliability (%) (Launcher w/Missile)	91.6/91.6	91.6	91.6

(b)(1)

c. (U) Explanation of Changes -- (Ch 1) Program Baseline Addition

d. (U) Reference -- (1) (U) Pd Est: IPR approved by HQDA Message, DAMA-WSM-S, dated 9 Oct 1981.

(2) (U) Approved Program: FY88-FY89 President's Budget as amended.
Program Baseline, 26 February 1988

11.(U) Program Acquisition Cost:

	Production Estimate	Changes	Current Estimate
a. (U) Cost --			
Development	107.0	+45.5	152.5
Procurement	2,195.1	-132.1	2063.0
Heat Missile	(1,299.3)	(-141.5)	(1157.8)
Launcher	(7.0)	(- 7.0)	(-0-)
AN/TAS 4/4A Night Sight	(363.2)	(- 88.9)	(274.3)
Ground Supt Retrofit	(325.8)	(+152.6)	(478.4)
Night Sight Retrofit	(26.1)	(- 12.8)	(13.3)
Total Flyaway	(2,021.4)	(- 97.6)	(1923.8)
Training Missile	(28.1)	(- 28.1)	(-0-)
Other Ground Supt. Equip.	(75.2)	(- 34.2)	(41.0)
Total Other Wpn Sys	(103.3)	(- 62.3)	(41.0)
SURGE	(48.9)	(- 15.5)	(33.4)
Initial Spares	(21.5)	(+ 43.3)	(64.8)
Total: constant FY84$	2,302.1	- 86.6	2215.5
Escalation	321.7	-143.0	178.7
Development	(-15.7)	(+ 23.8)	(- 9.3)
Procurement	(337.4)	(-149.4)	(188.0)
Construction	(0)	(0)	(0)
Total Program Cost	2,623.8	-229.6	2394.2
b. (U) Quantities --			
Development (RDT&E)	113	-0-	113
Procurement	141,224	-15,368	125,856
Total	141,337	-15,368	125,969
c. (U) Unit Cost --			
Procurement:			
FY84 Base-Year $	.016	-0-	.016
Then-Year $	.018	-0-	.019
Program:			
FY84 Base-Year $	.016	.003	.018
Then-Year $	.019	-0-	.019

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

e. (U) Foreign Military Sales -- Sales of TOW 2 to date consist of 4,372 TOW 2 missiles, value $49 million and 101 launchers, value $10 million. In addition, 8,030 TOW 2 missiles, value $81 million and 60 launchers, value $6 million have been procurred with SDAF funds. 6840 missiles and all launchers have been committed to Turkey and 1371 missiles to Norway from the SDAF account. Countries committed to TOW 2 upgrade consist of: Canada, Denmark, Germany, Netherlands, Norway, Sweden, Switzerland, Turkey, Portugal, Pakistan and Tunisia. Ratio of missiles to launchers sales is low since majority of FMS customers are electing to purchase modification kits through direct sales. ~~Confidential~~ FMS Cases for over $300 million are in progress and should be implemented for FY89 procurement.

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

f. (U) Nuclear Costs -- None.

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

(Current (Then Year) Dollars in Millions)

	Current Year		Budget Year
	Current Estimate (Dec 87 SAR)	UCR Baseline (DEC 86 SAR)	UCR Baseline (Dec 87 SAR)
a. (U) Program Acquisiton			
(1) (U) Cost	2394.2	2444.5	2394.2
(2) (U) Quantity	125,969	125,969	125,969
(3) (U) Unit Cost	.019	.019	.019
b. (U) Current Procurement	(FY88)	(FY88) [1]	(FY89)
(1) (U) Cost	188.9	188.9	173.2
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	-0-	-0-	.0
Net Total	188.9	188.9	173.2
(2) (U) Quantity	12,000	12,000	12,000
(3) (U) Unit Cost	.016	.016	.014

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

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

[1] Updated to FY88 Appropriation

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	-152.9	-	-155.4
Quantity	-	-202.3	-	-202.3
Schedule	-	+112.3	-	+112.3
Engineering	+49.0	+229.6	-	+278.6
Estimating	-	-200.7	-	-200.7
Other	-	-	-	-
Support	-	- 11.8	-	- 11.8
Subtotal	+46.5	-225.8	-0-	-179.3
Current Changes:				
Economic	-	+ 4.6	-	+ 4.6
Quantity	-	-	-	-
Schedule	-	- 9.9	-	- 9.9
Engineering	+5.4	- 47.5	-	- 42.1
Estimating	-	+ 6.4	-	+ 6.4
Other	-	-	-	-
Support	-	- 9.3	-	- 9.3
Subtotal	+ 5.4	- 55.7	-0-	- 50.3
Total Changes	+51.9	-281.5	-0-	-229.6
Current Estimate	143.2	2251.0	-0-	2394.2

(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	-	+ 37.3	-	+ 37.3
Engineering	+40.9	+172.0	-	+212.9
Estimating	-	-131.2	-	-131.2
Other	-	-	-	-
Support	-	- 23.3	-	- 23.3
Subtotal	+40.9	- 86.0	-0-	- 45.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	- 3.5	-	- 3.5
Engineering	+ 4.6	- 35.6	-	- 31.0
Estimating	-	+ 1.2	-	+ 1.2
Other	-	-	-	-
Support		- 8.2	-	- 8.2
Subtotal	+ 4.6	- 46.1	-0-	- 41.5
Total Changes	+45.5	-132.1	-0-	- 86.6
Current Estimate	152.5	2063.0	-0-	2215.5

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

b. (U) Previous Change Explanations --

(1) (U) RDT&E
Economic: revised escalation indices
Engineering: enhancement to TOW 2 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 PIPs
Estimating: changes in Night Sight Acquisition Strategy
Support: increase in requirement for GSE.

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

	Base-Year	Then-Year
(1) (U) RDT&E		
Engineering: enhancement to TOW 2 warhead	+ 4.6	+ 5.4
(2) Procurement		
Economic: revised escalation indices		+ 4.6
Schedule: compression of missile procurement	- 3.5	- 9.9
Engineering: decrease in funding of approved PIPs	- 35.6	- 47.5
Estimating: changes in Night Sight Acquisition Strategy	+ 1.2	+ 6.4
Support: decrease in requirement for GSE	- 8.2	- 9.3

d. (U) References --

Production Estimate: Production IPR approved by HQDA Message, DAMA-WSM-5, dated 9 Oct 1981.

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

PAUC Initial SAR Estimate	Changes								PAUC (CURRENT ESTIMATE)
	ECON	QTY	SCH	ENGR	EST	SPT	OTHER	TOTAL	
.019	-.001	-0-	+.001	+.002	-.002	-0-	-0-	-0-	.019

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

a. (U) RDT&E - N/A

b. (U) Procurement -

TOW Missiles (FY86/FY87)
Hughes Aircraft Co., Tucson, AZ
DAAH01-86-C-0220, FFP
Award: 7 Aug 86
Definitized: 7 Aug 86

Initial Contract Price		
Target	Ceiling	Qty
$165.4	N/A	23,970 1/

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$313.9	N/A	43,294 2/	$313.9	$313.9 2/

1/ (U) Includes USMC 4125 - SDAF 1200 - FMS 335 (Basic), 3,052 (ITOW), 2,477 (TOW 2) and 548 (Practice) - FY86

2/ (U) Includes USMC 2650 - SDAF 1200 - FMS 1878 (TOW 2A) and 3946 (ITOW and Practice) - FY87

3/ (U) Variances are not reported on Firm Fixed Price contracts

TOW 2 Subsystem (FY87)
Hughes Aircraft Co., El Segundo, CA
DAAH01-86-C-0907, FFP
Award: 29 Sep 87
Definitized: 29 Sep 87

Initial Contract Price		
Target	Ceiling	Qty
$190.1	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

15. (U) Contract Information (Cont)

Night Vision Sets (AN/UAS-12A)
Kollsman Instrument Co., Nashua, NH
DAAH01-84-C-0577, FFP
Award: 21 Sep 84
Definitized: 20 Mar 85

Initial Contract Price

Target	Ceiling	Qty
$ 41.1	N/A	775

Current Contract Price

Target	Ceiling	Qty
$ 41.1	N/A	775

Estimated Price at Completion

Contractor	Program Manager
$ 41.1	$41.1 M

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

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

a. (U) Program Status --

(1) (U) Percent Program Completed: 73.3% (11 yrs/15 yrs)

(2) (U) Percent Program Cost Appropriated: 74.1% ($1773.6/2394.2)

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

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY78-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP	TOTAL
RDT&E	123.0	20.2	-0-	-0-	143.2
Procurement	1650.6	173.2	427.2	-0-	2251.0
MILCON	-	-	-	-	-
TOTAL	1773.6	193.4	427.2	-0-	2394.2

c. (U) Annual Summary -- (Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions.)

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
APPROPRIATION: RDT&E								
1978				8.1			5.3	11.06
1979	113			14.4			10.3	12.61
1980				32.5			25.7	11.42
1981				25.8			22.5	7.58
1982				6.5			6.1	7.60
1983				2.2			2.2	4.90
1984				4.7			4.8	3.80
1985				11.3			11.9	3.40
1986				9.7			10.5	2.90
1987				4.3			4.8	3.10
1988				16.2			18.9	3.50
1989				16.8			20.2	3.50
Subtotal	113			152.5			143.2	

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

c. (U) Annual Summary --

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	1/ Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
APPROPRIATION: PROCUREMENT (MIPA: ACT II & ACT III)								
1981	3875		151.9	151.9			120.6	11.90
1982	10008		207.2	228.2			207.1	14.30
1983	12000		191.2	194.7			192.6	9.00
1984	18000		196.8	217.2			229.6	8.00
1985	12000		184.3	221.6	16.1		243.4	3.40
1986	12000		144.0	171.7	20.9	2/ (16.1)	193.1	2.90
1987	9350		110.8	115.0		(20.9)	134.0	3.10
1988	12000		147.3	156.5			188.9	3.50
1989	12000		130.6	138.9			173.2	3.50
1990	9455		118.2	122.6			157.3	3.30
1991	9929		127.0	129.9			170.9	2.90
1992	5239		73.5	73.5			99.0	2.40
Subtotal	125856		1782.8	1921.7	37.0	(37.0)	2109.7	
APPROPRIATION: OPA								
1981			30.5	30.5			27.8	11.90
1982			33.0	33.0			32.3	7.60
1983			44.1	44.1			45.3	4.90
1984			33.7	33.7			35.9	4.30
Subtotal			141.3	141.3			141.3	
Total	125969		1924.1	2215.5			2394.2	

1/ (U) Mobilization Rolling Stock for Surge Requirement

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

d. (U) Obligations and Expenditures --

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	TOTAL	OBLIGATED	EXPENDED
APPROPRIATION: RDT&E			
1978	5.3	5.3	5.3
1979	10.3	10.3	10.3
1980	25.7	25.7	25.7
1981	22.5	22.5	22.5
1982	6.1	6.1	5.8
1983	2.2	2.2	2.2
1984	4.8	4.8	4.8
1985	11.9	11.9	7.3
1986	10.5	9.8	9.6
1987	4.8	4.8	.5
1988	18.9	14.9	-0-
TO COMPLETE	20.2	N/A	N/A
TOTAL	143.2	98.3	86.3
APPROPRIATION: MIPA			
1981	120.6	120.6	120.6
1982	207.1	207.1	203.5
1983	192.6	146.9	145.8
1984	229.6	211.9	197.4
1985	243.4	217.3	168.4
1986	193.1	172.2	91.4
1987	134.0	91.2	.7
1988	188.9	N/A	N/A
TO COMPLETE	173.2	N/A	N/A
TOTAL	2178.2	1272.1	1061.6
APPROPRIATION: OPA			
1981	27.8	27.8	27.8
1982	32.3	32.3	32.3
1983	45.3	45.3	45.3
1984	35.9	35.9	33.4
TO COMPLETE	-0- 1/	N/A	N/A
TOTAL	141.3	141.3	138.8

1/ (U) Transferred to MIPA effective FY85

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	30,000
1982	N/A	10,008	10,008	30,000
1983	N/A	12,000	12,000	30,000
1984	N/A	18,000	18,000	30,000
1985	N/A	18,000	12,000	30,000
1986	N/A	18,000	24,000 1/	30,000
1987	N/A	15,500	18,700	30,000
1988	N/A	21,029	12,000	30,000
1989	N/A	24,812	12,000	30,000
1990	N/A	-0-	9,450	11,661
1991	N/A	-0-	9,929	
1992	N/A	-0-	5,239	

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	- 86.6	2215.5	+ 71.3	2144.2
	(TY $)	2623.8	-229.6	2394.2	+ 71.9	2322.3
PAUC	(BY $)	0.016	+ 0.002	0.018	+ 0.001	0.017
	(TY $)	0.019	0.0	0.019	+ 0.001	0.018

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)				N/A	
End Date (Mo/Yr)	3/90	N/A		N/A	

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

	To Date
RDT&E	113/113
Procurement	74,600/57,600

18. (U) Operating and Support Costs: N/A

SAR-87-061

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A) 823)
PROGRAM: T45TS

N-37 T45TS

AS OF DATE: December 31, 1987

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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. Office and Telephone Number:

Naval Air Systems Command
PMA-273, Rm. 852, JP-1
Washington, D.C. 20361-1273

Capt. B. C. Marshall, USN
Assigned: June 14, 1985
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 0338
ICN 0348

5. Related Programs: PE 63216N Navy Aircrew Common Ejection Seat (NACES)

UNCLASSIFIED

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. The GOSHAWK is a tandem seat aircraft powered by a single F405-RR-400 (Rolls-Royce Adour Mk 861-49) turbofan engine. The T-45A aircraft is being adapted to provide the capability for carrier catapult and arrested landings. The simulator suite includes both Instrument Flight Trainers (IFT) (device 2F137) and Operational Flight Trainers (OFT) (device 2F138). Academics include textbook materials, classroom aids and a computer-assisted instruction (CAI) (device 4E10) system. The TIS (device 4E9) utilizes existing hardware and 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 (DAC), to initiate a firm-fixed price, incrementally funded contract for development of the system at a total cost of approximately $511.9 million (TY$) over a six year period. Price definitization was subsequently reached in September 1985. After extensive negotiations, contract definitization was reached in May 1986 on a firm-fixed price FSED contract of $511.9 million (TY$) which conforms with the ceiling price established by the Navy. The FSED contract also included three limited production options for the procurement of 60 aircraft with associated ground training systems and logistic support hardware/software in FY 88 through FY 90. The $1,337 million not-to-exceed (NTE) option price contained major contract terms and conditions such as flyaway cost containment, contractor investment in rate tooling, product baseline and expanded warranty protection provisions.

b. Significant Developments Since Last Report — Following a successful Navy Program Decision Meeting (NPDM) in August 1987, the T45TS program was authorized 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 $420.8 million (TY$) which conforms with the $429.6 (TY$M) NTE price established by the Navy. Developmental Test & Evaluation (DT&E) included tests on the drop test article, ejection seat interseat sequencing, main and nose gear drop tests and speed brake tests. OPEVAL is currently scheduled for March 1990. Based on current projections, T45TS is expected to satisfy all mission requirements.

c. Changes Since "As Of" Date — None

8. Decision Coordinating Paper (DCP) Threshold Breaches: None. Update to T45TS NDCP approved by DoN 9 September 1987 and promulgated by OSD on 21 December 1987.

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	(Ch-1)
T-45A First Flight	Jan 88/Dec 87	Mar 88	(Ch-2)
Milestone IIIA Approval Limited Production (ALP) (DAB)	— /Sep 87	Sep 88	(Ch-1)
Milestone IIIB Approval Limited Production (ALP) (DAB)	— /Sep 88	—	(Ch-1)
Milestone IIIC Approval Limited Production (ALP) (DAB)	— /Sep 89	—	(Ch-1)
Complete Navy Technical Evaluation (NTE)	Jan 90/Oct 89	Oct 89	
Complete OPEVAL	Jun 90/Mar 90	Mar 90	
Initial Operational Capability (IOC)	May 91/Sep 90	Sep 90	
Milestone III Authorized Full Production (AFP) (DAB)	— /Oct 90	Oct 90	

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 to the current standard 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).

c. Current Change Explanations —

(Ch-1) Milestone IIIA, as part of Approval for Pilot Production incorporated in FSED, was redefined as Approval for Limited Production (ALP). Milestone IIIB and IIIC deleted. Milestone III redefined as Approval for Full Production.

(Ch-2) Prior approved program date for first flight based on optimistic internal schedule. First flight delayed three months due to slow release of engineering drawings and union work slowdown. Current estimate of first flight date conforms to original contractually required date of 31 March 1988.

d. References —

Planning Estimate: Draft SCP of January, 1984.

Approved Program: DAE Baseline dated 17 Feb 1988; Amended FY 1989 President's Budget; based on NDCP approved by OSD on December 21, 1987.

10. Technical/Operational Characteristics:

	Planning Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical —			
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/ Appr 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	1,000
(3) Speed			
(a) Max Level Flt (Mach)	.80/.85	N/A	.85
(b) Approach (Kts)	115-125/125	N/A	125
(4) Sustained G's @ 15,000 ft.	3.0/3.4	N/A	3.4
(5) Mean Flight Hours Between Failure (MFHBF)	3.2/3.2	N/A	3.2
(6) Direct Maintenance Man Hours per Flight Hour (DMMH/FH)	10.0/10.0	N/A	10.0
(7) Mission Capability (%)	85%/85%	N/A	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 estimated 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.

d. Current Change Explanations —None

e. References —

Planning Estimate: Draft SCP of January, 1984

Approved Program: DAE Baseline dated 17 Feb 1988; Amended FY 1989 President's Budget; based on NDCP approved by OSD on December 21, 1987.

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

a. Cost —	Planning Estimate	Changes	Current Estimate
Development (RDT&E)	$1150.3	-621.5	528.8
Procurement	2604.3	+570.0	3174.3
Airframe/CFE	(1259.1)	(+487.0)	(1746.1)
Engine/Accessories (GFE)	(363.6)	(-363.6)	(0.0)
Electronics (GFE/CFE)	(136.6)	(+27.9)	(164.5)
Change Allowance (ECO)	(42.9)	(+5.7)	(48.6)
Other GFE	(17.7)	(+16.1)	(33.8)
Nonrecurring	(35.4)	(+66.3)	(101.7)
Ancillary Equipment	(0.0)	(+.8)	(.8)
Total Flyaway	(1855.3)	(+240.2)	(2095.5)
Other Wpn Sys Cost	(577.5)	(+271.3)	(848.8)
Initial Spares	(171.5)	(+58.5)	(230.0)
Construction (MILCON)	--	+16.9	16.9
Total FY 84 Base-Year $	3754.6	-34.6	3720.0
Escalation	1707.4	-598.1	1109.3
Development (RDT&E)	(192.6)	(-130.1)	(62.5)
Procurement	(1514.8)	(-472.1)	(1042.7)
Construction (MILCON)	(—)	(+4.1)	(4.1)
Total Then-Year $	5462.0	-632.7	4829.3
b. Quantities —			
Development (RDT&E)	4	-2	2
Procurement	300	—	300
Total	304	-2	302
c. Unit Cost —			
Procurement:			
FY 84 Base-Year $	$8.7	$+1.9	$10.6
Then-Year $	13.7	+.3	14.0
Program:			
FY 84 Base-Year $	12.4	-0.1	12.3
Then-Year $	$18.0	$-2.0	$16.0

d. Approved Design to Cost Goal — N/A

e. Foreign Military Sales — None

f. Nuclear Costs — None

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

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline (Dec 86 SAR)	UCR Baseline Dec 87 SAR
a. Program Acquisition —			
(1) Cost	4829.3	4724.1	4829.3
(2) Quantity	302	302	302
(3) Unit Cost	16.0	15.6	16.0
b. Current Procurement —	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	392.2	392.2	429.4
Less CY Adv Proc	(29.5)	(29.5)	(40.8)
Plus PY Adv Proc	65.1	65.1	29.5
Net Total	427.8	427.8	418.1
(2) Quantity	12	12	24
(3) Unit Cost	35.7	35.7	17.4

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	-22.7	-731.3	-	-754.0
Quantity	-23.8	-	-	-23.8
Schedule	-619.6	+16.0	-	-603.6
Engineering	-11.8	+338.2	-	+326.4
Estimating	+26.7	-79.7	+21.0	-32.0
Other	-	-	-	-
Support	-104.0	+453.1	-	+349.1
Subtotal	-755.2	-3.7	+21.0	-737.9
Current Changes:				
Economic	-1.0	+39.7	+0.2	+38.9
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	+22.6	-	+22.6
Estimating	+0.1	+6.5	-0.2	+6.4
Other	-	-	-	-
Support	+4.5	+32.8	-	+37.3
Subtotal	+3.6	+101.6	-	+105.2
Total Changes	-751.6	+97.9	+21.0	-632.7
Current Estimate	591.3	4217.0	21.0	4829.3

715.1

13. Cost Variance Analysis: (Continued)

(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	+254.3	-	+235.9
Estimating	+23.6	-35.7	+17.0	+4.9
Other	-	-	-	-
Support	-108.6	+305.2	-	+196.6
Subtotal	-625.5	+523.8	+17.0	-84.7
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	+17.8	-	+17.8
Estimating	-	+3.8	-0.1	+3.7
Other	-	-	-	-
Support	+4.0	+24.6	-	+28.6
Subtotal	+4.0	+46.2	-0.1	+50.1
Total Changes	-621.5	+570.0	+16.9	-34.6
Current Estimate	528.8	3174.3	16.9	3720.0

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

13. Cost Variance Analysis: (Continued)

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
Support:	more refined estimate of ILS requirements

c. Current Change Explanations —

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Feb 88 economic escalation rates. (Economic)	N/A	-1.0
Accounting and estimating adjustments to accommodate revised escalation rates and prior year actuals. (Estimating)	—	+.1
Restoral of prior Navy In-House support reductions (Support)	+4.0	+4.5
(2) Procurement		
Revised Feb 88 economic escalation rates. (Economic)	N/A	+39.7
Addition of SAHRS as GFE (Engineering)	+17.8	+22.6
Estimating adjustments based on definitized FY 88 production contract. (Estimating)	+3.8	+6.5
Estimate of ILS requirements for aircraft and ground training systems. (Support)	+24.6	+32.8
(3) MILCON		
Revised Feb 88 economic escalation rates. (Economic)	N/A	+0.2
Revised estimate of system specific MILCON (Estimating)	-0.1	-0.2

d. References —

Planning Estimate: Draft SCP dated January, 1984

14. 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 (Planning Est)	Changes								PAUC (Current) (Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
17.967	-2.367	+.040	-1.999	+1.156	-.085	—	+1.279	-1.976	15.991

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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$511.9	N/A	2	$511.9	$511.9

Cost/Schedule Variances: None/FFP Contract

b. Procurement — (Then-year Dollars in Millions)

T-45 Training System:
Douglas Aircraft Co., Long Beach, CA,
N00019-84-C-0240, FFP
Award: December, 1987

Target	Ceiling	Qty
$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: 56.25% (9 yrs/16 yrs)

(2) Percent Program Cost Appropriated: 19.1% ($922.4/$4832.1)

16. Program Funding Summary: (Cont'd)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY80-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Balance To Complete Beyond FYDP (FY93-95)	TOTAL
RDT&E	455.8	87.8	47.7	-	591.3
Procurement	457.3	429.4	1659.9	1670.4	4217.0
MILCON	9.2	—	11.8	—	21.0
Total	922.3	517.2	1719.4	1670.4	4829.3

c. Annual Summary —

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1980				4.2 1/			4.2	10.6
1981				1.6 1/			1.6	10.6
1982				5.0 1/			5.0	7.6
1983				7.9 1/			7.9	4.9
1984				24.8 1/			24.8	3.8
1985				64.3			67.5	3.4
1986				107.4			116.0	2.8
1987				120.5			134.2 2/	2.7
1988				81.9			94.6	3.7
1989				73.3			87.8	3.8
1990				19.1			23.7	3.6
1991				18.8			24.0	3.3
Subtotal	2			528.8			591.3	

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/ FY 87 Appropriation Conference language permitted reprogramming back to President's Budget level if deemed absolutely necessary. Navy complied with the action and reprogrammed $5.0 million accordingly.

16. Program Funding Summary (Cont'd):

Appropriation: Procurement

1987				54.2	65.1		65.1	2.7
1988	12	40.1	174.0	325.6	29.5	65.1	392.2	3.7
1989	24	16.4	207.0	344.9	40.8	29.5	429.4	3.8
1990	24	14.6	182.2	341.9	48.3	40.8	438.3	3.6
1991	48	7.7	304.9	452.8	46.7	48.3	595.1	3.3
1992	48	5.7	290.2	465.7	48.7	46.7	626.5	2.8
1993	48	6.3	282.2	452.7	49.4	48.7	623.0	2.3
1994	48	5.5	277.9	394.3	51.7	49.4	555.3	2.3
1995	48	5.3	274.0	342.2		51.7	492.1	2.3
Subtotal	300	101.6	1992.4	3174.3	380.2	380.2	4217.0	

Appropriation: MILCON

1988				7.7			9.2	3.7
1989				—			—	3.8
1990				6.1			7.8	3.6
1991				3.1			4.0	3.3
1992				—			—	2.8
Subtotal				16.9			21.0	
Total	302			3720.0			4829.3	

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1980	4.2	4.2	4.2
1981	1.6	1.6	1.6
1982	5.0	5.0	5.0
1983	7.9	7.9	7.9
1984	24.8	24.8	23.5
1985	67.5	67.5	66.3
1986	116.0	116.0	111.9
1987	134.2	134.2	116.5
To Complete	230.1	N/A	N/A
Total	591.3	361.2	336.9
Appropriation: APN			
1987	65.1	65.1	31.9
To Complete	4151.9	N/A	N/A
TOTAL	4217.0	65.1	31.9

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	4	4	24
1989	8	8	8	24
1990	8	8	8	24
1991	16	16	16	48
1992	16	16	16	48
1993	16	16	16	48
1994	16	16	16	48
1995	16	16	16	48

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	3720.0	N/A	N/A
(TY $)	N/A	N/A	4829.3	N/A	N/A
PAUC (BY $)	N/A	N/A	12.3	N/A	N/A
(TY $)	N/A	N/A	16.0	N/A	N/A

c. Schedule Variance —

	Production Estimate	Variance (CE vs PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	12/87	N/A	N/A
Duration (in Months)	N/A	N/A	118	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	9/97	N/A	N/A

d. Deliveries (Plan/Actual) —

	To Date
RDT&E	0/0
Procurement	0/0

18. Operating and Support Costs: N/A

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

Program: ASAS/ENSCE

A-3 ASAS/ENSCE

AS OF DATE: 31 Dec 1987

87-024

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1. (U) Designation/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
Management Office (JTFPMO)
1500 Planning Research Drive
McLean, Virginia 22102-5099

PM: BG William E. Harmon
Assigned: 26 November 1984
Commercial: (703) 556-2930

4. (U) Program Elements/Procurement Line Items:
RDTE: PE 64321 PROJ D926 (Shared Funding)
PE 64321F (Air Force) (Shared Funding)
PROCUREMENT: SSN K28800 APPN 2035
AF 3080 -Cost Element 1683790 (Communications Electronics Spares)
-Cost Element 1683xxx (Electronic and Telecommunications Equipment)

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OASD(PA) DFOISR 88-F-0791

5. (U) Related Programs: Army PE 63745 (Tactical ESM Systems), and Army PE 35885G (Tactical Cryptologic Program). Extensive coordination is conducted with other services and with national intelligence agencies to ensure that duplication of effort is avoided.

6. (U) Mission and Description:

(b)(1)

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 MMI as the primary user interface to the system, which gave increased flexibility to the ASAS/ENSCE system. System Readiness and Vertification Test (SRVT) for the ASAS/ENSCE intelligence data processing module and the forward sensor interface data relay module was successfully completed in October, 1986. These modules were delivered to III Corps/2nd Armored Division, Ft Hood, TX in October, 1986. Field Trials for these modules were conducted during November and December 1986. The Army Materiel 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 the Assistant Secretary of the Army (Research, Development and Acquisition) approving a directed procurement 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).

b. (U) Significant Developments Since Last Report -- A competitive procurement contract was let in March, 1987 for production of LCC'S with a Type Classification of Limited Procurement, Urgent (LPU). In April 1987 Congress was notified of the results of the Nov/Dec 1986 Field Trials. 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. Program Funding and quantities reflect the FY88/89 President's budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions.

c. ASAS/ENSCE is expected to satisfy mission requirements.

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

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: None.

9. (U) Schedule:

a. (U) Milestones --	Dev Estimate/ Approved Program	Current Estimate	
ASAS Acquisition Strategy	Nov82/Nov82	Nov 82	
OSD/Congressional Approval of Acquisition Strategy	Feb83/Feb83	Feb 83	
Implementing Contractor Award	Mar83/Mar83	Mar 83	
Functional Capabilities Document Complete	Dec83/Dec83	Dec 83	
Preliminary Design Review (Architecture)	Feb84/Feb84	Feb 84	
Joint Oversight Group (ASARC Authority)	Mar84/Mar84	Mar 84	
Request for Proposals	May84/May84	May 84	
JTFP Letter of Instruction	Jul84/Jul84	Jul 84	
Award Baseline System Contracts (Development)	Dec84/Dec84	Dec 84	
Preliminary Design Review (Development)	Nov85/Nov85	Nov 85	
ABB Testing	Aug85/Aug85	Aug 85	
AIM/FSIC Testing*	Jul86/Jul86	Jul 86	
IDP/CPI Testing	Nov87/TBD	TBD	(Ch-1)
Software Release 1	Nov87/Jan89	Jan 89	(Ch-2)
Software Release 2	Sep88/Dec90	Dec 90	(Ch-2)
Software Release 3	Nov88/Feb91	Feb 91	(Ch-2)

*Field Trials

b. (U) Current Change Explanation --

(Ch-1) Milestone no longer valid; development and procurement of these modules deferred until Block Upgrade timeframe due to budget constraints as a result of Congressional reductions.

(Ch-2) SAR submission "As of 31 Dec 86" stated that software release dates would change upon approval of "Plan G". On 2 Nov 87, JOG approved "Plan G" with software release dates as stated above.

c. (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: FY88/89 Amended President's Budget

10. (U) Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonst Perform	Current Estimate
a. TECHNICAL/OPERATIONAL			
(b)(1)			

b. (U) Previous/Current Change Explanations - None

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

	Development Estimate*	Changes	Current Estimate
a. (U) Cost -			
Development (RDTE)	998.8	+.2	999.0
Procurement	771.0	+48.3	819.3
Construction (MILCON)	0.0	0.0	0.0
Total FY86 Base-Year $	1769.8	+48.5	1818.3
(U) Escalation --	240.1	+25.6	265.7
Development (RDTE)	(+79.9)	(+2.2)	(+82.1)
Procurement	(+160.2)	(+23.4)	(+183.6)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	2009.9	+74.1	2084.0

*Development estimate reflects change from BY84 to BY86.

b. (U) Quantities -- TBD

c. (U) Unit Cost --TBD

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

	(Average Unit Flyaway Cost) Dev Estimate/ Appr Program	Current Estimate	Latest Appr Threshold
o Qty: TBD			
o Peak Rate: TBD			
o FY86 Base-Year $	TBD	TBD	TBD
Then-Year $	TBD	TBD	TBD
o Qty: TBD			
o Peak Rate: TBD			
FY86 Base-Year $	TBD	TBD	TBD
Then-Year $	TBD	TBD	TBD

e. (U) Foreign Military Sales - None

f. (U) Nuclear Costs --None

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

		Current Year		Budget Year
		Current Est (Dec 87 SAR)	UCR Baseline (Dec86 SAR)	UCR Baseline (Dec87 SAR)
a.	Program Acquisition --			
	(1) Cost	2084.0	2009.9	2084.0
	(2) Quantity	TBD	TBD	TBD
	(3) Unit Cost	TBD	TBD	TBD
b.	Current Procurement --	(FY 1988)	(FY 1988 APPN)	(FY 1989)
	(1) Cost			
	Less CY Adv Proc	38.2	38.2	30.3
	Plus PY Adv Proc	-0-	-0-	-0-
	Net Total	38.2	38.2	30.3
	(2) Quantity	TBD	TBD	TBD
	(3) Unit Cost	TBD	TBD	TBD

13. Cost Variance Analysis:

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

	RDTE	PROCUREMENT	MILCON	TOTAL
Development Est	1078.7	931.2	0.0	2009.9
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
SUBTOTAL	0.0	0.0	0.0	0.0
Current Changes:				
Economic	+1.9	+10.5		+12.4
Quantity				
Schedule				
Engineering				
Estimating	+ .5	+61.2	0	+61.7
Other				
Support				
SUBTOTAL	+2.4	+71.7	0	+74.1
Total Changes	+2.4	+71.7	0.0	+74.1
Current Estimate	1081.1	1002.9	0.0	2084.0

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13. Cost Variance Analysis: (Cont'd)

(U) Summary -- FY86 Constant Dollars (Base-Year) in Millions

	RDTE	PROC	MILCON	TOTAL
Development Est	998.8	771.0	0.0	1769.8
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
SUBTOTAL	0.0	0.0	0.0	0.0
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	+0.2	+48.3	0.0	+48.5
Other				
Support				
SUBTOTAL	+0.2	+48.3	0.0	+48.5
Total Changes	+0.2	+48.3	0.0	+48.5
Current Estimate	990.0	819.3		1818.3

*Development estimate reflects change from BY84 to BY86.

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c. Current Change Explanations --

(1) (U) RDTE	(Dollars in Millions) Base Year	Then Yr
Revised Feb 88 escalation rates. (Economic)	N/A	+1.9
Revised program estimate - Dollar amounts now reflect FY89 Amended Budget Submission. (Estimating)	+0.2	+0.5

(2) (U) Procurement	(Dollars in Millions) Base Year	Then Yr
Revised Feb 88 escalation rates. (Economic)	N/A	+10.5
Revised program estimate - Dollar amounts now reflect FY89 Amended Budget Submission. (Estimating)	+48.3	+61.2

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	TBD

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

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

a. (U) RDTE -- The National Science Foundation has listed JPL as a Federally Funded Research & Development Center (FFRDC) under the cognizance of the National Aeronautics and Space Administration. JPL is the prime integrator for the ASAS/ENSCE. 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 this phase), acceptance testing, conduct of government reviews and associated contract management of industrial contractors. Although JPL is the prime

Initial Contract Price		
Target	Ceiling	Qty
TBD	TBD	TBD

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

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) (U) Percent Program Completed: 60% (Year 6 of 10)

(2) (U) Percent Program Cost Appropriated: 47.1% ($981.1M/$2084.0M)

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

(b)(1)

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

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

(b)(1)

Army/Air Force

(b)(1)

NOTE: Individual columns may not total due to rounding.

(b)(1)

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

d. (U) Obligations and Expenditures --

Appropriation: RDTE

(b)(1)

17. (U) Production Rate Data: None

18. (U) Operating and Support Costs: N/A

~~CONFIDENTIAL~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823) 87-036
PROGRAM: MLRS TGW

AS OF DATE: December 31, 1987

A-17 MLRS TGW

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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:

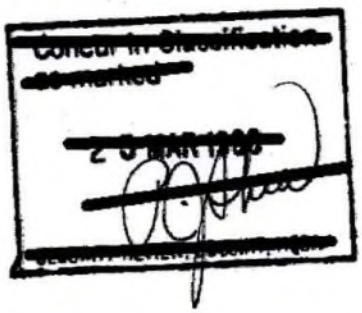
MLRS Project Office
Program Management Division
Redstone Arsenal, AL 35898-5700

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

4. (U) Program Elements:

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:

a. (U) The concept of a TGW for the MLRS envisions the attack of armored targets from above using highly accurate and lethal submunitions dispensed from an MLRS rocket. There is an urgent need for an autonomous, terminal homing, indirect fire-and-forget capability to defeat hard point targets such as armored vehicles and equipment before they are committed into the central battle, therefore reducing their presentation rate. The TGW for the MLRS will contain multiple submunitions packaged within the rocket warhead section. The TGW consists of a dispenser and three terminally guided submunitions (TGSM's). The primary mission of the MLRS TGW is to provide rapid fire, nonnuclear capability to destroy a wide spectrum of stationary and moving, medium hard to very hard, armored targets. The Army intends to develop this warhead in cooperation with the Republic of France (FR), the Federal Republic of Germany (GE), and the United Kingdom (UK) under a Memorandum of Understanding (MOU) dated 3 December 1983.

b. (U) This system is intended to supplement cannon and rocket artillery rather than replace equipment and/or munitions in the current inventory. The TGW will be fully integrated into the existing MLRS and be compatible with the components of the system as required in the specification for the rocket, rocket pod/container, AT2 fuze, 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.

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 17½ 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) Development of TGW brassboards and manufacture of CDS prototype hardware are continuing to support the captive flight test series. The first series of captive flight tests were conducted from May through August 1987 in Europe using the brassboard 1H (BB1H).

(2) (U) Preliminary analysis of BB1H captive flight test data indicates the current detection algorithm will provide performance that will meet the specification for the future Soviet tank in all but the most severe clutter environments. High probabilities of acquisition for targets with low radar cross section are predicted by these data. Other improvements in radar signal processing and radar hardware have been identified that would enable even the most severe requirements to be met. These techniques will be tested and analyzed during the remainder of CDS.

(3) (U) Projected completion date for the current CDS program is now February 1989. The contractor has experienced prototype hardware build problems and increased span time required to integrate the hardware into a TGSM. Contractor performance in this area has shown improvement during first quarter FY88.

(4) (U) Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions.

(5) (U) The MLRS TGW is expected to satisfy the mission requirement.

c. (U) Changes Since "as of" Date --- None.

8. (U) System Concept Paper (SCP) Threshold Breaches:

(U) There are currently no SCP (dated July 1984) or Secretary of Defense Memorandum (dated 14 November 1984) threshold breaches.

9. (U) Schedule:

a. [redacted] Milestones --	Planning Estimate/ Approved Program	Current Estimate
Milestone I (ASARC)	Aug 84/Aug 84	Aug 84
Milestone I (DSARC)	Sep 84/Sep 84	Sep 84
Award Validation Phase Contracts	Nov 84/Nov 84	Nov 84
Captive Flight Tests Initiated	Dec 85/May 87	May 87 (CH-1)
Milestone II (ASARC)	Feb 87/N/A	N/A (CH-2)
ASARC Review (CDS/SDS Transition)	N/A/Nov 88	Nov 88 (CH-2)
Milestone II (DAB)	Mar 87/N/A	N/A (CH-2)
DAB Review (CDS/SDS Transition)	N/A/Jan 89	Jan 89 (CH-2)
Advance Development Flights Completed	Apr 89/Jan 92	Jan 92 (CH-3)
Milestone III (ASARC)	Mar 89/N/A	N/A (CH-2)
Milestone II/III (ASARC)	N/A/Nov 91	Nov 91 (CH-2)
Milestone III (JRMB)	Apr 89/N/A	N/A (CH-2)
Milestone II/III (DAB)	N/A/Jan 92	Jan 92 (CH-2)
Maturation Contract Award	Jun 89/Feb 92	Feb 92 (CH-3)
Low Rate Production Contr Awd	Jun 89/Feb 92	Feb 92 (CH-3)
MDT Flight Test Completed	Nov 90/Aug 93	Aug 93 (CH-3)
Initial Delivery (Rocket)	Oct 90/Aug 93	Aug 93 (CH-3)
Production Qualification Testing		
Start	Dec 90/Aug 93	Aug 93 (CH-3)
Complete	Aug 91/May 94	May 94 (CH-3)
Full-Scale Production Contract Award	Sep 91/Jun 94	Jun 94 (CH-3)

(b)(1) [redacted]

b. (U) Previous Change Explanations -- Initial milestone dates established per ASARC/DSARC I. These milestones were "TBD" in initial SAR (September 1984). 17½-month delay in completion of the CDS due to the difficulty and precision of work at the component design and fabrication level.

c. (U) Current Change Explanations --

(CH-1): Delay in start of captive flight test from February 1987 to May 1987 due to hardware and instrumentation problems.

(CH-2): Previously reported as Milestone II and Milestone III. Dates changed to reflect revised acquisition schedule.

(CH-3): Program milestones reflect a 5-month delay in the completion of the CDS (from September 1988 to February 1989) due to technical and manufacturing problems associated with prototype hardware.

d. (U) References --

Planning Estimate: SCP for MLRS TGW, July 1984.

Approved Program: FY 1988-1989 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions.

10. (U) Technical/Operational Characteristics: 1/

	Plng Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. (U) Technical --			
(U) Effectiveness	TBD/TBD		TBD
(U) Range (km)	TBD/TBD		TBD
Maximum	TBD/TBD		TBD
Minimum	TBD/TBD		TBD
b. (U) Operational --			
Reliability	TBD/TBD		TBD
Rocket	TBD/TBD		TBD
TGSM	TBD/TBD		TBD
Availability	TBD/TBD		TBD

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations -- None

e. (U) References --

Planning Estimate: See Note 1/.

Approved Program: See Note 1/.

1/ Deferral of action to approve MLRS TGW goals and thresholds has been requested by HQDA pending completion of the CDS. A system Required Operational Capability will be established just prior to the end of CDS and presented at the next milestone (CDS/SDS Transition Milestone).

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars) 1/

	Planning Estimate	Changes	Current Estimate
a. (U) Cost --			
Development (RDT&E) 2/	190.7	+75.1	265.8
Procurement	TBD		TBD
Flyaway	(-)	(-)	(-)
Peculiar Support Equip	(-)	(-)	(-)
Other Weapon Sys Cost	(-)	(-)	(-)
Initial Spares	(-)	(-)	(-)
Construction (MILCON)	TBD		TBD
Total FY84 Base Year $	190.7	+75.1	265.8
Escalation	20.5	+28.3	48.8
Development (RDT&E)	(20.5)	(+28.3)	(48.8)
Procurement			
Construction (MILCON)			
Total Then-Year $	211.2	+103.4	314.6

b. (U) Quantities -- N/A

c. (U) Unit Cost -- N/A

d. (U) Approved Design to Cost Goal -- (Design to cost goals have not been established)

e. (U) Foreign Military Sales -- None

f. (U) Nuclear Costs -- None

1/ The program acquisition cost shown reflects only the U.S. share of MLRS TGW.

2/ Total international development program cost is $810.0M (FY84 dollars). Total U.S. share of the TGW development program is $354.8M (FY84 dollars) which is 40 percent of the international program cost plus other U.S. national tasks. The U.S. share of the total TGW development program in escalated dollars is $432.8M. The SAR total of $314.6M reflects the President's Budget through FY93.

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

NOTE: In accordance with Title 10, U. S. Code 2433, unit cost reporting shall not apply to reports that are limited to the development (RDTE) 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	-12.0			-12.0
Quantity				
Schedule	+22.3			+22.3
Engineering	+ 1.5			+ 1.5
Estimating	+91.6			+91.6
Other				
Support				
Subtotal	+103.4	0.0	0.0	+103.4
Current Changes:				
Economic	+1.0			+ 1.0
Quantity				
Schedule				
Engineering				
Estimating	-1.0			- 1.0
Other				
Support				
Subtotal	0.0	0.0	0.0	0.0
Total Changes	+103.4	0.0	0.0	+103.4
Current Estimate	314.6	TBD	TBD	314.6

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	+61.3			+61.3
Other				
Support				
Subtotal	+76.9	0.0	0.0	+76.9
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	- 1.8			- 1.8
Other				
Support				
Subtotal	- 1.8	0.0	0.0	- 1.8
Total Changes	+75.1	0.0	0.0	+75.1
Current Estimate	265.8	TBD	TBD	265.8

b. (U) Previous Change Explanations --

RDT&E

Economic: Revised escalation indices through December 1986.

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. 14½-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 bulk storage memory.

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

Procurement

Economic: Revised escalation indices through December 1986.

Schedule: Start of low-rate production rescheduled (recategorized to estimating).

Estimating: Correction to move dollars from schedule to estimating category.

MILCON

Economic: Revised escalation indices through December 1986.

Schedule: Reschedule of MCA requirement.

Estimating: Adjustment of base program to compensate for escalation adjustments not taken.

c. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
February 1988 economic escalation rates (ECONOMIC)	N/A	+1.0
Prior year budget decrease (ESTIMATING)	-1.8	-1.0

(2) Procurement - N/A

(3) MILCON - N/A

d. (U) References --

Planning Estimate: FY 1985 President's Budget.

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
$186.7	N/A	N/A	(b)(1)

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -0.4	$ -2.4
Cumulative Variances To Date (10/31/87)	-2.6	-7.2
Net Change	$ -2.2	$ -4.8

Explanation of Change: Variances are due to technical and manufacturing problems associated with prototype hardware. Contractor's estimate is based on completion of CDS in October 1988. The PM's estimate is based on completion of CDS in February 1989 and reflects the Governments 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: 64.3% (9 years/14 years)
(2) (U) Percent Program Cost Appropriated: 43.1% ($135.5/$314.6)

b. (U) Appropriation Summary --

Appropriation	Current + Prior Yrs (FY80-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-93)	Balance to Complete Beyond FYDP (FY94-02)	TOTAL
RDT&E	135.5	36.2	142.9	0	314.6
TOTAL	135.5	36.2	142.9	0	314.6

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

c. (U) Annual Summary 1/ --

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
	Rkt	Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1980				0.6			0.5	10.6
1981				0.3			0.3	10.6
1982				1.1			1.0	7.6
1983				2.4			2.4	4.9
1984				15.2			15.5	3.8
1985				23.1			24.4	3.4
1986				25.1			27.3	2.8
1987				35.8			40.1	2.7
1988				20.7			24.0	3.7
1989				30.1			36.2	3.8
1990				33.2			41.3	3.6
1991				39.2			50.2	3.3
1992				33.4			43.9	2.8
1993				5.6			7.5	2.3
Total				265.8			314.6	-

1/ Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional direction and FY89 amended budget decisions.

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1980	0.5	0.5	0.5
1981	0.3	0.3	0.3
1982	1.0	1.0	1.0
1983	2.4	2.3	2.3
1984	15.5	15.4	15.4
1985	24.4	24.4	24.0
1986	27.3	27.1	25.4
1987	40.1	39.3	23.6
1988	24.0	0.4	0.1
To complete	179.1	0	0
Total	314.6	110.7	92.6

17. (U) Production Rate Data:

a. (U) Annual Production Rates -- N/A

18. (U) Operating and Support Costs: N/A

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
RDT&E-ONLY SAR

87-033

PROGRAM: LIGHT HELICOPTER EXPERIMENTAL (LHX)

A-14 LHX

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name): Light Helicopter Experimental (LHX)

2. DoD Component: U.S. Army

3. Responsible Office and Telephone Number:

LHX Program Manager's Office
U.S. Army Aviation Systems Command
(AVSCOM)
St. Louis, MO 63120-1798

Major General Ronald K. Andreson
Assigned: August 1984
AUTOVON 693-1800
Commercial (314) 263-1800

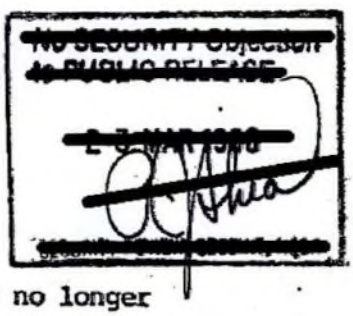
4. Program Elements/Procurement Line Items:

RDT&E: PE 63220 Project D325
PE 64216 Project DC72 1/
PE 64810 Project D327 (Shared Funding - FY 1988 only)
(RDT&E-only SAR)

PROCUREMENT: TBD

MILCON: TBD

1/ Previous SAR identified DC72 as a shared funding PE. This no longer applies.



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OASD(PA) DFOISR 88-T-0779

5. Related Programs: Air-to-Air Stinger Missile System; Anti-tank Missile System; Army Aviation Modernization Program including AH-64 and UH-60.

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 effectiveness and battlefield survivability to defeat the threat of the mid-1990's and will 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; location/navigation accuracy; inability to self deploy to overseas theaters of operations; inadequate reliability, performance, survivability, and high cost of ownership compared to existing aircraft. LHX improvements will include lightweight composite airframe structures; current technology target acquisition and night vision sensors and tri-service architecture that is compatible with the Navy Advanced Tactical Aircraft (ATA) and Air Force Advanced Tactical Fighter (ATF)systems that can incorporate the Integrated Communication/Navigation/ Identification Avionics (ICNIA) modules and Integrated Electronic Warfare System (INEWS) modules; and built-in diagnostics/prognostics. LHX will be integrated into the force structure to complement the heavy AH-64 attack and UH-60 utility helicopters.

7. Program Highlights:

a. Significant Historical Developments — Following the 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).

b. Significant Developments Since Last Report — 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 a continuing DAB not later than 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 initiated. The independent assessments were performed by the RAND Corporation and the Institute for Defense Analyses (IDA) from June to November 1987. Both study teams recommended a new development conventional helicopter as the most cost and operationally effective airframe alternative for the LHX.

7. Program Highlights (Cont'd):

Program funding and quantities reflect the FY 1988/1989 Amended President's Budget, except as adjusted for FY 1988 Congressional direction and FY 1989 amended budget submissions.

Developmental Test/Operational Test (DT/OT) schedules are TBD based on definition of new refocused Program.

c. Changes Since "As Of Date" -- The Army approved LHX program that was briefed to the OSD Conventional System Committee on 7 December 1987 was changed as a result of the 7 January 1988, Aviation Modernization DAB. An Acquisition Decision Memorandum (ADM) dated 20 January 1988 was issued that directed the LHX be refocused to develop a light weight, low cost helicopter for the light attack/armed reconnaissance mission to replace the aging AH-1, OH-58, and OH-6 fleets.

8. Decision Coordinating Paper (DCP) Threshold Breaches: SDDM dated 19 May 1987 resulting from the 23 April 1987 LHX DAB I and ADM dated 20 January 1988 resulting from the 7 January 1988 Aviation Modernization DAB contained no thresholds.

9. Schedule:

a. Milestones --

	Plan Estimate/ Approved Program	Current Estimate	
T800 Engine FSD Contract Awards	Jul 85/Jul 85	Jul 85	
Milestone I (ASARC I)	Feb 87/Apr 88	Apr 88	(Ch-1)
(DAB I)	Mar 87/Apr 88	Apr 88	(Ch-1)
Milestone II (ASARC II)	Feb 87/Dec 90	Dec 90	(Ch-1)
(DAB II)	Mar 87/Dec 90	Dec 90	(Ch-1)
Issue RFP for Air Vehicle	Mar 87/May 88	May 88	(Ch-1)
Contract Awards for Air Vehicle (Phase I) 1/	Oct 87/Oct 88	Oct 88	(Ch-1)
T800 Engine Source Selection (FSD Down Selection)	Sep 88/Oct 88	Oct 88	(Ch-1)
Contract Award for Air Vehicle (Phase II) 2/	Jul 89/Dec 90	Dec 90	(Ch-1)
First Flight (FSD Hardware)	Sep 91/May 93	May 93	(Ch-1)
T800 Engine Production Contract Award	Jan 93/Dec 92	Dec 92	(Ch-1)
DT/EUTE Completed	Nov 93/TBD	TBD	(Ch-1)
Milestone III A (LRIP)	Jan 94/Dec 93	Dec 93	(Ch-1)
Air Vehicle Production Contract Award	Jan 94/Dec 93	Dec 93	(Ch-1)
First Air Vehicle Production Delivery	Jul 95/Jun 95	Jun 95	(Ch-1)
Milestone III (ASARC/DAB III)	Jan 94/Nov 95	Nov 95	(Ch-1)
FUE/IOC	May 96/Dec 95	Dec 95	(Ch-1)

9. Schedule (Cont'd):

b. Previous Change Explanations —

All milestones were revised from the AMC approved Acquisition Strategy (16 December 1985) to reflect a current 1995 IOC Acquisition Strategy as briefed to the Chief of Staff of the Army on 10 November 1986.

c. Current Change Explanations --

(Ch-1) All milestones were revised from the Acquisition Strategy as briefed to the Chief of Staff of the Army on 10 November 1986 to reflect the refocused LHX program as briefed to the Defense Acquisition Executive (DAE) by the Under Secretary of the Army (USA) on 19 February 1988.

d. References --

Planning Estimate: AMC Approved Acquisition Strategy (16 December 1985).

Approved Program: FY 1988/1989 Amended President's Budget and supporting documentation as contained in the RDT&E descriptive summary.

Footnotes

1/ Phase I is replaced in the current program with a competitive demonstration effort.

2/ Phase II is replaced in the current program with a full scale development effort.

10. Technical/Operational Characteristics:

a. Technical —	Plan Estimate/ Appr Program	Demonstrated Performance	Current Estimate
SCAT Primary Mission Gross Weight (PMGW) (lbs):	8,500/N/A		N/A (Ch-1)
Flight Performance (Primary Mission):			
SCAT Vertical Rate of Climb (VROC) feet per minute (FPM) 4000'/95°F. at structural design gross weight (Armed Reconnaissance Mission)	500/500		500
Cruise Speed at PMGW, 4,000'/ 95°F. (Max Continuous)			

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

a. Technical (Continued)--	Plan Estimate/ Appr Program	Demonstrated Performance	Current Estimate
Power):			
(a) SCAT (knots):	170/170		170
(b) UTAS (knots):	160/N/A		N/A (Ch-2)
Reliability			
Mean Time Between Essential Maintenance Action (MTBEMA) (hours)	4.5/4.5		4.5
Mean Time Between Mission Affecting Failure (MTBMAF) (hours)	8.4/8.5		8.5 (Ch-3)
Operational Availability (Peacetime)	.86/.86		.86
Maintainability			
Mean Time to Repair (MTTR) (hours)	1/.86		.86 (Ch-3)
Maintenance Manhours per Flight Hour (MMH/FH)	2.8/2.6		2.6

b. Operational --	Plan Estimate/ Appr Program	Demonstrated Performance	Current Estimate
Payload (Primary Mission)			
SCAT (Expendable Ordnance)			
HELLFIRE Missiles:	4/8		8 (Ch-4)
STINGER Missiles:	2/4		4 (Ch-4)
Gun Ammo, 500 rds.	TBD/500		500 (Ch-4)
UTAS (Ordnance/Troops)			
STINGER Missiles:	2/N/A		N/A (Ch-2)
Troops:	6/N/A		N/A (Ch-2)
Air Transportability in C-141B (No. of Aircraft/Hours Load-Unload):			
SCAT	4/1.5/3/1.5		3/1.5
UTAS	3/1.5/N/A		N/A (Ch-2)
Self-Deployable (NM):	1260/1260		1260

c. Previous Change Explanations --

PMGW increased from 8,500 to 9,500 lbs. to reflect revised weight estimates.

MTTR revised from 1.0 to 0.7 hours to reflect results of Reliability, Availability, and Maintainability (RAM) data analysis.

MMH/FH revised from 2.8 to 2.6 hours to reflect results of Reliability, Availability, and Maintainability (RAM) data analysis.

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

PMGW weapon load increased from 4 to 6 missiles to reflect emerging results of LHX Cost and Operational Effectiveness Analysis (COEA).

Number of aircraft loaded per hour decreased from 4/1.5 to 3/1.5 (SCAT) and 3/1.5 to 2/1.5 (UTAS) to reflect increase in size of aircraft.

d. Current Change Explanations --

(Ch-1) In accordance with the refocused program, empty weight is being tracked in lieu of PMGW. The current estimate of empty weight is 7500 lbs.

(Ch-2) UTAS design excluded from refocused program.

(Ch-3) MTBMAF and MTTR revised to reflect changes in Reliability, Availability, and Maintainability (RAM) rationale report.

(Ch-4) Basic configuration weapon load modified to reflect full weapons capacity of LHX.

e. References --

Planning Estimate: Letter of Agreement approved by DA, 19 August 1985. Draft Required Operational Capability (ROC) document dated 11 March 1985.

Approved Program: FY 1988/1989 Amended President's Budget and supporting documentation.

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

a. Cost --

	Planning Estimate	Changes	Current Estimate
Development (RDT&E)	1756.2	+ 620.7	2376.9
Procurement	TBD	------	TBD
Air Vehicle	TBD	------	TBD
Engine	TBD	------	TBD
Initial Spares	TBD	------	TBD
Construction (MILCON)	TBD	------	TBD
Total FY 84 Base-Year $	1756.2	+ 620.7	2376.9
Escalation	376.8	+ 200.3	577.1
Development (RDT&E)	(376.8)	(+ 200.3)	(+577.1)
Procurement	(-0-)	(-0-)	(-0-)
Construction (MILCON)	(-0-)	(-0-)	(-0-)
Total Then-Year $	2133.0	+ 821.0	2954.0

11. Program Acquisition Cost (Cont'd):

b. Quantities — N/A

c. Unit Cost -- TBD

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- TBD

f. Nuclear Costs -- N/A

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 (RDTE) program.

13. Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	2133.0	-	-	2133.0
Previous Changes:				
Economic	- 24.0	-	-	- 24.0
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	1533.3	-	-	1533.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	1509.3	-	-	1509.3
Current Changes:				
Economic	7.0	-	-	7.0
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 695.3	-	-	- 695.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	- 688.3	-	-	- 688.3
Total Changes:	821.0	-	-	821.0
Current Estimate:	2954.0	-	-	2954.0

13. Cost Variance Analysis (Cont'd):

(FY 1984 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1756.2	----	----	1756.2
Previous Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	1215.3	-	-	1215.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	1215.3	-	-	1215.3
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 594.6	-	-	- 594.6
Other	-	-	-	-
Support	-	-	-	-
Subtotal	- 594.6	-	-	- 594.6
Total Changes	620.7	-	-	620.7
Current Estimate	2376.9	-	-	2376.9

b. Previous Change Explanations --

RDT&E

Economic: Revised December 1986 economic escalation rates (-$24.0M).

Estimating: Acquisition Strategy revised to include competition throughout development, culminating in full prototype fly-off prior to production decision.

Addition of funds for contractor tooling.

FY 1988/1989 Amended President's Budget adds 1 year to program funding.

c. Current Change Explanations --

	Dollars in Millions Base-Year	Then-Year
(1) RDT&E		
Revised February 1988 economic escalation rates (Economic)	N/A	+ 7.0
Acquisition Strategy revised to decrease competitive development time, eliminate prototype fly-off and exclude assault/ utility design.	- 594.6	- 695.3

13. Cost Variance Analysis (Cont'd):

(2) Procurement - N/A

(3) MILCON - N/A

d. References --

Planning Estimate: AMC approved Acquisition Strategy (16 December 1985).

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	Initial Contract Price Target	Ceiling	Quantity
Lycoming/Pratt & Whitney Lycoming, Stratford, CT P&W, West Palm Beach, PL	240.0 1/	TBD 2/	72 5/

DAAJ09-85-C-B019
Award: July 19, 1985
Definitized: July 19, 1985 (Date of contract award)
Type: FFP with CPIF option

Current Contract Price			Estimated Price at Completion 6/	
Target	Ceiling	Quantity	Contractor	Program Manager
240.1 3/	TBD	72		

Previous Cumulative Variances	Cost Variance	Schedule Variance
N/A	N/A	N/A

b. RDT&E --

Engine	Initial Contract Price Target	Ceiling	Quantity
LHTEC Allison Garrett Turbine Division, Indianapolis, IN Garrett Turbine Engine Co., Phoenix, AZ	264.0 4/	TBD 2/	72

DAAJ09-85-C-B017
Award: July 19, 1985
Definitized: July 19, 1985 (Date of contract award)
Type: FFP with CPIF option

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

Current Contract Price			Estimated Price at Completion 6/	
Target	Ceiling	Quantity	Contractor	Program Manager
264.1 3/	TBD	72		

Previous Cumulative Variances	Cost Variance	Schedule Variance
N/A	N/A	N/A

Footnotes:

1/ Target price includes:

Basic Contract (FFP)	209.6
Options (FFP)	6.6
A/V Support (CPIF)	23.8
	240.0

2/ Ceiling price to be negotiated for CPIF option.

3/ Contract modifications in the amount of $0.1M were awarded 30 September 1986 to the basic contract for air vehicle system/engine interface documentation and technical effort.

4/ Target price includes:

Basic Contract (FFP)	212.3
Options (FFP)	11.8
A/V Support (CPIF)	39.9
	264.0

5/ Only the winning contractor team will produce deliverable engines. Changes to quantities of engines will be determined and negotiated during down select and after the LHX strategy has been definitized.

6/ Estimated price at completion for the contractors and the PM is competition sensitive. Following down selection of the winning contractor team, data will be available for release.

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

a. Program Status —

(1) Percent Program Completed: (5 yrs./TBD)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: (448.6/TBD)
(Funds Appropriated to Date in Millions/Total Program Funding in Millions)

16. Program Funding Summary (Cont'd):

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current $ Prior Yrs. (FY 84-88)	Budget Year (FY 89)	Balance to Complete FYDP[1/] (FY 90-94)	Beyond FYDP (FY 95+)	Total
RDTE	448.6	180.5	2324.9	TBD	2954.0
PROC	-0-	-0-	-0-	TBD	TBD
MILCON	-0-	-0-	TBD	TBD	TBD
TOTAL	448.6	180.5	2324.9	TBD	2954.0

c. Annual Summary --

Fiscal Year	Qty	FY 1984 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate %
Appropriation: RDT&E								
1984				1.0			1.0	3.8
1985				67.8			71.4	3.4
1986				98.4			106.9	2.8
1987				124.4			139.3	2.7
1988				111.9			130.0	3.7
1989				150.0			180.5	3.8
1990				655.9			815.8	3.6
1991				741.3			949.4	3.3
1992				426.2			559.7	2.8
TOTAL				2376.9			2954.0	

Program funding and quantities reflect the FY 1988/1989 President's Budget, except as adjusted for FY 1988 Congressional direction and FY 1989 amended budget decisions.

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1984	1.0	1.0	1.0
1985	71.4	71.3	67.4
1986	106.9	106.9	106.2
1987	139.3	137.6	109.6
1988	130.0	35.9	5.5
Subtotal	448.6	352.7	289.7
To Complete	TBD	N/A	N/A
Total	TBD	352.7	289.7

1/ The current estimate includes RDT&E funding through FY 1992 only, base on the FY 1988/1989 Amended President's Budget.

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: N/A

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

87-037

PROGRAM: Mobile Subscriber Equipment (MSE)

A-18 MSE

AS OF DATE: December 31, 1987

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CLEARED
MAR 23 1988 22
NO SECURITY Objection
TO PUBLIC RELEASE
SECURITY REVIEW, OASD(PA)DFOISR

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, NJ 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.

OASD(PA) DFOISR 88-F-0734

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 functional areas: Subscriber Terminals, Mobile Subscriber Access, Wire Subscriber Access, Area Coverage and System Control. The MSE System provides the Army with a new capability and will not replace any existing system.

7. Program Highlights:

a. Significant Historical Developments -- The MSE system is part of the TRI-TAC architecture and was identified as the division backbone communication system in the Army's INTACS Objective System, approved in October 1975, and revalidated by TRADOC in Msg R24112002 Feb. 81, Subject: Mobile Subscriber Equipment.

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.

OSD Memorandum dated 8 Jan. 80 approved the Mission Element Need Statement (MENS) for MSE.

HQ DA (DCSRDA) Message dated 6 Aug. 82 directed AMC to proceed immediately with actions necessary to obtain the MSE system.

In Nov. 82, guidance was received from the Under Secretary of the Army to procure MSE using a non-developmental approach.

The JOR and MENS were updated and expanded to include corps and divisions in the MSE Operational Capabilities Document (MSEOCD) dated 24 May 84.

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.

On 31 Dec. 85, Option 1 of the contract was signed.

b. Significant Developments Since Last Report -- On 19 Feb. 87, Option 2 of the contract was signed. OSD approved the Test and Evaluation Master Plan (TEMP) on 14 October 1987. FAT (PATE) was started on 3 August 1987. Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.

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

8. Decision Coordinating Paper (DCP) Threshold Breaches: None. The MSE program is documented in the MSE Operational/Capabilities Document (MSEOCD), 24 May 84.

9. Schedule:

a. Milestones --	Production Estimate/ Approved Program 1/	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 (Production)	Dec 85/Dec 85	Dec 85
First Article Test (Start)	N/A /Jul 87	Jul 87
First Article Test (Complete)	N/A /Jan 88	Jan 88
First Production Delivery (On-Site)	Apr 88/Feb 88	Feb 88
Destination Final Acceptance (Start)	N/A /Feb 88	Feb 88
Destination Final Acceptance(Complete)	N/A /Apr 88	Apr 88
First Unit Equipped/IOC	May 88/May 88	May 88
User Follow-On Test & Eval (Start)	N/A /May 88	May 88
User Follow-On Test & Eval Completed	Aug 88/Sep 88	Sep 88

b. Previous Change Explanations -- Redefinition of milestone terms.

1/ Update reflects the approved Program Baseline Document.

c. Current Change Explanations -- First Unit Equipped/IOC date is May 88, the date that the system handoff takes place.

d. References --
Production Estimate: MSE Operational Capabilities Document (MSEOCD) 24 May 84 and MSE Program Baseline document dated July 87.
Approved Program: FY89 Amended Budget Submit
Baseline Program Document dated July 1987

10. Technical/Operational Characteristics:

	Pdn Estimate/ Appr Program 1/	Demonstrated Performance	Current Estimate
a. Technical			
MSE Switching Equipment			
Node Center Switch			
Max # of Local Subscribers	24/NA	24	24
# of Digital Transmission Groups	16/NA	16	16
Operating Temperature2/	-40oto120oF/ -40oto120oF	-40oto120oF	-40oto120oF
Subscriber Switchboard Capacity			
Large Extension Switch			
Max # of Local Subscribers	176/176	176	176
# of Digital Transmission Groups	8/NA	8	8
Operating Temperature2/	-40oto120oF/ -40oto120oF	-40oto120oF3/	-40oto120oF
Small Extension Switch (V1)			
Max # of Local Subscribers	N/A/26	26	26
Groups			
Operating Temperature2/	N/A/-40° to 120°F	-40oto120oF	-40oto120oF
Small Extension Switch (V2)			
Max # of Local Subscribers	41/NA	41	41
# of Digital Transmission Groups	1/NA	1	1
Operating Temperature2/	-40oto120oF/ -40o to 120o F	-40oto120oF	-40oto120oF
Mobile Subscriber Affiliation Capacity (Per Radio Access Unit)	N/A/50	50	50
MSE Radio Equipment			
UHF			
Frequency			
Band I	225-400 Mhz/225-400Mhz	225-400Mhz	225-400Mhz
Band III	1350-1850Mhz/1350-1850Mhz	1350-1850Mhz	1350-1850Mhz
Output Power			
Band I	10 watts/NA	10 watts	10 watts
Band III	5 watts/NA	5 watts4/	5 watts
Data Rates	256,512,1024Kbps/NA	256,512, 1024Kbps	256,512, 1024Kbps
Operating Temperature1/	-40o to 120oF/NA	-40oto120oF	-40oto120oF

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
4/ Portion of initial quantity below 5 watts. Design fix to appear in Jan. 88 production. No impact on FOTE. All applicable radios will undergo retrofit and be brought into compliance with the 5 watt requirement.

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

	Pdn Estimate/ Appr Program 1/	Demonstrated Performance	Current Estimate
MSE Radio Equipment (Cont'd)			
VHF			
Frequency	30-88 Mhz/30-88 Mhz	30-88 Mhz	30-88 Mhz
Output Power	14-18 watts/14-18 watts	14-18 watts	14-18 watts
Data Rates	16 Kbps/16 Kbps	16 Kbps	16 Kbps
Operating Temperature2/	-40o to 120oF/ -40o to 120oF	-40oto120oF	-40oto120oF

b. Operational

Set-up/Tear Down Time (Node)	30 Min/30 Min	TBD	30 Min
Max Vehicle Curb Weight	8600lbs/8800lbs	8800lbs	8800lbs
Max MSE Radio Operating Ranges			
VHF	15 Km/15 Km	3/	15 Km
UHF	40 Km/40 Km	3/	40 Km
Grade of Service (20% Off-Hook Factor)	N/A/90%	90%	90%

c. Previous Change Explanations -- Max Vehicle Curb Weight was changed due to the installation of an airlift cross member & vehicle modifications.

d. Current Change Explanations -- Added the demonstrated performance data.

e. References -- MSE System Specification, dated 8 July 1985 and MSE Program Baseline document dated July 87.

Production Estimate: MSE System Specification, dated 8 July 1985 and MSE Program Baseline document dated July 87.

Approved Program: FY89 Amended Budget Submit Baseline Program Document dated July 1987.

1/ Update reflects the approved Program Baseline Document.

2/ Ambient Temperature External to the Assemblage

3/ To be verified during the output power test.

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

	Production Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	$ -	$ -	$ -
Procurement	4,428.5	-388.6	4,039.9
Subscriber Terminals	(157.4)	(-12.7)	(144.7)
Mobile Subscriber Access	(548.2)	(-81.9)	(466.3)
Wire Subscriber Access	(1,198.2)	(-123.2)	(1,075.0)
Area Coverage	(1,587.4)	(-150.0)	(1,437.4)
System Control Center	(116.4)	(-11.4)	(105.0)
Initial Spare Parts	(160.4)	(-22.9)	(137.5)
Warranty	(166.3)	(-17.7)	(148.6)
Contractor Fielding	(166.3)	(-20.0)	(146.3)
Other Weapon Sys. Cost	(327.9)	(51.2)	(379.1)
Construction (MILCON)	-	-	-
TOTAL FY86 Base-Year $	$4,428.5	$-388.6	$4,039.9 1/
Escalation --	705.5	-93.1	612.4
Development (RDT&E)	-		-
Procurement	(705.5)	(-93.1)	(612.4)
Construction (MILCON)	-		-
TOTAL Then-Year $	$5,134.0	-481.7	$4,652.3
b. Quantities --			
Development	-	-	-
Procurement	48	2	50
TOTAL	48 2/	2	50 2/
c. Unit Cost --			
Procurement:			
FY86 Base-Year $	$ 92.3	$-11.5	$80.8
Then-Year $	107.0	-14.0	93.0
Program:			
FY86 Base-Year $	92.3	-11.5	80.8
Then-Year $	$107.0	$-14.0	$93.0

1/ The changes from the last report to this one are due to a reallocation of the stub items and use of the new infation indicies, dated 4 Feb 88.

2/ 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 $4.652B All user equipment located in the division/corps areas has been included in the total program acquisition cost.

1. Program Acquisition Cost (Cont'd) (Current Estimate in Millions of $)

d. Approved Design to Cost Goal -- N/A. MSE is a Non-Developmental Item.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

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

		Current Year		Budget Year
		Current Estimate (DEC 87 SAR)	UCR Baseline (DEC 86 SAR)	UCR Baseline (DEC 87 SAR)
a.	Program Acquisition:			
	(1) Cost	$4,652.3	$4,654.0	$4,652.3
	(2) Quantity	50	50	50
	(3) Unit Cost	93.0	93.1	93.0
b.	Current Procurement:	(FY 1988)	(FY 1988)	(FY 1989)
	(1) Cost	1019.8	1019.8	995.7
	(2) Quantity	12	12	12
	(3) Unit Cost	85.0	85.0	83.0

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	-	-813.2	-	-813.2
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-480.0	-	-480.0
Current Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-1.7	-	-1.7
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-1.7	-	-1.7
Total Changes	-	-481.7	-	-481.7
Current Estimate	-	$4,652.3	-	$4,652.3

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	-	-660.7	-	-660.7
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-367.3	-	-367.3
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-21.3	-	-21.3
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-21.3	-	-21.3
Total Changes	-	-388.6	-	-388.6
Current Estimate	-	$4,039.9	-	$4,039.9

b. Previous Change Explanations --

Procurement	(Dollars in Millions) Base-Year	Then-Year
(a) Economic - Revised indices dated 12 Dec 86	N/A	-26.8
(b) Quantity - Increased qty for 2 additional units in FY91	293.4	360.0
(c) Estimating - Change due to revision of force structure requirements	-660.7	-813.2

c. Current Change Explanations --

Estimating:		
(a) Change due to reprogramming	-1.6	-1.7
(b) Revised indices dated 4 Feb 88	-19.7	N/A

The changes to the constant dollars are due to the new inflation indices dated 4 Feb 88 and a reprograming action. Since the MSE Contract is a firm fixed forward priced contract, the then year dollars remain fixed and the constant dollars change is due to the new indices. The changes to current dollars are the result of a reprogramming action.

d. References --

Production Estimate: MSE Contracts DAAB07-86-C-K022, DAAB07-86-D-K023.

14. Program Acquisition Unit Cost (PAUC) History:

a. Initial SAR Estimate to Current Estimate:

PAUC (Initial SAR Est)	CHANGES								PAUC (Current Est
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
107.0	-0.6	3.5	--	--	-16.9	--	--	--	93.0

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

a. RDT&E -- N/A

b. Procurement

Basic Contract:

	Initial Contract Price		
	Target	Ceiling	Qty
GTE Corp., Taunton, MA DAAB07-86-C-K022, FFP, Award: 19 Dec 85 Definitized: 19 Dec 85	N/A	$4,145.7	48

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Prog. Manager
N/A	$4,476.5	50	$4,476.5	$4,476.5

Requirements Contract(IK's Only)

	Target	Ceiling	Qty
GTE Corp., Taunton, MA DAAB07-86-D-K022, FFP, (Delivery Order Based) Award: 19 Dec 85 Definitized: 19 Dec 85	N/A	$40.9	9,416

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	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: 57.1% (4 yrs/7 yrs)

(2) Percent Program Cost Appropriated: 49.9% ($2,320.4/$4,652.3)

b. Appropriation Summary --

	(Then-Year Dollars in Millions)				
Appropriation	Current & Prior Yrs (FY85-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-FY91)	Beyond FYDP	Total
RDT&E	-	-	-	-	-
Procurement	$2,320.4	$995.7	$1,336.2	-	$4,652.3
Milcon	-	-	-	-	-
Total	$2,320.4	$995.7	$1,336.2	-	$4,652.3

6. Program Funding Summary (cont'd)

c. Annual Summary --

Fiscal Year	Qty	FY 86 Base-Year Dollars Flyaway Nonrec 1/	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)	
Appropriation: RDT&E - N/A									
Appropriation: Procurement									
1985	1		60.7	61.6			63.3	3.4	2/
1986	1		303.2	315.3			335.3	2.8	2/
1987	11		791.8	820.8			902.0	2.7	
1988	12		863.7	896.4			1019.8	3.7	
1989	12		814.9	847.7			995.7	3.8	
1990	11		771.1	807.7			976.2	3.6	
1991	2		280.1	290.4			360.0	3.3	
Total	50		3885.5	4039.9			4652.3		3/ 4/
Appropriation: MILCON - N/A									

1/ The MSE contract is a price contract. Nonrecurring costs are not separately identified.

2/ The FYDP Procurement Annex (5 Jan. 87) erroneously shows an FY 85 and FY 86 Initial Spares Budget of $2.9 and $5.9 Million that had been included in the Baseline program.

3/ The quantity of 50 units identified above represents twenty-eight division signal bns, twenty corps signal bns and two training sets for a total cost of $4,652.3M. All user equipment located in the division/ corps areas has been included in the total program acquisition cost.

4/ Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.

6. Program Funding Summary (Cont'd)

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
Appropriation: RDT&E - N/A			
Appropriation: Procurement			
1985	63.3	63.3	40.0
1986	335.3	335.1	161.8
1987	902.0	891.8	106.5
1988	1019.8	0.0	0.0
To Complete	2331.9	0.0	0.0
Total	4652.3	1290.2	308.3

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 2996.4 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 the standard composite pay and allowances and the retired accrual factors. 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 firm 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

B. Operating and Support Costs: (Cont'd

the number and type of vehicles and generators, the operating scenario (4,243 miles driven per year for active forces and 668 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.

b. Costs --

(FY 86 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per MSE System 1/
Personnel	12.8
Replenishment Spares	1.0
Depot Maintenance	1.3
POL	0.2
Total	15.3 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/ The change in the O & S cost between this SAR and the 31 December 1986 SAR is due to an increase in the Reserve/Guard operating tempo. The slight decrease in POL is due to it being overstated in the 31 December 1986 SAR.

SAR-87-058

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SELECTED ACQUISITION REPORT (RCS:DD-COMP(O&A)823)
PROGRAM: SSN 21 CLASS SUBMARINE

N-34 SSN-21

AS OF DATE: 31 December 1987

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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: CAPT M.S. Firebaugh
Assigned: January 1984
Telephone: (202) 692-1888

4. [U] Program Elements/Procurement Line Items:
RDT&E:
PE 0205634N, Project S0218 Submarine Silencing*
PE 0603561N, Project S0207 Advanced Submarine Control
PE 0603561N, Project S0344 Submarine Auxiliaries*
PE 0603561N, Project S0348 Deep Components*
PE 0603561N, Project S0364 Submarine Damage Prevention*
PE 0603561N, Project S0923 Improved Performance Machinery*
PE 0603561N, Project S0971 Submarine Survivability*
PE 0603561N, Project S1266 Submarine Propellers*
PE 0603562N, Project S0221 Target Strength Reduction*
PE 0603562N, Project S0320 Weapons Stowage and Launch*
PE 0603569N, Project S1255 Advanced Submarine Technology*
PE 0603570N, Project S1914 S6W Nuclear Propulsion Plant
PE 0604561N, Project S1946 SSN 21 Development
PE 0604567N, Project S1803-007 Ship Contract Design

PROCUREMENT: 24281N
MILCON: N/A
O&MN: N/A

~~AS AMENDED~~

~~APR 11 1988~~

* These program elements were absorbed into PE 0604561N, Project S1946 for FY87 and future years.

~~Classified by: Multiple Sources~~
~~Declassify on: OADR~~

~~CONFIDENTIAL~~

DECLASSIFIED 88-T-0904

5. [U] Related Programs:

PE 0204281N, Project S0139	Mine Detection and Avoidance
PE 0603508N, Project S0223	Submarine Sonar Improvement (Adv)
PE 0603572N, Project S1739	Submarine Arctic W/F Development
PE 0603522N, Project X0770	Adv Submarine Support Equipment
PE 0603560N, Project S0222	Submarine Hull Array Development (Adv)
PE 0603562N, Project S1305	Adv Conform Sub Acoustic Sensors
PE 0603567N, Project S0967	Non Acoustic ASW
PE 0603569N, Project S1974	Adv Sub Tech
PE 0604502N, Project S0742	Submarine Integrated Antenna System
PE 0604502N, Project S1411	Submarine Tactical Communication System
PE 0604503N, Project S0219	Submarine Sonar Improvement (Eng)
PE 0604508N, Project S0166	SPS Improvement
PE 0604514N, Project S0247	ESGN
PE 0604514N, Project S0253	Navigation System
PE 0604515N, Project S0775	Submarine Surveillance Equipment
PE 0604520N, Project S0198	Submarine Hull Array Development (Eng)
PE 0604524N, Project S1347	AN/BSY-1
PE 0604524N, Project S1941	AN/BSY-2
PE 0604562N, Project S0236	SSN Combat Control System Improvement (Eng)

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.

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 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 NPOR 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.

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 Launcher, and Submarine Survivability. DT-III is scheduled for FY94-FY95. OT-III (Operational Test-III) and OT-IV are scheduled for FY95/FY96. 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 is scheduled to commence in 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. The SSN21 Class Submarine is expected to satisfy the mission requirements.

c. Changes Since As Of 31 December 1987 Report -- None

8. [U] Decision Coordinating Paper (DCP) Threshold Breaches: None

9. [U] Schedule:

a. Milestones --	Development Estimate/ Approved Program	Current 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/Oct86	Oct 86
Milestone IIIA	Jun 88/Jun 88	Jun 88
First Production Contract Award	Nov 88/Nov 88	Nov 88
Milestone IIIB	Mar 90/Mar 90	Mar 90
Delivery (First Ship)	Nov 94/Nov 94	Nov 94
IOC (First Ship)	Nov 94/Nov 94	Nov 94 (CH-1)

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. Current Change Explanation --

(CH-1) IOC (First Ship) changed from Mar 95 to Nov 94 to conform with delivery of lead ship.

d. References: DAE Baseline on 17 Feb 1988.

b. [redacted] Technical/Operational Characteristics:

a. [redacted] Technical --	Baseline Estimate/ Approved Program	Demonstrated Performance	Current Estimate
Submarine			
Length	350 ft. (approx)/353 ft.	N/A	353 ft.
Beam Max	40 ft./40 ft.	N/A	40 ft.
Draft Nav.	36 ft. (max)/34 ft.	N/A	34 ft.
(b)(1)			
Crew			
Total billets	134 Men/134 Men	N/A	134 Men
Underway	116 Men/108 Men	N/A	108 Men
AN/BSY-2 Combat System			
Mean Time Between Failure (MTBF)			
(b)(1)			

c. Previous Change Explanation --

Length change from 350 ft. (approx) to 353 ft. due to refinement during preliminary design phase; Draft Nav. was reduced from 36 ft. (max) to 34 ft. to minimize the amount of channel dredging and reduce the drydock sill depth requirements; Displacement change from 9100 tons (approx) to 9150 tons due to refinement during the preliminary design phase; and underway manning reduction due to refinement in manning studies.

d. Current Change Explanation -- None

10. [U] Technical/Operational Characteristics: (Cont'd)

a. [U] References --

DEVELOPMENT ESTIMATE: DCP dtd 11 Jun 86

OPNAVINST C9010 Ser 02/8C394451 dtd 13 Dec 85, entitled "APPROVED TOP LEVEL REQUIREMENT (TLR) FOR THE SEAWOLF CLASS (SSN 21) NUCLEAR ATTACK SUBMARINE"

APPROVED PROGRAM: FY1988/89 Approved Biennal Budget **DAE Baseline, dated 17 February 1988**

11. [U] Program Acquisition Cost

(Current Estimate in Millions of Dollars)

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	1724.6	+237.7	1962.3
Procurement (EC & OF/PD)	1425.0	4243.8	5668.8
Basic Ship Cost	(883.6)	(2023.4)	(2907.0)
GFE	(494.2)	(2015.0)	(2509.2)
Other	(3.8)	(40.0)	(42.8)
OF/PD	(44.4)	(165.4)	(209.8)
Construction (MILCON)	0	0	0
Total FY85 Base-Year $	3149.6	4481.5	7631.1
* Excludes FY92 Adv Procurement for FY93 Ships.			
Escalation	725.4	896.2	1621.6
Development	(188.0)	(31.8)	(219.8)
Procurement	(537.4)	(864.4)	(1401.8)
Construction (MILCON)	0	0	0
Total Then-Year $	3875.0	5377.7	9252.7
b. Quantities --			
Development (RDT&E)	0	0	0
Procurement	1	4	5
Total	1	4	5
c. Unit Cost --			
Procurement:			
FY85 Base-Year $	1425.0	-291.3	1133.7
Then-Year $	1962.4	-548.3	1414.1
Program:			
FY85 Base-Year $	3149.6	-1623.4	1526.2
Then-Year $	3875.0	-2024.5	1850.5

d. Approved Design to Cost Goal -- N/A. Per NAVSEA letter Ser 01722/299, Subject: Programs Subject to Design to Cost Principles, dated 14 September 1984. The SSN 21 is not subject to formal Design to Cost Principles.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- SSN 21 draws upon general reactor plant research and development work performed by the Department of Energy but this contribution cannot be quantified.

12. [U] Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Estimate (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a. Program Acquisition --			
(1) Cost	9252.7	9256.4	9252.7
(2) Quantity	5	5	5
(3) Unit Cost	1850.5	1851.3	1850.5
b. Current Procurement --	(FY1988)	(FY1988)	(FY1989)
(1) Cost	632.6	632.6	1488.0
Less CY Adv Proc	N/A	N/A	393.0
Plus PY Adv Proc	N/A	N/A	632.6
Net Total	N/A	N/A	1727.6
(2) Quantity	N/A	N/A	1
(3) Unit Cost	N/A	N/A	1727.6

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	-45.6	-317.4	-	-363.0
Quantity	-	+5080.8	-	+5080.8
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+325.8	+101.5	-	+427.3
Other	-	-	-	-
Support	-	+236.3	-	+236.3
Subtotal	280.2	5101.2	0.0	5381.4
Current Changes:				
Economic	+.8	+64.4	-	+65.2
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-11.5	-58.8	-	-70.3
Other	-	-	-	-
OF/PD Support	-	+1.4	-	+1.4
Subtotal	-10.7	7.0	0.0	- 3.7
Total Changes	269.5	5108.2	0.0	5377.7
Current Estimate	2182.1	7070.6	0.0	9252.7

13. [U] Cost Variance Analysis (Cont'd):

(FY1985 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	1734.6	1425.0	0.0	3159.6
Previous Changes:				
Quantity	-	-3935.4	-	+3935.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+247.3	+125.0	-	+372.3
Other	-	-	-	-
Support	-	+164.4	-	+164.4
Subtotal	247.3	4224.8	0.0	4472.1
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-9.5	+18.0	-	+8.5
Other	-	-	-	-
Support	-	+1.0	-	+1.0
Subtotal	-9.5	19.0	-	9.5
Total Changes	237.8	4243.8	0.0	4481.6
Current Estimate	1982.4	5668.8	0.0	7631.2

a. Previous Change Explanation --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised Jan 86 Economic Escalation Rates (Economic)	N/A	-45.6
Congressional Adjustments (Estimating)	-12.4	-13.4
Delete Arctic Warfare (PE 63522-S1739) (Estimating)	-86.3	-97.6
Addition of FY1991/1992 RDT&E Romts for the SSN 21 Program (Estimating)	+364.4	+452.7
Revised Program Romts (Estimating)	-18.4	-15.9
(2) Procurement		
Revised Jan 86 Economic Escalation Rates (Economic)	N/A	-317.4
Addition of 2 Submarines (Quantity)	+3935.4	+5080.8

(2) Procurement (Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
Refinement of Estimates to Reflect Later Contract/Pricing Data (Estimating)	+125.0	+101.5
Additional Outfitting/Post Delivery for Quantity Add (Support)	+164.4	+236.3

c. Current Change Explanations

(1) RDT&E

Revised Jan 87 Economic Escalation Rates (Economic)	N/A	+.8
Congressional Adjustments (Estimating	-8.2	-9.4
Revised Program Rqmts (Estimating)	-1.3	-2.1

(2) Procurement

Revised Jan 87 Economic Escalation Rates (Economic)	N/A	+64.4
Refinement of Estimates to Reflect Later Contract/Pricing Data (Estimating)	+18.0	-58.8
Refinement of Estimates to Outfitting/Post Delivery (Support)	+1.0	+1.4

(3) MILCON -- N/A

d. References -- SECNAV Memo dated 13 Dec 83.

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	
3875.0	0	0	0	0	0	0	0	0	3875.0

b. Current Baseline to Current Estimate --

PAUC (Initial SAR Est)	Changes								PAUC (Dev Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
3875.0	-59.6	-2083.8	-	-	+71.4	-	+47.5	-2024.5	1850.5

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	24.1	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
234.0	234.0	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

* 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.

15. [U] Contract Information: (Cont'd)

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	70.2	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
70.2	70.2	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

* The Navy has waived implementation of DOD Instruction 7000.2 for Naval Nuclear Propulsion Program procurements.

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	333.0	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
333.0	333.0	N/A	400.0	400.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date*	-2.2	-6.1
Net Change	N/A	N/A

* From latest Cost Performance Report covering period through October 1987.

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	44.7	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
147.0	147.0	N/A	224.0	224.0

15. [U] Contract Information: (Cont'd)

	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

* The Navy has waived implementation of DOD Instruction 7000.2 for Naval Nuclear Propulsion Program procurements.

16. [U] Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 33.3% (5/15)

(2) Percent Program Cost Appropriated: 20.9% (1930.7/9252.7)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY84-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP	Total
RDT&E	1298.1	239.0	645.0	-	2182.1
Procurement	632.6	1488.0	4665.5	284.5	7070.6
MILCON	-	-	-	-	-
Total	1930.7	1727.0	5310.5	284.5	9252.7

c. Annual Summary --

Fiscal Year	Qty	FY Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Nonrec	Rec	Total	Advance Proc Debit (-)	Advance Proc Credit (+)	Total	
Appropriation: RDT&E								
1984	0		110.8	110.8			109.2	3.8
1985	0		257.6	257.6			261.5	3.4
1986	0		352.6	352.6			368.1	2.8
1987	0		282.6	282.6			304.3	2.7
1988	0		228.3	228.3			255.0	3.7
1989	0		206.4	206.4			239.0	3.8
1990	0		187.1	187.1			224.1	3.6
1991	0		179.2	179.2			221.1	3.3
1992	0		157.8	157.8			199.8	2.8
Subtotal	0		1962.4	1962.4			2182.1	N/A

16. [U] Program Funding Summary (Cont'd)

Appropriation: Procurement

1987	C	332.3	332.3		375.0	375.0	1.6
1988	0	221.0	221.0		257.6	257.6	3.7
1989	1	1239.5	1239.5	393.0	532.6	1488.0	3.8
1990	0	472.9	472.9		583.0	583.0	3.6
1991	2	1806.9	1806.9	563.1	187.1	2282.7	3.3
1992	2	1392.2	1392.2	600.0		1799.8	2.8
1993	0	16.6	16.6			21.9	2.3
1994	0	32.0	32.0			43.3	2.3
1995	0	67.1	67.1			92.9	2.3
1996	0	57.8	57.8			81.9	2.3
1997	0	23.5	23.5			33.8	2.3
1998	0	4.2	4.2			6.2	2.3
1999	0	3.0	3.0			4.5	2.3
Subtotal	5	5668.8	5668.8	1795.7	1795.7	7070.6	N/A
Total	5	7631.2	7631.2	1795.7	1795.7	9252.01	N/A

d. Annual Summary --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1984	109.2	109.2	106.3
1985	261.5	261.5	255.6
1986	368.1	368.1	355.5
1987	304.3	300.0	216.2
1988	255.0	147.3	19.0
Total	1298.1	1186.1	952.6
	Appropriation: SCN		
1987	375.0	374.2	77.3
1988	257.6	221.8	.1
Total	632.6	596.0	77.4

17. N/A

18. N/A

SAR-87-062

UNCLASSIFIED

N-38 TAO FLEET OILER - 187

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: T-AO 187 CLASS FLEET OILER AS OF DATE: 31 December 1987

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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: 0603564N: 0604567N (Shared funding)

Procurement (SCN): 24441N, APPN 1611, ICN 5025

5. Related Programs:

AOE 6 Class

APR 11 1988

UNCLASSIFIED

OASD(PA) DPDTSR 88-T-0918

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

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 35 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 (Since Last Report):

a. Significant Historical Developments - The T-AO-187 Class program was approved by DCP# S0859-SL 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.

b. Significant Developments since Last Report - None.

c. Changes Since "As of" Date - N/A

8. Decision Coordinating Paper (DCP) Threshold Breaches: N/A

9. Schedule:

a. Milestones	Production Estimate/ Approved Program	Current Estimate
CNO Executive Board	Jun 80	Jun 80
DSARC I	Mar 80	Mar 80
Characteristics Approved	Feb 81	Feb 81
DCP #S0859 Approved	Dec 81	Dec 81
Production Contract Award	Nov 82	Nov 82
Production Started-First Ship	Apr 84	Apr 84
Launch - First Ship	Aug 85	Aug 85
Acceptance Trials - First Ship	Jul 86	Sep 86
Delivery - First Ship	Sep 86	Dec 86
Initial Operating Capability	Nov 86	Feb 87
Last T-AO Delivery (T-AO 9101)	Aug 93	Mar 94

b. Previous Change Explanations: Technical problems associated with main reduction gears and lack of required on-board repair parts.

c. Current Change Explanations: N/A

d. References: Production Estimate; Approved Program; FY 88/89 Amended Biennial Budget; NDCP S0859 approved 7 December 1981; and DAE Baseline dtd 17 February 1988.

10. Technical/Operational Characteristics:

	Devel Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. Technical			
Length Overall	677.5 feet	N/A	677.5 feet
Beam Max.	97.5 feet		97.5 feet
Draft Navigational	35.0 feet		36.0 feet
Displacement	40,000.0 long tons		40,000.0 long tons
Propulsion			
(1) Type	2 Diesel Engines twin shaft Controllable Reversible Pitch Propellers		2 Diesel Engines twin shaft Controllable Reversible Pitch Propellers
(2) SHP	16,000 Each		16,000 Each
Accomodations	137		137
b. Operational			
Speed Max.	20 Knots	N/A	20 Knots
Endurance	6000 NM		6000 NM
Armament	NONE		NONE
Cargo	180,000 Barrels		180,000 Barrels

c. Previous Change Explanation: N/A

d. Current Change Explanation: N/A

e. References:

Production Estimates: NDCP S0859-SL approved 7 December 1981

Approved Program: FY 88/89 Amended Biennial Budget; and DAE Baseline dtd 17 February 1988.

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

a. Cost	Development Estimate	Changes	Current Estimate
Development (RDT&E)	15.8	- 1.0	14.8
Procurement	2591.9	- 215.2	2376.7
Total Sailaway	2518.4	- 232.2	2286.2
Other Weapon System Costs	-	-	-
Initial Spares	-	-	-
Total FY84 Base-Year $	2518.4	- 232.2	2286.2
Escalation	583.0	- 258.5	324.5
Development (RDT&E)	(.4)	(-.3)	(.7)
Procurement	(582.6)	(- 258.8)	(323.8)
Total Then-Year $	3190.7	- 503.7	2716.0*

* Excludes FY 92 Advanced Procurement for FY 93 ships.

b. Quantities

Development (RDT&E)	-		-	-
Procurement	17	+	1	18.0
Total	17	+	1	18.0

c. Unit Cost

Procurement:				
FY84 Base-Year $	152.5	-	20.4	132.0
Then-Year $	186.8	-	36.7	150.0
Program:				
FY84 Base-Year $	152.4	-	19.1	132.9
Then-Year $	187.7	-	36.8	150.9

d. Approved Design to Cost Goal: N/A (Not required by OR)

e. Foreign Military Sales: N/A

f. Nuclear Costs: N/A

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then Year) Dollars in Millions)

	Current Year		Budget Year
	SAR Current (DEC 1987 PROG)	UCR Baseline (DEC 1986 SAR)	UCR Baseline (DEC 1987 SAR)
a. Program Acquisition			
(1) Cost	2716.0	2690.2	2716.0
(2) Quantity	18	18	18
(3) Unit Cost	150.890	149.456	150.890
b. Current Procurement	(FY 88)	(FY 88)	(FY 89)
(1) Cost	265.6	265.6	297.9
Less CY Adv Proc	-	-	-
Less PY Adv Proc	-	-	-
Net Total	265.6	265.6	297.9
(2) Quantity	2	2	2
(3) Unit Cost	132.800	132.800	148.950

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

13. Cost Variance Analysis:

a. Summary: (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	TOTAL
Baseline Estimate (PdE)	16.2	3174.5	3190.7
Previous Changes:			
Economic	-	-163.1	-163.1
Quantity	-	+177.6	+177.6
Schedule	-	-	-
Engineering	-	-	-
Estimating	+3.3	-518.3	-515.0
Other	-	-	-
Support	-	-	-
SUBTOTAL	+3.3	-503.8	-500.5
Current Changes:			
Economic	-	+ 9.3	+ 9.3
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-4.7	+ 21.2	+ 16.5
Other	-	-	-
Support	-	-	-
SUBTOTAL	-4.7	+ 30.5	+ 25.8
TOTAL CHANGES	-1.4	-473.3	-474.7
CURRENT ESTIMATE	14.8	2701.2	2716.0

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

13. Cost Variance Analysis: (Cont.)

(FY 1984 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	TOTAL
Baseline Estimate (PdE)	15.8	2591.9	2607.7
Previous Changes:			
Quantity	-	+166.4	+166.4
Schedule	-	-	-
Engineering	-	-	-
Estimating	+ 3.0	-422.2	-419.2
Other	-	-	-
Support	-	-	-
SUBTOTAL	+ 3.0	-255.8	-252.8
Current Changes:			
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	- 4.2	+ 40.6	+36.4
Other	-	-	-
Support	-	-	-
SUBTOTAL	- 4.2	+ 40.6	+ 36.4
TOTAL CHANGES	- 1.2	-215.2	-216.4
CURRENT ESTIMATE	+14.6	2376.7	2391.3

b. Previous Change Explanation:

RDT&E

Estimating: contract design to SCN in FY-87 from RDT&E,N to SCN

Procurement

Economic: adjustments for reviser inflation indices
Quantity: one additional ship added to the program in FY-91
Estimating: various Congressional recissions and adjustments

MILCON none

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

	BASE-YEAR	THEN-YEAR
c. Current Change Explanation		
(1) RDT&E		
Twin Skeg alternative canceled; design requirements reduced (Estimating).	- 4.2	- 4.7
(2) PROCUREMENT		
Adjustments for revised inflation indices (Economic).	N/A	+ 9.3
Repricing based on prior year shipbuilding experience. (Estimating).	+ 40.6	+ 21.2
(3) MILCON	N/A	N/A

d. References: Production Estimate;
NDCP - S0859-SL approved 7 December 1981

14. Program Acquisition Unit Cost (PAUC) History:

a. Initial SAR Estimate to Current Baseline Estimate
Same as Current Baseline Estimate.

b. Current Baseline Estimate to Current Estimate

PAUC Baseline Estimate	Changes (Then Year Dollars in Millions)								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
187.7	-8.5	-0.6	-	-	-27.7	-	-	-36.8	150.9

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E - N/A

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

b. Procurement

Avondale Shipyard, Inc.
New Orleans, LA N00024-83-C-2012 (FPI)
November 12, 1982
T-AO 187, 188, 189, 190

Initial Contract Price		
Target	Ceiling	Qty
492.2	595.1	4

Current Contract Price		
Target	Ceiling	Qty
502.9	607.3	4

Estimated Price At Completion	
Contractor	Program Manager
498.8	500.7

	Cost Variance	Schedule Variance
Previous Cumulative Variance	+ 18.9	- 4.8
Cumulative Variance to Date	+ 18.0	- 4.1
Net Change	- 0.9	+ 0.7

Explanation of Change: Although the shipbuilder's CPR is showing an unfavorable cost and schedule variance, both the shipbuilder and the program manager are projecting an underrun at completion. T-AO 187, 188, 189, and 190 have been delivered. The Program Manager has taken these unfavorable variances into consideration in developing his estimated price to complete (EPC).

Pennsylvania Shipbuilding, Co.
Chester, PA N00024-85-C-2115 (FPI)
May 6, 1985
T-AO 191, 192, 194, 196

Initial Contract Price		
Target	Ceiling	Qty
222.5	262.9	2

Current Contract Price		
Target	Ceiling	Qty
420.4	496.8	4

Estimated Price At Completion	
Contractor	Program Manager
457.6	496.8

	Cost Variance	Schedule Variance
Previous Cumulative Variance	+ 26.1	- 1.7
Cumulative Variance to Date	+ 52.4	+ 2.7
Net Change	+ 26.3	+ 4.4

Explanation of Change: Penn Ship has experienced continuing productivity problems as well as higher than anticipated labor and overhead costs. Both have contributed to unfavorable cost and schedule variances. Additional funding has been formally requested via reprogramming action (DD 1415) for the FY 85-87 Penn ships. The Program manager's estimate at completion is a significant overrun and exceeds approved funding.

b. Procurement (cont.)

Avondale Shipyard, Inc.
New Orleans, LA N00024-85-C-2131 (FPI)
June 28, 1985
T-AO 193, 195, 197

Initial Contract Price		
Target	Ceiling	Qty
221.5	247.1	2

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
327.9	368.6	3	321.5	324.9

	Cost Variance	Schedule Variance
Previous Cumulative Variance	- 0.8	+ 4.1
Cumulative Variance to Date	+ 1.0	+ 1.1
Net Change	+ 1.8	- 3.0

Explanation of Change: Although the shipbuilder's CPR is showing an unfavorable cost and schedule variance, both the shipbuilder and the program manager are projecting an underrun at completion. The T-AO 193 is scheduled for delivery in August 1988. The Program Manager has taken these unfavorable variances into consideration in developing his estimated price to complete (EPC).

c. MILCON Contracts: N/A

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status:

(1) Percent Program Completed: 76.9% (10/13)

(2) Percent Program Cost Appropriated: 69.3% (1883.2/2716.0)

b. Appropriation Summary:

		(Then-Year Dollars in Millions)			
	Current $	Budget	Balance	To Complete	
Appropriation	Prior Yrs. (FY82-88)	Year (FY89)	FYDP (FY90-92)	Beyond FYDP (FY93)	Total
RDT&E	14.6	-0-	0.2	-	14.8
Procurement	1868.6	297.9	524.2	10.5	2701.2
Total	1883.2	297.9	524.4	10.5	2716.0

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

c. Annual Summary:

Fiscal Year	Qty	FY84 Base-Year Dollars			Then-Year Dollars			Escal Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1982	-	-	-	12.0	-	-	12.0	-
1983	-	-	-	1.0	-	-	1.0	-
1984	-	-	-	0.3	-	-	.3	-
1985	-	-	-	0.3	-	-	.3	3.5
1986	-	-	-	0.1	-	-	.1	3.5
1987	-	-	-	0.7	-	-	0.9	3.5
1988	-	-	-	-	-	-	-	3.5
1989	-	-	-	-	-	-	-	3.5
1990	-	-	-	0.2	-	-	.2	3.5
1991	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-
SUBTOTAL	-	-	-	14.6	-	-	14.8	-

PROGRAM: T-AO 187 CLASS FLEET OILER
AS OF DATE: 31 December 1987

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

c. Annual Summary: (cont.)

Fiscal Year	Qty	FY84 Base-Year Dollars			Then-Year Dollars			Escal Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement								
1982	1	-	-	179.1	-	-	179.1	-
1983	1	-	-	141.9	-	-	141.9	-
1984	2	-	-	270.1	-	-	285.1	-
1985	3	-	-	419.8	-	-	454.0	-
1986	2	-	-	249.4	-	-	278.0	-
1987	2	-	-	229.9	-	-	264.9	-
1988	2	-	-	223.2	-	-	265.6	3.5
1989	2	-	-	243.0	-	-	297.9	3.5
1990	2	-	-	262.5	-	-	330.4	2.9
1991	1	-	-	137.2	-	-	176.9	2.4
1992	-	-	-	12.8	-	-	16.9	2.4
Balance to Complete	-	-	-	7.8	-	-	10.5	-
Subtotal	18	-	-	2376.7	-	-	2701.2	-
Total	18	-	-	2391.3 ~~2351.3~~	-	-	2716.0	-

16. Program Funding Summary: (cont.)

d. Obligations and Expenditures

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1982	12.0	12.0	12.0
1983	1.0	1.0	1.0
1984	.3	.3	.3
1985	.3	.3	.3
1986	.1	.1	.1
1987	0.9	.9	.9
1988	.0	-	-
1989	.0	-	-
1990	.2	-	-
Balance To Complete	-	-	-
Total	14.8	14.6	14.6

16. Program Funding Summary: (cont.)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: SCN			
1982	179.1	169.6	165.7
1983	141.9	137.2	130.8
1984	285.1	275.4	257.8
1985	454.0	402.4	311.8
1986	278.0	228.2	107.7
1987	264.9	230.1	33.0
1988	265.6	-	-
1989	297.9	-	-
1990	330.4	-	-
1991	176.9	-	-
1992	16.9	-	-
Balance To Complete	10.5	-	-
Total	2701.2	1442.9	1006.8

17. Production Rate Data: Not Applicable

18. Operating and Support Costs:

a. Assumptions and Ground Rules - N/A

b. Costs - N/A

SAR-87-098

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~~RESTRICTED DATA~~

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: SHORT RANGE ATTACK MISSILE (SRAM) II

AF-30 SRAM II

As of Date: December 31, 1987

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SAF/PAS
88-0141- T

1. (U) Designation and Nomenclature (Popular Name): AGM-131A/Short Range Attack Missile (SRAM) II.

2. (U) DOD Component: US Air Force

3. (U) Responsible Office

SRAM II Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433

Col Herbert L. Bevelhymer
Assigned: January, 1985
AV 785-5080;
COMM (513) 255-5080

4. (U) Program Elements/Procurement Line Items:

RDT&E: PE 63364F
PROCUREMENT: PE 11218F APPN 3020 ICN ADVASM
O&M: NA
MILCON: NA

(b)(1) [redacted]

[redacted] SRAM II SCG, 15 MAY 88

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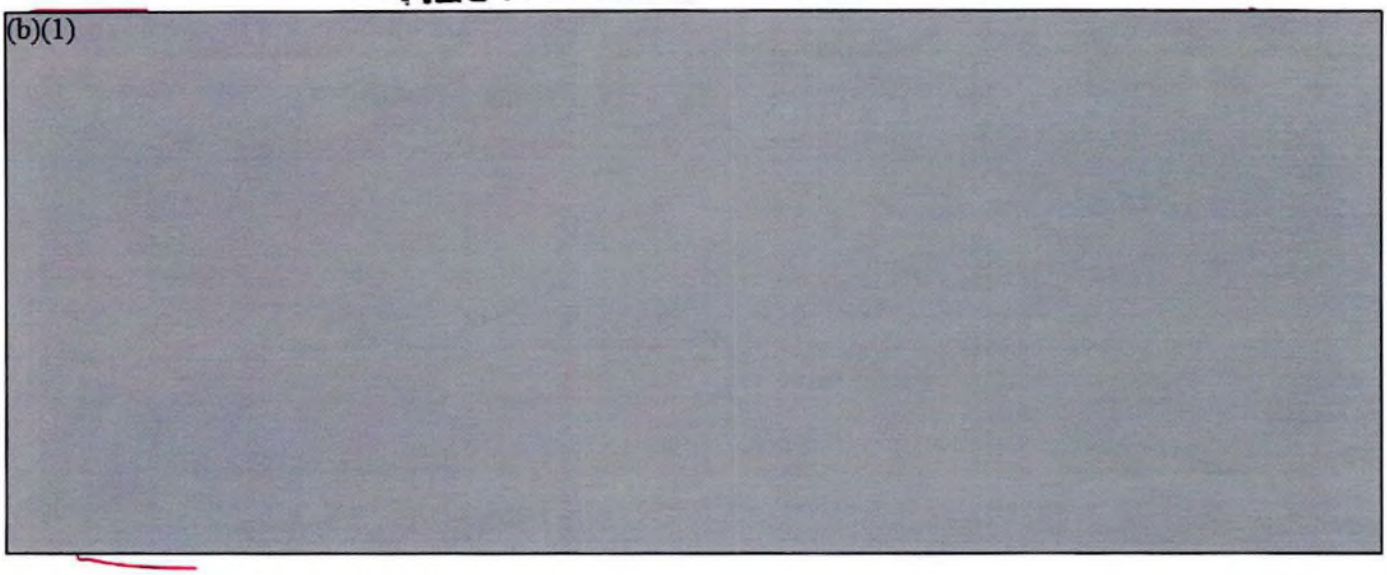
(b)(1)



7. (~~C/RD~~) Program Highlights:

a. (U) Significant Historical Developments -- The SRAM II program was a new start in FY85. The decision to initiate the program was made in September 1982, following an unsuccessful attempt to establish a new production source for the existing SRAM rocket motor. An accelerated acquisition approach was chosen for SRAM II because of the need to field an operational system in the early 1990s. Thus, the normal Concept Exploration and Demonstration/Validation Phases were combined to form a System Definition Phase. A competition was conducted and contracts were awarded (February 1985) to three major aerospace contractors (Boeing Aerospace, Martin Marietta Orlando Aerospace, and McDonnell Douglas Astronautics) for system definition studies and component risk reduction testing. In addition, integration study contracts were awarded to Rockwell and Boeing Military Airplane Company for B-1B integration.

(U) In August 1985, after four months of detailed trade studies by the three contractors and a two-month Air Force evaluation of the trade studies, decisions were made on two key missile characteristics. A missile size of approximately two-thirds of the existing SRAM was selected to allow carriage of twelve missiles on a modified B-1B multipurpose launcher. For missile propulsion, a solid rocket motor was chosen since this technology met all performance requirements at the least estimated cost. Risk reduction work, including firings of full-scale rocket motor candidate designs and tests of candidate missile inertial navigation units using test bed aircraft to simulate bomber and missile flights, were successfully completed. Contractor and government agencies reviewed a draft request for proposal (RFP) and provided comments for inclusion into the final full scale development (FSD) and initial production RFP.

(b)(1)



(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)

[redacted]

(U) An advanced design phase, with options for FSD and initial production, contract (firm price incentive fee) 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 -- The air vehicle Preliminary Design Review (PDR) was held in Nov 87 and subsystem PDRs are currently being conducted.

(U) The SRAM II system is expected to satisfy the mission requirements.

(U) FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

c. (U) Changes Since "As Of" Date -- None

8. (U) Systems Concept Paper (SCP) Threshold Breaches: There are currently no SCP (dated 1 February 1985) threshold breaches. The draft 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 --

	Planning Estimate/ Approved Program	Current/Development Estimate
Systems Concept Paper	Feb 85/ NA	Feb 85
Milestone II (DAB)	Jun 87/ Aug 87 (Ch 3)	Aug 87
Preliminary Design Review	Jul 87/ NA	Nov 87
Critical Design Review	Jun 88/ NA	May 89 (Ch 1)
First Live Launch	Oct 89/ NA	Sep 90

	Planning Estimate/ Approved Program	Current/Development Estimate
Milestone IIIA (DAB) Low Rate Production	Apr 90/Jul 91 (Ch 3)	Jul 91
Milestone IIIB (DAB)	Sep 91/Oct 92 (Ch 3)	Oct 92 (Ch 2)
IOC (50 missiles)	Mar 92/Apr 93 (Ch 3)	Apr 93

b. (U) Previous Change Explanations --

Minor changes resulted from schedules developed throughout the source selection process by the government and winning contractor. The FY89 production funds were deleted causing a one-year delay in long lead production.

Milestone II (DAB) was completed 22 Jul 87. Final Documentation and Action Items have been completed. The Acquisition Decision Memorandum (ADM) was signed 19 Aug 87.

Missile PDR was delayed from Aug 87 to Nov 87 because the warhead Phase III request, which contains DOD/DOE proposed Military Characteristics, was delayed in coordination with OSD. Development of the B-1B carrier aircraft modifications (for SRAM II capability) constitutes the critical path schedule for the overall SRAM II program. The B-1B aircraft carrier contracts could not be awarded until after the ADM was released. This resulted in delaying the missile CDR from Aug 88 to Feb 89. The first live launch moved from Aug 89 to Sep 90, and Milestone IIIa slipped from May 90 to Jul 91. The first live launch and Milestone IIIa dates (derived from carrier aircraft contractor proposals) may change after fact finding/negotiations are completed. Deletion of FY89 production funding resulted in Milestone IIIA slipping from Apr 90 to May 90, Milestone IIIB from Sep 91 to Jul 92 and IOC from Mar 92 to Apr 93.

c. (U) Current Change Explanations --

(Ch 1) The missile CDR was delayed from Feb 89 to May 89 because the Warhead Phase III decision was delayed.

(Ch 2) The Milestone IIIB was changed from Jul 92 to Oct 92 to be consistent with missile and carrier aircraft integration schedule refinements.

(Ch 3) Reflects USD(A) baseline approval.

d. (U) References --

Planning Estimate: FY87 Descriptive Summary.

Development Estimate: Acquisition Decision Memorandum, dated 19 Aug 1987.

Approved Program: Draft SCP, dated 1 February 1985, subject: "SRAM II Systems Concept Paper"; USD(A) memo, 9 Feb 1988.

10. (~~S~~) Technical/Operational Characteristics:

	Planning Estimate/ Approved Program	Demonstrated Performance	Current/ Development Estimate
a. (U) Technical --			
(U) Reliability/Availability			
Reliability excluding warhead	TBD/0.95	N/A	0.98/0.95 (Ch 1)
Availability excluding warhead	TBD/0.95	N/A	0.95
(U) Size (Length/ Diameter) (in)	168/15/168/15	N/A	168/16 (Ch 2)
(U) Weight (pounds)	1800/1800	N/A	2100 (Ch 2)
b. (~~S~~) Operational --			

(b)(1);(b)(3):42 USC §2168(a) (1)(C)--(FRD)

(b)(1) [redacted]

c. (U) Previous Change Explanations --

The current estimates are based on data obtained and evaluated during the SRAM II Source Selection. The warhead candidate selected by the DOE on 5 Nov 86 and the B-1B handover azimuth error was changed to reflect current planned capability.

(b)(1) [redacted]

d. (U) Current Change Explanations --

(Ch 1) Change Planning Estimate from TBD to establish a Development Estimate Baseline.

(b)(1) [redacted]

e. (U) References --

Planning Estimate: Draft System Concept Paper (SCP), dated 1 February 85.

Development Estimate: Acquisition Decision Memorandum, dated 19 Aug 1987.

Approved Program: Draft System Concept Paper (SCP), dated 1 February 85; USD(A) memo, 9 Feb 1988.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

		Planning Estimate	Change	Current Est/ Development Est.
a. (U)	Cost —			
	Development (RDTE)	864.2	-3.6	860.6
	Procurement	1366.9	-507.0	859.9
	Airframe	(244.5)	(-75.9)	(168.6)
	Engine	(303.0)	(-78.2)	(224.8)
	Nav/Guidance	(515.6)	(-170.6)	(345.0)
	Total Flyaway	(1063.1)	(-324.7)	(738.4)
	Other Weapon System Cost	(250.5)	(-162.9)	(87.6)
	Initial Spares	(53.3)	(-19.4)	(33.9)
	Construction (MILCON)	N/A	N/A	N/A
	Total FY83 Base-Year $	2231.1	-510.6	1720.5
	Escalation	833.4	-160.5	672.9
	Development (RDTE)	(216.7)	(+5.6)	(222.3)
	Procurement	(616.7)	(-166.1)	(450.6)
	Construction (MILCON)	N/A	N/A	N/A
	Total Then-Year $	3064.5	-671.1	2393.4
b. (U)	Quantities —			
	Development (RDTE)	N/A	N/A	N/A
	Procurement	1633	0.0	1633
	Total	1633	0.0	1633
c. (U)	Unit Cost —			
	Procurement:			
	FY83 Base-Year $	.837	-.310	.527
	Then-Year $	1.215	-.412	.803
	Program:			
	FY83 Base-Year $	1.366	-.312	1.054
	Then-Year $	1.877	-.411	1.466

d. (U) **Approved Design-to-Cost Goal — None**

e. (U) **Foreign Military Sales — None**

(b)(1) [redacted]

"FORMERLY RESTRICTED DATA"
"Unauthorized disclosure subject to administrative and criminal sanctions. Handling Restricted Data in foreign dissemination. Section [illegible] Atomic Energy Act, 1954."

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Estimate Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition —			
(1) Cost	2393.4	2465.0	2393.4
(2) Quantity	1633	1633	1633
(3) Unit Cost	1.466	1.509	1.466
b. Current Procurement —	N/A		

13. Cost Variance Analysis:

a. Summary—(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1080.9	1983.6	0.0	3064.5
Previous Changes:				
Economic	-10.7	-32.4		-43.1
Quantity				
Schedule		+87.6		+87.6
Engineering				
Estimating	-175.1	-325.0		-500.1
Other				
Support	+187.4	-299.0		-111.6
Subtotal	+1.6	-568.8	0.0	-567.2
Current Changes:				
Economic	-0.4	+10.6		+10.2
Quantity				0.0
Schedule				0.0
Engineering				
Estimating	+0.8	-160.6		-159.8
Other				0.0
Support		+45.7		+45.7
Subtotal	+0.4	-104.3	0.0	-103.9
Total Changes	+2.0	-673.1	0.0	-671.1
Current Est/ Development Est	1082.9	1310.5	0.0	2393.4

(FY83 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	864.2	1366.9	0.0	2231.1
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-145.2	-212.5		-357.7
Other				
Support	+147.9	-212.3		-64.4
Subtotal	+2.7	-424.8	0.0	-422.1
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-6.3	-112.2		-118.5
Other				
Support		+30.0		+30.0
Subtotal	-6.3	-82.2	0.0	-88.5
Total Changes	-3.6	-507.0	0.0	-510.6
Current Est/ Development Est	860.6	859.9	0.0	1720.5

b. Previous Change Explanations —

(1) RDT&E

Economic: Revised economic escalation indices.

Estimating: Contractor proposals received in the competitive source selection were utilized to revise the program estimate. Correction of erroneous categorization of B-1 integration costs. Adjustment for current and prior inflation.

b. Previous Change Explanations (Cont'd)—

Support: Revised B-1 integration and support estimate based on source selection analysis of contractor proposal. Correction of erroneous categorization of B-1 integration costs.

(2) PROCUREMENT

Economic: Revised escalation indices.

Schedule: Production funding deferred two years and annual quantities rephased.

Estimating: Contractor proposals received in the competitive source selection were utilized to revise the program estimate.

Support: Previous estimate based on SRAM-A analogy. Current estimate based on contractor proposal in response to SRAM II support concept.

(3) MILCON: N/A

c. Current Change Explanations—

(1) RDT&E:	(Dollars in Millions) Base Year	Then Year
Revised economic escalation indices. (Economic)	0.0	-0.4
Revised program office estimate in support of Decision Coordinating Paper. (Estimating)	-6.8	+0.4
Adjustment for current and prior year escalation. (Estimating)	+1.5	+1.8
Adjustment for FY 90 and beyond escalation. (Estimating)	-1.0	-1.4

c. Current Change Explanations (Cont'd)--

(2) PROCUREMENT

Revised economic escalation indices. (Economic)	0.0	+10.6
Revised program office estimate in support of Decision Coordinating Paper. (Estimating)	-105.8	-151.0
Adjustment for FY 90 and beyond escalation.	-7.0	-10.6
(Estimating)	(-6.4)	(-9.6)
(Support)	(-0.6)	(-1.0)
Revised initial spares estimate. (Support)	+22.5	+34.9
Increased site activation, depot support, and Electronic Systems Test Set (ESTS) maintenance added. (Support)	+8.1	+11.8

(3) MILCON: N/A

d. References—

Planning Estimate: FY 1987 President's Budget, February 1986.

Development Estimate: FY 1989 Amended President's Budget, February 1988.

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then Year $)

a. Initial SAR Estimate to Current Estimate

PAUC Initial Est/ P E	Changes								PAUC Current Est/DE
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
1.877	-.020	—	+.054	—	-.404	—	-.041	-.411	1.466

15. 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
$214.4	$234.3	N/A	$214.4	$229.8

	Cost Variance	Schedule Variance
Cumulative Variance To Date (12/31/87)*	-1.809	-2.433

* Contract Cost Performanuce Data being reported for the first time.

Explanation of Variance: The unfavorable cost variance is due primarily to the propulsion subcontractor, Hercules Inc. Additional effort was required for changes in support and design for insulator grinding and machining configuration. The unfavorable schedule variance is due to overly optimistic scheduling by Hercules.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status —

(1) Percent Program Completed: 38.5% (5 yrs/13 yrs)
(2) Percent Program Cost Appropriated: 12.0%
($287.7M/$2393.4M)

b. Appropriation Summary — (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY84-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93-96)	Total
RDT&E	287.7	231.5	563.4	0.3	1082.9
Procurement	0.0	0.0	207.8	1102.7	1310.5
MILCON	0.0	0.0	0.0	0.0	0.0
Total	287.7	231.5	771.2	1103.0	2393.4

16. Program Funding Summary -(Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary — *

Fiscal Year	Qty	FY 83 Base Year			Then Year			Esc Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1984				5.9			6.3	3.8
1985				11.0			12.0	3.4
1986				26.5			29.7	2.8
1987				56.6			65.5	2.7
1988				145.0			174.2	3.7
1989				185.9			231.5	3.8
1990				223.1			287.1	3.6
1991				127.6			169.2	3.3
1992				78.8			107.1	2.8
1993				0.2			0.3	2.3
Subtotal				860.6			1082.9	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary —*

Fiscal Year	Qty	FY 83 Base Year			Then Year			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement								
1990				8.7	6.2	-	12.0	3.6
1991	25	2.0	38.1	53.3	6.2	(6.2)	75.8	3.3
1992	75	-	49.7	82.5	19.5	(6.2)	120.0	2.8
1993	300	-	127.5	150.5	30.7	(19.5)	223.9	2.3
1994	400	-	182.0	200.8	30.7	(30.7)	305.6	2.3
1995	400	-	168.7	192.0	31.7	(30.7)	299.0	2.3
1996	433	-	170.4	172.1	-	(31.7)	274.2	2.3
Subtotal	1633	2.0	736.4	859.9	125.0	(125.0)	1310.5	
Total	1633	2.0	736.4	1720.5	125.0	(125.0)	2393.4	

* FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

d. Obligations and Program Office—

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1984	6.3	6.3	6.3
1985	12.0	12.0	11.9
1986	29.7	29.7	28.6
1987	65.5	65.5	15.4
1988	174.2	11.8	0.1
To Comp	795.2	N/A	N/A
Total	1082.9	125.3	62.3
Appropriations: Procurement and MILCON — N/A			

Reflects program office records as of 31 Dec 87.

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 7 months for FY 1991, 8 months for FY 1992, and 12 months thereafter.)

Fiscal Year	Production Rates (quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	42.9	N/A	42.9	N/A
1992	112.5	N/A	112.5	N/A
1993	300.0	N/A	300.0	N/A
1994	400.0	N/A	400.0	N/A
1995	400.0	N/A	400.0	N/A
1996	433.0	N/A	433.0	N/A

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 $)	N/A	N/A	1720.5	N/A	N/A
	(TY $)	N/A	N/A	2393.4	N/A	N/A
PAUC	(BY $)	N/A	N/A	1.054	N/A	N/A
	(TY $)	N/A	N/A	1.466	N/A	N/A

17. Production Rate Data (Cont'd):

c. Schedule Variance — (NOTE: Subject to the limitations on production rates above.)

Item	Production Estimate	Variance (CE Less PdE)	Current Estimate	Variance (CE vs Max)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	8/91	N/A	N/A
Duration (in Months)	N/A	N/A	70	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	5/97	N/A	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 —

Operation of ten including two single wings, two single wings with Combat Crew Training School (CCTS), and two double wings. Average operational missile count per wing is 160. A total of 1633 missiles is being purchased.

The estimate is based on steady state for the SRAM II system operating on the B-1B aircraft.

Personnel Pay was based on projected basing posture for SRAM II with adjustments made for increased missile reliability and maintainability.

Consumables costs are for expendables directly associated with the flying mission.

Depot maintenance costs include corrective maintenance for SRUs, depot supply activities, repair of Nuclear Test Instrumentation Kits (NTIK) components, surveillance testing, and all associated transportation.

Sustaining Investment costs included are replenishment spares, support equipment maintenance and software modification/maintenance. Other direct costs includes Installation Support Non-Pay and Medical Non-Pay.

Indirect costs address Acquisitionand Training and Permanent Change of Station (PCS) and Depot Non-maintenance.

18. Operating and Support Costs:

b. Costs —

(FY 1983 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per AGM-131A Squadron	Avg Annual Cost Per AGM-69A Squadron (SRAM A)
Personnel	51.7	51.7
O & S Consumables	0.148	0.157
Direct Depot Maintenance	0.925	1.478
Sustaining Investment	4.6	0.834 *
Other Direct Cost	13.8	13.8
Indirect Costs	4.93	4.517 **
Total	76.103	72.486

* Sustaining Investment for SRAM A includes only Replenishment Spares and Software Modifications/Maintenance; it does not include Support Equipment maintenance.

** Indirect costs include only Acquistion and Training and Permanent Change of Station and depot transportation costs. It does not include depot supply costs.

SAR-87-121

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: MICROWAVE LANDING SYSTEM (MLS)

AF-23 MLS

AS OF DATE: 31 December 1987

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SAF/PAS
88-0127-T

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: Mr David J. Carstairs
(Acting)
Assigned: 15 October 87
AV 478-4952
Comm (617) 377-4952

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)

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OASD(PA) DFOISR 88-T-0470

5. Related Programs: None

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: The Fixed Base Microwave Landing System (FBMLS) 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 second and third MLS contracts.

c. Commercial Microwave Landing Systems Avionics (CMLSA): The Commercial Microwave Landing System Avionics equipment modified and tested as necessary for integration and installation into cargo, tanker, trainer, bomber, and operational support aircraft will interoperate with the Civil and Military Ground System.

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.

b. Significant Developments Since Last Report:

(1) Commercial MLS Avionics development contract awarded in Oct 1987.

(2) FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

(3) The Mobile MLS, Commercial MLS Avionics and Fixed Base MLS are expected to satisfy the mission requirements as directed.

c. Changes since 31 December 1987 -- None.

8. Decision Coordinating Paper (DCP) Threshold Breaches: N/A

9. Schedule:

a. Milestones --	Planning Estimate/ Approved Program	Current Estimate
(1) MMLS		
Service Component Program Initiation	Jan 83/Jan 83	Jan 83
System Operational Concept MAC TMLS	Sep 84/Sep 84	Sep 84
System Operational Concept	Sep 85/Sep 85	TBD
MMLS Development Contract Award	Jun 86/Nov 87	Jan 88
MMLS IOT&E Completion	Sep 88/Mar 90	May 90
MMLS Production Contract Award	Oct 88/May 90	May 90
MMLS Initial Operational Capability	Sep 89/Aug 91	May 91
(2) FBMLS		
FBMLS Program Initiated	Jan 83/Jan 83	Jan 83
FBMLS Production Contract Award (FAA)	Jun 87/Jun 87	Jun 89 (Ch-1)
FBMLS First System Delivery (FSD)	Mar 90/Mar 90	Apr 92 (Ch-1)

(3) CMLSA

CMLSA Contract award	May 87/May 87	Oct 87
CMLSA DT&E/IOT&E Complete	Sep 88/Sep 88	Aug 89
CMLSA Production Decision	Dec 88/Dec 88	Apr 89
CMLSA Initial Operational Capability	Oct 90/Oct 90	Oct 90

9. Schedule: (Cont'd)

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.

c. Current Change Explanations --

(Ch-1) 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.

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: FY 1988/FY 1989 President's Budget.

10. Technical/Operational Characteristics:

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. Technical --			
(1) MMLS			
Degrees of Azimuth Coverage	± 40/ ± 40	N/A	± 40
Degrees of Elevation Coverage	0.9 to 15/0.9 to 15	N/A	0.9 to 15
Range in Nautical Miles (Min)	15/15	N/A	15
Operating Temperature Range in degrees Fahrenheit	-60 to +120/-60 to +120	N/A	-60 to +120
(2) FBMLS			
Degrees of Azimuth Coverage (to 20 NM)	± 40/ ± 40	N/A	± 40
Degrees of Elevation Coverage	0.9 to 15/0.9 to 15	N/A	0.9 to 15
Range in Nautical Miles	20 / 20	N/A	20
Operating Temperature Range in degrees Fahrenheit	-68 to +131/-68 to +131	N/A	-68 to +131
(3) CMLSA			
Mean Time between Corrective Maintenance Action (Receiver Processor) in hours	5,000 / NA	N/A	5,000

10. Technical/Operational Characteristics: (Cont'd)

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
System Mean Time between Critical Failures in hours	7,000 / NA	N/A	7,000
System Mean Time between Corrective Maint. Action in hours	2,000 / NA	N/A	2,000

b. Operational --

(1) MMLS

Percent Interoperable with International Civil Aviation Organization (ICAO) MLS Equipment	100/100	N/A	100
Number of selectable channels from 5031 MHz to 5090.7 MHz	200/200	N/A	200
Field Assembly personnel/ time (minutes) required	2/30 / 2/30	N/A	2/30

(2) FBMLS

Percent Interoperable with International Civil Aviation Organization (ICAO)	100/100	N/A	100
Number of selectable channels from 5031-5090.7 MHz	200/200	N/A	200

(3) CMLSA

Critical Failures per year	.1 / N/A	N/A	.1

c. Previous Change Explanations -- FBMLS technical/operational characteristics were added. CMLSA technical/operational characteristics were added.

d. Current Change Explanations -- None

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 : FY 1988/FY 1989 President's Budget.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost --	Planning Estimate	Changes	Current Estimate
(1) Ground Systems			
Development (RDT&E)	29.9	-8.5	21.4
Procurement	47.8	+101.7	149.5
MMLS	(39.4)	(-6.1)	(33.3)
FBMLS	-	(+94.8)	(94.8)
Total Flyaway	(39.4)	(+88.7)	(128.1)
Peculiar Support	-	-	-
Other Weapon/System Cost	-	-	-
Initial Spares	(8.4)	(+13.0)	(21.4)
MMLS	(8.4)	(-1.6)	(6.8)
FBMLS	-	(+14.6)	(14.6)
Operations & Maintenance (O&M)		+35.2	35.2
Total FY82 Base-Year $	77.7	+128.4	206.1
Escalation	26.2	+70.1	96.3
Development (RDT&E)	(7.4)	(-1.7)	(5.7)
Procurement	(18.8)	(+54.0)	(72.8)
Ops & Maint (O&M)	-	(+17.8)	(17.8)
Total Then-Year $	103.9	+198.5	302.4
(2) Commercial Avionics			
Development (RDT&E)	4.7	+2.7	7.4
Procurement	16.4	-4.7	11.7
Comm Avionics	(15.2)	(-4.9)	(10.3)
Total Flyaway	(15.2)	(-4.9)	(10.3)
Peculiar Support	-	-	-
Other Weapon/System Cost	-	-	-
Initial Spares	(1.2)	(+0.2)	(1.4)
Operations & Maintenance (O&M)	6.7	+0.1	6.8
Total FY 82 Base-Year $	27.8	-1.9	25.9
Escalation	12.3	-2.3	10.0
Development (RDT&E)	(0.9)	(+0.6)	(1.5)
Procurement	(9.1)	(-3.2)	(5.9)
Ops & Maint (O&M)	(2.3)	(+0.3)	(2.6)
Total Then-Year $	40.1	-4.2	35.9

11. Program Acquisition Cost (Cont'd) (Current Estimate in Millions of Dollars)

	Planning Estimate	Changes	Current Estimate
(3) MLS Summary			
Development	34.6	-5.8	28.8
Procurement	64.2	+97.0	161.2
MMLS	(39.4)	(-6.1)	(33.3)
FBMLS	-	(+94.8)	(94.8)
Comm Avionics	(15.2)	(-4.9)	(10.3)
Total Flyaway	(54.6)	(+83.8)	(138.4)
Peculiar Support	-	-	-
Other Weapon/System Cost	-	-	-
Initial Spares	(9.6)	(+13.2)	(22.8)
MMLS	(8.4)	(-1.6)	(6.8)
FBMLS	-	(+14.6)	(14.6)
Comm Avionics	(1.2)	(+0.2)	(1.4)
Operations & Maintenance (O&M)	6.7	+35.3	42.0
Total FY82 Base Year	105.5	+126.5	232.0
Escalation	38.5	+67.8	106.3
Development (RDT&E)	(8.3)	(-1.1)	(7.2)
Procurement	(27.9)	(+50.8)	(78.7)
Ops & Maint (O&M)	(2.3)	(+18.1)	(20.4)
Total Then-Year $	144.0	194.3	338.3

b. Quantities --

(1) Ground Systems			
Development (RDT&E)	2	0	2
Procurement	128	+210	338
Total	130	+210	340
(2) Commercial Avionics			
Development (RDT&E)	0	0	0
Procurement	376	0	376
Total	376	0	376
(3) MLS Summary			
Development (RDT&E)	2	0	2
Procurement	504	+210	714
Total	506	+210	716

11. Program Acquisition Cost (Cont'd) (Current Estimate in Millions of Dollars)

	Planning Estimate	Changes	Current Estimate
c. Unit Cost --			
(1) Ground Systems			
Procurement:			
FY82 Base-Year $	0.373	+0.069	0.442
Then-Year $	0.520	+0.138	0.658
Program:			
FY82 Base-Year $	0.598	+0.008	0.606
Then-Year $	0.799	+0.090	0.889
(2) Commercial Avionics			
Procurement:			
FY 82 Base-Year $	0.044	-0.013	0.031
Then-Year $	0.068	-0.021	0.047
Program:			
FY 82 Base-Year $	0.074	-0.005	0.069
Then-Year $	0.107	-0.012	0.095
(3) MLS Summary			
Procurement:			
FY82 Base-Year $	0.127	+0.099	0.226
Then Year $	0.183	+0.153	0.336
Program			
FY82 Base-Year $	0.208	+0.116	0.324
Then Year $	0.285	+0.187	0.472

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- N/A

f. Nuclear Costs -- N/A

13. Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Ground Systems			
(a) Cost	302.4	306.7	302.4
(b) Quantity	340	340	340
(c) Unit Cost	0.889	0.902	0.889
(2) Commercial Avionics			
(a) Cost	35.9	36.3	35.9
(b) Quantity	376	376	376
(c) Unit Cost	0.095	0.097	0.095
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Ground Systems			
No procurement program in the current or budget year due to congressional cuts.			
(2) Commercial Avionics			
(a) Cost	N/A	N/A	5.6
Less CY Adv Proc	N/A	N/A	0
Plus PY Adv Proc	N/A	N/A	0
Net Total	N/A	N/A	5.6
(b) Quantity	N/A	N/A	160
(c) Unit Cost	N/A	N/A	0.035

13. 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	-0.5	-3.9	-	-4.4
Quantity	-	+157.0	-	+157.0
Schedule	-	+8.6	-	+8.6
Engineering	-	-	-	-
Estimating	-9.8	-23.5	-	-33.3
Other	-	-	-	-
Support	-	+20.4	+53.0	+73.4
Subtotal	-10.3	+158.6	+53.0	+201.3
Current Changes:				
Economic	-0.1	+2.1	+0.5	+2.5
Quantity	-	-	-	-
Schedule	-	+4.0	-	+4.0
Engineering	-	-	-	-
Estimating	+0.2	-9.3	-	-9.1
Other	-	-	-	-
Support	-	+0.3	-0.5	-0.2
Subtotal	+0.1	-2.9	0.0	-2.8
Total Changes	-10.2	+155.7	0.0	+198.5
Current Estimate	27.1	222.3	53.0	302.4

(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	-8.7	-15.3	-	-24.0
Other	-	-	-	-
Support	-	+13.4	+35.5	+48.9
Subtotal	-8.7	+107.8	+35.5	+134.6
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+0.2	-5.7	-	-5.5
Other	-	-	-	-
Support	-	-0.4	-0.3	-0.7
Subtotal	+0.2	-6.1	-0.3	-6.2
Total Changes	-8.5	+101.7	+35.2	+128.4
Current Estimate	21.4	149.5	35.2	206.1

13. Cost Variance Analysis (Cont'd):

a. Summary -- Commercial Avionics

(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	-2.4	-0.2	-2.7
Quantity	-	-	-	-
Schedule	-	+1.0	-	+1.0
Engineering	-	-	-	-
Estimating	+1.1	-3.5	-	-2.4
Other	-	-	-	-
Support	-	+0.6	+0.6	+1.2
Subtotal	+1.0	-4.3	+0.4	-2.9
Current Changes:				
Economic	-	+0.1	+0.1	+0.2
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+2.3	-3.4	-	-1.1
Other	-	-	-	-
Support	-	-0.3	-0.1	-0.4
Subtotal	+2.3	-3.6	0.0	-1.3
Total Changes	+3.3	-7.9	+0.4	-4.2
Current Estimate	8.9	17.6	9.4	35.9

(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	+0.8	-2.6	-	-1.8
Other	-	-	-	-
Support	-	+0.4	+0.2	+0.6
Subtotal	+0.8	-2.2	+0.2	-1.2
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+1.9	-2.3	-	-0.4
Other	-	-	-	-
Support	-	-0.2	-0.1	-0.3
Subtotal	+1.9	-2.5	-0.1	-0.7
Total Changes	+2.7	-4.7	+0.1	-1.9
Current Estimate	7.4	11.7	6.8	25.9

13. 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	-0.6	-6.3	-0.2	-7.1
Quantity	-	+157.0	-	+157.0
Schedule	-	+9.6	-	+9.6
Engineering	-	-	-	-
Estimating	-8.7	-27.0	-	-35.7
Other	-	-	-	-
Support	-	+21.0	+53.6	+74.6
Subtotal	-9.3	+154.3	+53.4	+198.4
Current Changes:				
Economic	-0.1	+2.2	+0.6	+2.7
Quantity	-	-	-	-
Schedule	-	+4.0	-	+4.0
Engineering	-	-	-	-
Estimating	+2.5	-12.7	-	-10.2
Other	-	-	-	-
Support	-	0.0	-0.6	-0.6
Subtotal	+2.4	-6.5	0.0	-4.1
Total Changes	-6.9	+147.8	+53.4	+194.3
Current Estimate	36.0	239.9	62.4	338.3

(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	-7.9	-17.9	-	-25.8
Other	-	-	-	-
Support	-	+13.8	+35.7	+49.5
Subtotal	-7.9	+105.6	+35.7	+133.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+2.1	-8.0	-	-5.9
Other	-	-	-	-
Support	-	-0.6	-0.4	-1.0
Subtotal	+2.1	-8.6	-0.4	-6.9
Total Changes	-5.8	+97.0	+35.3	+126.5
Current Estimate	28.8	161.2	42.0	232.0

3. 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.

(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.

(c) O&M

SUPPORT: Refinement of added installation costs of 256 FBMLS.

(2) Commercial Avionics

(a) RDT&E

ECONOMIC: Revised escalation indices.
ESTIMATING: OSD funding reduction and restoration based on further definition of development effort.

(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 in estimated installation costs.

13. Cost Variance Analysis (Cont'd) :

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) Ground Systems		
(a) RDT&E		
Revised escalation indices (Economic)	--	-0.1
Refinement of prior year actual development costs (Estimating)	+0.2	+0.2
(b) Procurement		
Revised escalation indices (Economic)	--	+2.1
Delay in procurement due to congressional actions (Schedule)	--	+4.0
Refinement of estimated cost of hardware (Estimating)	-5.7	-9.3
Refinement of estimated cost and delay in procurement of support (Support)	-0.4	+0.3
(c) O&M		
Revised escalation indices (Economic)	--	+0.5
Refinement of estimated support costs (Support)	-0.3	-0.5
(2) Associated Commercial Avionics		
(a) RDT&E		
Refinement of prior year actual development costs (Estimating)	+1.9	+2.3
(b) Procurement		
Revised escalation indices (Economic)	--	+0.1
Refinement of estimated costs of hardware (Estimating)	-2.3	-3.4
Refinement of estimated support costs (Support)	-0.2	-0.3
(c) O&M		
Revised escalation indices (Economic)	--	+0.1
Refinement of estimated support costs (Support)	-0.1	-0.1

d. Reference -- FY86 President's Budget

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	-0.005	-0.032	+0.037	-	-0.125	+0.215	-	+0.090	0.889

(2) Commercial Avionics

PAUC (Planning Estimate)	Changes (Then Year Dollars in Millions								PAUC (Current Estimate)
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
0.107	-0.007	-	+0.002	-	-0.009	+0.002	-	-0.012	0.095

15. Contract Information: (Then-Year Dollars in Millions)

None

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Ground Systems

(a) Percent Program Completed: 26.7% (4 yrs/15 yrs)

(b) Percent Program Cost Appropriated: 4.6% ($14.0/$302.4)

(2) Commercial Avionics

(a) Percent Program Completed: 37.5% (3 yrs/8 yrs)

(b) Percent Program Cost Appropriated: 24.8% ($8.9 /$35.9)

16. Program Funding Summary: (Cont'd) (Current Estimate in Millions of Dollars)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY86-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93-98)	Total
(1) Ground Systems					
RDT&E	14.0	13.1	-	-	27.1
Procurement	-	-	109.1	113.2	222.3
O&M	-	-	9.9	43.1	53.0
Total	14.0	13.1	119.0	156.3	302.4
(2) Commercial Avionics					
RDT&E	8.9	-	-	-	8.9
Procurement	-	5.6	12.0	-	17.6
O&M	-	-	9.4	-	9.4
Total	8.9	5.6	21.4	-	35.9
(3) Total Program					
RDT&E	22.9	13.1	-	-	36.0
Procurement	-	5.6	121.1	113.2	239.9
O&M	-	-	19.3	43.1	62.4
Total	22.9	18.7	140.4	156.3	338.3

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- Ground Systems: FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

Fiscal Year	Qty	FY82 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1984	-	-	-	0.7	-	-	0.8	3.8
1985	-	-	-	0.9	-	-	1.0	3.4
1986	-	-	-	1.2	-	-	1.4	2.8
1987	-	-	-	1.1	-	-	1.4	2.7
1988	-	-	-	7.5	-	-	9.4	3.7
1989	-	-	-	10.0	-	-	13.1	3.8
Subtotal	2	-	-	21.4	-	-	27.1	-
Appropriation: Procurement								
1990	70	-	29.6	35.4	-	-	49.3	3.6
1991	55	-	20.9	24.9	-	-	35.6	3.3
1992	38	-	14.6	16.6	-	-	24.2	2.8
1993	38	-	14.7	16.7	-	-	25.0	2.3
1994	38	-	14.7	16.7	-	-	25.5	2.3
1995	38	-	14.7	16.7	-	-	26.1	2.3
1996	38	-	10.7	12.6	-	-	20.3	2.3
1997	23	-	8.2	9.9	-	-	16.3	2.3
Subtotal	338	-	128.1	149.5	-	-	222.3	-
Appropriation: O&M								
1991	-	-	-	2.6	-	-	3.6	3.3
1992	-	-	-	4.4	-	-	6.3	2.8
1993	-	-	-	5.3	-	-	7.9	2.3
1994	-	-	-	5.4	-	-	8.1	2.3
1995	-	-	-	5.5	-	-	8.3	2.3
1996	-	-	-	5.5	-	-	8.5	2.3
1997	-	-	-	5.5	-	-	8.7	2.3
1998	-	-	-	1.0	-	-	1.6	2.3
Subtotal	-	-	-	35.2	-	-	53.0	-
Total	340	-	128.1	206.1	-	-	302.4	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary (Cont'd) -- Commercial Avionics: FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

Fiscal Year	Qty	FY82 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1985	-	-	-	1.7	-	-	2.0	3.4
1986	-	-	-	1.5	-	-	1.8	2.8
1987	-	-	-	3.7	-	-	4.5	2.7
1988	-	-	-	0.5	-	-	0.6	3.7
Subtotal	-	-	-	7.4	-	-	8.9	-
Appropriation: Procurement								
1989	160	-	3.5	3.8	-	-	5.6	3.8
1990	167	-	5.4	5.7	-	-	8.6	3.6
1991	49	-	1.4	2.0	-	-	3.1	3.3
1992	0	-	0.0	0.2	-	-	0.3	2.8
Subtotal	376	-	10.3	11.7	-	-	17.6	-
Appropriation: O&M								
1990	-	-	-	2.9	-	-	3.9	3.6
1991	-	-	-	3.0	-	-	4.2	3.3
1992	-	-	-	0.9	-	-	1.3	2.8
Subtotal	-	-	-	6.8	-	-	9.4	-
Total	376	-	10.3	25.9	-	-	35.9	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

Annual Summary -- MLS Summary: FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

Fiscal Year	Qty	FY82 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1984	-	-	-	0.7	-	-	0.8	3.8
1985	-	-	-	2.6	-	-	3.0	3.4
1986	-	-	-	2.7	-	-	3.2	2.8
1987	-	-	-	4.8	-	-	5.9	2.7
1988	-	-	-	8.0	-	-	10.0	3.7
1989	-	-	-	10.0	-	-	13.1	3.8
Subtotal	2	-	-	28.8	-	-	36.0	-
Appropriation: Procurement								
1989	160	-	3.6	3.8	-	-	5.6	3.8
1990	237	-	35.0	41.1	-	-	57.9	3.6
1991	104	-	22.4	26.9	-	-	38.7	3.3
1992	38	-	14.6	16.8	-	-	24.5	2.8
1993	38	-	14.7	16.7	-	-	25.0	2.3
1994	38	-	14.7	16.7	-	-	25.5	2.3
1995	38	-	14.7	16.7	-	-	26.1	2.3
1996	38	-	10.7	12.6	-	-	20.3	2.3
1997	23	-	8.2	9.9	-	-	16.3	2.3
Subtotal	714	-	138.6	161.2	-	-	239.9	-
Appropriation: O&M								
1990	-	-	-	2.9	-	-	3.9	3.6
1991	-	-	-	5.6	-	-	7.8	3.3
1992	-	-	-	5.3	-	-	7.6	2.8
1993	-	-	-	5.3	-	-	7.9	2.3
1994	-	-	-	5.4	-	-	8.1	2.3
1995	-	-	-	5.5	-	-	8.3	2.3
1996	-	-	-	5.5	-	-	8.5	2.3
1997	-	-	-	5.5	-	-	8.7	2.3
1998	-	-	-	1.0	-	-	1.6	2.3
Subtotal	-	-	-	42.0	-	-	62.4	-
Total	716	-	138.6	232.0	-	-	338.3	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

d. Obligations and Expenditures --

(1) Ground Systems (Note 1)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1984	0.8	0.8	0.8
1985	1.0	1.0	1.0
1986	1.4	1.4	1.1
1987	1.4	1.4	1.0
1988	9.4	1.4	0.2
1989	13.1	-	-
Total	27.1	6.0	4.1

(2) Commercial Avionics (Note 1)

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1985	2.0	2.0	2.0
1986	1.8	1.8	1.8
1987	4.5	4.5	0.4
1988	0.6	0.6	0.3
Total	8.9	8.9	4.5

17. Production Rate Data: N/A

18. Operating and Support Costs: N/A

NOTE 1: Reflects Program Office data as of 3 February 1988 ESD/STAR.

(9)

SAR-87-078

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SELECTED ACQUISITION REPORT (SCS: DD-COMP(Q&A)823)
PROGRAM: ADVANCED TACTICAL FIGHTER

AF-4/ ATF

AS OF DATE: December 31, 1987

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88-0126-1

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:

RDT&E: PE 63230F
PE 64239F
PE 64227F BPAC 643143 (shared funding)
PE 63109F BPAC 623393 (shared funding)
PE 64250F

5. (U) Related Programs: Not Applicable

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AS AMENDED

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[redacted]
Classified By: ATF SCG, dtd [redacted]
Declassify On: OADR

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ASD(PA) DFOISR 88-T-0178

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 with their final reports being delivered in 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. Seven contracts were awarded for PAVE PILLAR, the Integrated Avionics pre-design effort, in 1985. VHSIC insertion efforts were started for equipment which would be necessary to complete a fully integrated aircraft. 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 put on contract to develop prototype engines under the renamed ATF Engine (ATFE) program. 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.

b. (U) Significant Developments Since Last Report -- 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 Engines 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. Procedures have been instituted to allow all involved government and industrial organizations to participate fully in resolving technical issues and implementing the optimum set of common avionics hardware and software items. Common avionics documents published to date include an Advanced Avionics Architecture standard and draft specifications for data processors, packaging, software development tools, etc.

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 Presidential Budget Decisions (PBD's). Proper adjustments will be completed and reported in a future SAR.

ATF as currently planned will satisfy its mission requirments.

c. (U) Changes Since 'As of' Date -- None

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches -- None

9. (U) Schedule:

a. (U) Milestones --

	Planning Estimate/ Approved Program*	Current Estimate
1. Mission Element Need Statement Approval	Nov 81/Nov 81	Nov 81
2. Concept Development Contract Award	Sep 83/ --	Sep 83
3. Milestone I (JRMB I)	Sep 85/ --	Oct 86
4. Dem/Val Contract Award	Oct 85/ --	Oct 86
5. Milestone II (DAB II)	Dec 88/ --	Nov 90 (Ch-1)
6. Milestone III (DAB III)	Dec 91/ --	Nov 95 (Ch-1)
7. IOC**	Sep 95/Sep 95	Sep 96 (Ch-1)

* The approved program sets the beginning date and year of IOC goal, but does not contain the detailed schedule milestones.

** IOC is defined as delivery of one combat-coded squadron.

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 and be consistent with DAB Milestone II and III projections.

c. (U) Current Change Explanations --

(Ch-1) DAB Milestone II is changed from January 91 to November 90, DAB III from January 95 to November 95, and IOC from March 96 to September 96 to reduce the concurrency in the program.

d. (U) References --

Planning Estimate: Advanced Tactical Fighter, Mission Element Need Statement, approved by Defense Resources Board Nov 23, 1981

Approved Program: Tactical Air Forces (TAF), Statement of Operational Need, Nov 9, 1984

10. (U) Technical/Operational Characteristics:

a. (U) Technical* --	Plan Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(b)(1)			

b. (U) Operational* --

(U) TAKE-OFF GROSS WEIGHT (Primary Air Superiority Mission) (Internal Fuel Only) (Lbs)	50,000/TBD	N/A	50,000

(b)(1)

*(U) Specific technical and operational characteristics for this aircraft are still being determined. These planning estimates may change markedly as tradeoffs are accomplished during the Demonstration/Validation phase (currently FY 86-91).

c. (U) Previous Change Explanations -- None

d. (U) Current Change Explanations -- None

e. (U) References --

Planning Estimate: Advanced Tactical Fighter, Mission Element Need Statement, approved by Defense Resources Board Nov 23, 1981

Approved Program: Tactical Air Forces (TAF), Statement of Operational Need, Nov 9, 1984

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. (U) Cost --	Planning Estimate	Changes	Current Estimate
Development (RDT&E)	$ 11785.5	$ -1728.3	$ 10057.2
Procurement	--	--	--
Construction (MILCON)	--	--	--
Total FY 85 Base-Year $	11785.5	-1728.3	10057.2
Escalation	3508.5	-895.7	2612.8
Development (RDT&E)	(3508.5)	(-895.7)	(2612.8)
Procurement	--	--	--
Construction (MILCON)	--	--	--
Total Then Year $	$ 15294.0	$ -2624.0	$ 12670.0
b. (U) Quantities --			
Development (RDT&E)	12	-3	9
Procurement	N/A	N/A	N/A
Total	12	-3	9

c. (U) Unit Cost -- Not Applicable

d. (U) Approved Design to Cost Goal -- None

h. (U) Foreign Military Sales -- None

f. (U) Nuclear Costs -- None

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. (U) Program Acquisition *			
(1) Cost	12670.0	12643.4	12670.0
(2) Quantity	9	9	9
(3) Unit Cost	N/A	N/A	N/A

*RDT&E only

b. (U) Current Procurement -- Not Applicable

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	-665.8	--	--	-665.8
Quantity	-467.7	--	--	-467.7
Schedule	+407.1	--	--	+407.1
Engineering	0.0	--	--	0.0
Estimating	-2206.2	--	--	-2206.2
Other	0.0	--	--	0.0
Support	+282.0	--	--	+282.0
Subtotal	-2650.6	--	--	-2650.6
Current Changes				
Economic	+49.6	--	--	+49.6
Quantity		--	--	
Schedule		--	--	
Engineering		--	--	
Estimating	-23.0	--	--	-23.0
Other		--	--	
Support		--	--	
Subtotal	+26.6	--	--	+26.6
Total Changes	-2624.0	--	--	-2624.0
Current Estimate	12670.0	--	--	12670.0

(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	-1563.1	--	--	-1563.1
Other	0.0	--	--	0.0
Support	218.6	--	--	218.6
Subtotal	-1713.5	--	--	-1713.5
Current Changes				
Quantity		--	--	
Schedule	0.0	--	--	0.0
Engineering	0.0	--	--	0.0
Estimating	-14.8	--	--	-14.8
Other	0.0	--	--	0.0
Support		--	--	
Subtotal	-14.8	--	--	-14.8
Total Changes	-1728.3	--	--	-1728.3
Current Estimate	10057.2	--	--	10057.2

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 (JRMB I) decision delayed, revision of program estimate to reflect funding constraints.

Estimating: Adjustment for prior year escalation, updated estimating methodology, Gramm-Rudman cuts, and addition of INEWS/ICNIA avionics effort.

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)	--	+49.6
Adjustment for current and prior years escalation change. (Estimating)	+5.4	+5.8
Adjustment for FY90 and out escalation change. (Estimating)	-43.8	-56.7
Reduction in FY86 funding resulting from deletion of contingent liabilities from the JAFE contracts. (Estimating)	-.7	-.7
Increase in FY87 funding. Used to support FY87 engine contractual obligations. (Estimating)	+11.4	+12.3
Congressional Reduction in FY88 funding. Non-availability of these funds will delay prototype engine contract efforts, resulting in delays of prototype first flight, start of FSD, and IOC. (Estimating)	-32.8	-36.7
Increase in President's Budget Request for FY89. These funds will be used to add prototype modules to the INEWS program and begin Advanced Avionics Comsec Unit development. (Estimating)	+45.7	+53.0

(2) (U) Procurement -- Not Applicable

(3) (U) MILCON -- Not Applicable

d. (U) References --

Planning Estimate: FY86 President's Budget, 1 Feb 1985.

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 --

Demonstrator Engine:

Pratt & Whitney Aircraft Group,
West Palm Beach, Florida
F33657-83-C-0092, FFP*
Award: September 30, 1983
Definitized: September 30, 1983

Initial Contract Price		
Target	Ceiling	Qty
$ 207.6	N/A	2

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 207.6	N/A	2	$ 207.6	$ 207.6

* No CPR (FFP Contract)

Demonstrator Engine:

General Electric Co., Cincinnati, OH
F33657-83-C-0281, FFP*
Award: September 30, 1983
Definitized: September 30, 1983

Initial Contract Price		
Target	Ceiling	Qty
$ 207.6	N/A	2

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$ 208.0	N/A	2	$ 208.0	$ 208.0

*No CPR (FFP Contract)

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
$ 341.9	N/A	6	$ 341.9	$ 341.9

* 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
$ 341.9	N/A	6	$ 341.9	$ 341.9

* 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)

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) Percent Program Completed: 42.9 % (6 yrs / 14 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 8.5 % ($1071.9M / $12670.0M)
(Funds Appropriated To Date in Millions/Total Program Funding in Millions)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY83-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93-96)	Total
RDT&E	$ 1071.9	$ 798.9	$ 3777.7	$ 7021.5	$ 12670.0
Procurement	$ --	$ --	$ --	$ --	$ --
MILCON	$ --	$ --	$ --	$ --	$ --
Total	$ 1071.9	$ 798.9	$ 3777.7	$ 7021.5	$ 12670.0

c. (U) Annual Summary * --

Fiscal Year	FY 85 Base-Year Dollars Qty	Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E								
1983	--	--	--	21.1	--	--	20.0	4.9
1984	--	--	--	34.6	--	--	34.1	3.8
1985	--	--	--	89.2	--	--	90.8	3.4
1986	--	--	--	145.7	--	--	152.1	2.8
1987	--	--	--	245.5	--	--	264.7**	2.7
1988	--	--	--	455.9	--	--	510.2	3.7
1989	--	--	--	688.7	--	--	798.9	3.8
1990	--	--	--	974.7	--	--	1168.7	3.6
1991	--	--	--	1162.9	--	--	1436.2	3.3
1992	--	--	--	925.7	--	--	1172.8	2.8
1993	--	--	--	2190.1	--	--	2838.4	2.3
1994	--	--	--	1922.1	--	--	2548.7	2.3
1995	--	--	--	1011.0	--	--	1370.9	2.3
1996	--	--	--	190.0	--	--	263.5	2.3
Total	9	--	--	10057.2	--	--	12670.0	

Appropriation: Procurement - None
Appropriation: MILCON - None

*FY90 and beyond have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBD's. Proper adjustments will be completed and reported in a future SAR.

** Does not include the reprogramming of $34.1M included in the FY88 appropriations bill which is pending approval of sources. Non-availability of these funds will delay development of the prototype ATFE's resulting in a commensurate slip in prototype first flight, start of FSD, and IOC.

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated **	Expended **
	Appropriation: RDT&E		
1983	20.0	19.9 *	19.9
1984	34.1	33.5 *	33.5
1985	90.8	90.0 *	89.4
1986	152.1	151.9	140.0
1987	264.7	262.4	248.0
1988	510.2	42.2***	25.7
To Complete	11598.1	N/A	N/A
Total	12670.0	599.9	556.5

* Prior year obligations do not equal appropriation totals due to allowances for contingent liabilities on JAFE contracts.

** Reflects program office records as of 31 December, 1987.

*** Reflects funds released for obligation to the program office as of 31 Dec 87.

17. (U) Production Rate Data:

Not Applicable.

18. (U) Operating and Support Costs:

Not Applicable.

SAR-87-086

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SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)

PROGRAM: (U) Mark XV Identification, Friend or Foe (IFF) System

AS OF DATE: December 31, 1987

AF-8 C13

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SAF/PAC

88-0155-

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:

Combat Identification System Program Office
Aeronautical Systems Division
Wright-Patterson AFB, OH 45433-6503

Col Donald M. Bohler
Assigned: 15 July 1987
AV: 785-4523
Comm: (513) 255-6611

4. (U) Program Elements/Procurement Line Items:

RDT&E:	Air Force	PE 63742F Project 642599	(Shared funding)
		PE 64725F Project 642598	(Shared funding)
		PE 64725F Project 643592	(Tri-service core program)
	Army	PE 63706A Project D297	(Shared funding)
		PE 64709A Project D530	(Shared funding)
	Navy	PE 64211N Project W1253	(Shared funding)

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.

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OASD(PA) DFOISR 88-F-0744

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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 (F^3PC). 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 80 with the approval of the Joint Mission Element Need Statement (JMENS) and concept design contracts were awarded to three contractor teams in Oct 80. Final contractor reports were submitted in Aug 81. An RFP for Demonstration/Validation was issued in Jul 82. The RFP was restructured in Jan 83 into a two phase program. Phase I (brassboard waveform demonstration) contracts were awarded to Bendix and Texas Instruments in May 83. A 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 84. DSARC I was held in Jul 84 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 slipped the start of FSD to FY88.

At the NATO Identification System (NIS) project director's meeting on 8-10 Dec 86, 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.

b. (U) Significant Developments Since Last Report--

(1) (U) 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 continues with completion scheduled by March 1988.

(2) (U) 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.

7. (U) Program Highlights (Cont'd):

[redacted]90 and beyond numbers have not been completely adjusted to reflect the impact of [redacted]89 PBDs. Proper adjustments will be completed and reported in a future SAR.

(U) The Mark XV system is expected to satisfy the mission requirements.

c. (U) Changes Since 'As Of' Date -- None.

8. (U) Decision Coordinating Paper Threshold Breaches: The DCP is currently in work to support the DAB II process.

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/Mar 88	Nov 88 Ch-1
FSD Contract Award	Jun 88/Jun 88	Dec 88 Ch-1
Critical Design Review	Jun 89/Jun 89	May 90 Ch-1
DAB IIIA	Sep 91/Sep 91	Aug 93 Ch-1
First Production Contract Award	Oct 91/Oct 91	Sep 93 Ch-1
DAB IIIB	Sep 92/Sep 92	Nov 94 Ch-1
IOC	Sep 94/Sep 94	Sep 94 (1)

Notes:
(1) 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 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 3 Mar 87. FSD Contract Award was delayed from Jun 88 to Aug 88 to allow for implementation of SDDM actions and contractual procedures. 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 91 to Jun 92, First Production Contract Award changed from Oct 91 to Jul 92, and DAB IIIB changed from Sep 92 to Jun 93.

c. (U) Current Change Explanations --

(Ch-1) The DAB II date was delayed to Nov 88 due to the Air Force decision to hold release of the Request for Proposal (RFP) for FSD to review the system requirement. Subsequent milestones are impacted by this delay. The time from

c. (U) Current Change Explanations (Cont'd) --

FSD contract award to DAB IIIA was increased by twelve months due to a reassessment of the development schedule. DAB II and subsequent milestone current estimated completion dates assume an RFP release prior to 29 Apr 88. Overall changes from the 30 Sep 87 SAR to the 31 Dec 87 SAR include the following: DAB II changed from May 88 to Nov 88; FSD contract award changed from Aug 88 to Dec 88; Critical Design Review changed from Jun 89 to May 90; DAB IIIA changed from Jun 92 to Aug 93; First Production Contract Award changed from Jul 92 to Sep 93; and DAB IIIB changed from Jun 93 to Nov 94.

d. (U) References --

(1) (U) Planning Estimate: SDDM, 22 August 84 (Unclassified), System Concept Paper (SCP) (draft) 16 November 84 (Secret), PMD 4015(13)/63742F, 5 April 85 (Unclassified) AFSC Form 56, 63742-85-122, 28 August 85 (Unclassified)

(2) (U) Approved Program: SDDM, 22 August 84 (Unclassified), SCP (draft) 16 November 84 ~~(Secret)~~, PMD 4015(13)/63742F, 5 April 85 (Unclassified) AFSC Form 56, 63742-85-122, 28 August 85 (Unclassified)

10. ( ) Technical/Operational Characteristics:

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(b)(1)			
(2) (U) Volume:			
(a) (U) Transponder, Type I (based on APX-100) (cu in)	610/610		610
(b) (U) Transponder, Type II (based on APX-101) (cu in)			TBD (Ch-1)
(c) (U) Transponder, Type III (based on APX-100, Panel Mount) (cu in)			TBD (Ch-1)
(d) (U) Interrogator, Airborne (based on APX-76) (cu in)	1027/1027		1027
(e) (U) Interrogator, Ground (based on TPX-46) (cu in)			TBD (Ch-1)
(f) (U) Interrogator, Ship (based on UPX-27) (cu in)			TBD (Ch-1)

			Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
b.	(U)	Operational:			
(1)	(U)	System Compatibility (Signals) (Note 1)	MK XV, MK XII, ATCRBS, MODE S/ MK XV, MK XII, ATCRBS, MODE S		MK XV, MK XII ATCRBS, MODE S
(2)	(U)	Form, Fit, Function and Plug Compatible (F3PC) (Note 2)	Direct MK XII retrofit/ Direct MK XII retrofit		Direct MK XII retrofit
(3)	(U)	Frequency Band(s)		L(D)/L(D)	L(D) (Note 8)
(4)	(U)	Mean Time Between Failures (MTBF) (Hrs) (Note 3)		1000/1000	1000
(5)	(U)	Mean Time Between Critical Failures (MTBCF) (Hrs) (Note 4)		370/370	370
(6)	(U)	Mean Time Between Maintenance (MTBM) (Hrs) (Note 4)		177/177	177
(7)	(U)	Maintenance False Removal Rate (MFRR) (percent (%)		2/2	2
(8)	(U)	Mean Time to Repair-On Equipment (Hrs)		0.5/0.5	0.5
(9)	(U)	Mean Time to Repair-Off Equipment (Hrs)		2.5/2.5	2.5
(10)	(U)	Maintenance Manhour Per Operating Hour (MMH/OH)		0.0075/0.0075	0.0075

(b)(1)

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 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 -- None.

d. (U) Current Change Explanations --
(Ch-1) 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.

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: Mark XV MROC, 16 July 84 (Secret), SDDM, 22 August 84 (Unclassified), and System Concept Paper (SCP) (draft), 16 November 84 ~~(Secret)~~.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars) (Summary)

	Planning Estimate	Changes	Current Estimate
a. (U) Cost --			
Development (RDT&E)	$ 1200.6	-279.6	$ 921.0
Total FY82 Base Year $	1200.6	-279.6	921.0
Escalation	471.5	-140.5	331.0
Development (RDT&E)	(471.5)	(-140.5)	(331.0)
Total Then Year $	1672.1	-420.1	1252.0
b. (U) Quantities --	N/A		N/A
Development (RDT&E)			
Total			
c. (U) Unit Cost --	N/A		N/A

d. (U) Approved Design to Cost Goal -- N/A

e. (U) Foreign Military Sales -- N/A

f. (U) Nuclear Costs -- N/A

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	-89.7			-89.7
Quantity	-			-
Schedule	+81.2			+81.2
Engineering	-			-
Estimating	-429.4			-429.4
Other	-			-
Support	+6.7			+6.7
Subtotal	-431.2			-431.2
Current Changes:				
Economic	+3.1			+3.1
Quantity	-			-
Schedule	+11.7			+11.7
Engineering	-			-
Estimating	-3.7			-3.7
Other	-			-
Support	-			-
Subtotal	+11.1			+11.1
Total Changes	-420.1			-420.1
Current Estimate	1252.0			1252.0

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	-282.4			-282.4
Other	-			-
Support	+5.7			+5.7
Subtotal	-276.7			-276.7
Current Changes:				
Quantity	-			-
Schedule	-			-
Engineering	-			-
Estimating	-2.9			-2.9
Other	-			-
Support	-			-
Subtotal	-2.9			-2.9
Total Changes	-279.6			-279.6
Current Estimate	921.0			921.0

b. (U) Previous Change Explanations --

) 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.

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)	---	+3.1
Inflation impact of rescheduled effort caused by budget reductions (Schedule)	---	+11.7
Adjustment for current and prior year escalation changes (Estimating)	+.5	+.8
Reduced Army and Air Force management reserve (Estimating)	-.7	-.6
Adjustment for FY90 and beyond outyear funds (Estimating)	-2.7	-3.9

(2) (U) PROCUREMENT -- N/A

(3) (U) MILCON -- N/A

d. (U) References --
Planning Estimate: FY86 President's Budget

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

Initial SAR/Planning Estimate (PE) to Current Estimate (CE)

PAUC Initial SAR/Planning Estimate	Changes (Then-Year Dollars in Millions)								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Spt	Other	Total	
N/A	-	-	-	-	-	-	-	-	N/A

15. (U) Contract Information: (Then-Year Dollars in Millions)

(U) a. RDT&E -

Currently no contracts over $40 Million.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status--

(1) Percent Program Completed: 56.3% (9 yrs/16 yrs)

(2) Percent Program Cost Appropriated: 15.2% ($190.5/$1252.0)

b. (U) Appropriation Summary --

(Then Year Dollars in Millions)

Appropriation	Current & Prior Years (FY80-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Balance to Complete Beyond FYDP (FY93-95)	Total
RDT&E	$ 190.5	$ 88.8	$ 606.0	$ 366.7	$ 1252.0
TOTAL	$ 190.5	$ 88.8	$ 606.0	$ 366.7	$ 1252.0

c. (U) Annual Summary -- FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

c. (U) Annual Summary --

Fiscal Year	Qty	FY82 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate
APPROPRIATION: RDT&E								
Tri-Service								
1980	N/A	N/A	N/A	9.8	N/A	N/A	8.5	-
1981				6.5			6.2	11.9
1982				14.1			14.4	9.2
1983				15.7			16.8	4.9
1984				18.4			20.5	3.8
1985				21.8			25.0	3.4
1986				26.5			31.2	2.8
1987				23.0			27.9	2.7
1988				31.8			40.0	3.7
1989				68.0			88.8	3.8
1990				175.0			236.2	3.6
1991				143.7			199.9	3.3
1992				119.1			169.9	2.8
1993				136.0			198.4	2.3
1994				60.5			90.3	2.3
1995				51.1			78.0	2.3
SUBTTL				921.0			1252.0	-
TOTAL				921.0			1252.0	-
Air Force								
1980	N/A	N/A	N/A	6.9	N/A	N/A	6.0	-
1981				1.3			1.2	11.9
1982				5.9			6.0	9.2
1983				6.8			7.3	4.9
1984				8.7			9.7	3.8
1985				14.3			16.4	3.4
1986				7.4			8.7	2.8
1987				8.1			9.8	2.7
1988				17.9			22.5	3.7
1989				50.8			66.3	3.8
1990				125.8			169.8	3.6
1991				122.1			169.9	3.3
1992				74.9			106.9	2.8
1993				69.8			101.8	2.3
1994				10.7			16.0	2.3
1995				-			-	2.3
SUBTTL				531.4			718.3	-

Army

1980	N/A	N/A	N/A	2.9	N/A	N/A	2.5	-
1981				2.6			2.5	11.9
1982				5.8			5.9	9.2
1983				2.8			3.0	4.9
1984				3.6			4.0	3.8
1985				3.7			4.2	3.4
1986				7.7			9.1	2.8
1987				4.5			5.5	2.7
1988				1.2			1.5	3.7
1989				3.8			5.0	3.8
1990				15.1			20.4	3.6
1991				12.4			17.2	3.3
1992				13.9			19.8	2.8
1993				6.6			9.6	2.3
1994				-			-	2.3
1995				-			-	2.3
SUBTTL				86.6			110.2	-

Navy

1980	N/A	N/A	N/A	-	N/A	N/A	-	-
1981				2.6			2.5	11.9
1982				2.4			2.5	9.2
1983				6.1			6.5	4.9
1984				6.1			6.8	3.8
1985				3.8			4.4	3.4
1986				11.4			13.4	2.8
1987				10.4			12.6	2.7
1988				12.7			16.0	3.7
1989				13.4			17.5	3.8
1990				34.1			46.0	3.6
1991				9.2			12.8	3.3
1992				30.3			43.2	2.8
1993				59.6			87.0	2.3
1994				49.8			74.3	2.3
1995				51.1			78.0	2.3
SUBTTL				303.0			423.5	-

16. (U) Program Funding Summary: (Current Estimate in Millions of dollars)

d. (U) Obligations and Expenditures -- (As of: 31 Dec 87)

Fiscal Year	Then Year Dollars in Millions		
	Total	Obligated	Expended
APPROPRIATION: RDT&E			
Tri-Service			
1980	8.5	8.5	8.5
1981	6.2	6.2	6.2
1982	14.4	14.4	12.9
1983	16.8	16.8	16.5
1984	20.5	20.5	20.3
1985	25.0	25.0	23.5
1986	31.2	31.2	27.7
1987	27.9	26.7	15.9
1988	40.0	6.6	0.3
To Complete	1061.5	-	-
TOTAL	1252.0	155.9	131.8
Air Force			
1980	6.0	6.0	6.0
1981	1.2	1.2	1.2
1982	6.0	6.0	6.0
1983	7.3	7.3	7.2
1984	9.7	9.7	9.5
1985	16.4	16.4	15.2
1986	8.7	8.7	7.6
1987	9.8	9.7	5.9
1988	22.5	3.9	0.1
To Complete	630.7	-	-
TOTAL	718.3	68.9	58.7
Army			
1980	2.5	2.5	2.5
1981	2.5	2.5	2.5
1982	5.9	5.9	5.9
1983	3.0	3.0	3.0
1984	4.0	4.0	4.0
1985	4.2	4.2	4.2
1986	9.1	9.1	8.3
1987	5.5	5.4	2.9
1988	1.5	0.3	-
To Complete	72.0	-	-
TOTAL	110.2	36.9	33.3

1980	-	-	-
1981	2.5	2.5	2.5
1982	2.5	2.5	1.0
1983	6.5	6.5	6.3
1984	6.8	6.8	6.8
1985	4.4	4.4	4.1
1986	13.4	13.4	11.8
1987	12.6	11.6	7.1
1988	16.0	2.4	0.2
To Complete	358.8	-	-
TOTAL	423.5	50.1	39.8

17. (U) Production Rate Data:

a. (U) Annual Production Rates -- N/A

b. (U) Cost Variance -- Dollars in Millions -- N/A

c. (U) Schedule Variance -- N/A

d. (U) Deliveries including spares (Plan/Actual) --

	To Date
RDT&E	N/A
Procurement	N/A

18. (U) Operating and Support Costs -- N/A

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SAR-87-096

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: SMALL ICBM

AF-29 SMALL ICBM

AS OF DATE: Dec 31, 1987

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1. Designation and Nomenclature (Popular Name): None assigned to date (Small ICBM)

2. DOD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

Ballistic Missile Office
Norton AFB, CA 92409-6468

Brig Gen Edward P. Barry, Jr.
Assigned: 4 September 1985
AV 876-6014; COMM (714) 382-6014

4. Program Elements/Procurement Line Items:

RDT&E: PE 64312F (Shared funding)

PROCUREMENT: PE 11219F

MILCON: PE 11219F

SAF/PAS
88-0139-T

5. 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. Should deterrence fail, the Small ICBM must be able to effectively attack the full spectrum of designated targets with nuclear weapons. The system must provide a prompt retaliatory capability. The Small ICBM missile has three powered, solid propellant stages capable of delivering a single reentry vehicle. The missile is to be transported in a hardened mobile launcher. Small ICBM does not 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 by the Authorization Act 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 Phase/Pre-Full-Scale Development (FSD) Phase. 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 with FSD of a 37,000 lb class single warhead ICBM carried on a hardened mobile launcher (HML) deployed initially at Minuteman ICBM launch facilities, but with a future option for Southwest basing (random movement mode). The entire test program for pre-operational prototype hardware was successfully completed and a fully successful System Design Review was completed on the entire weapon system and its subsystems.

b. Significant Developments Since last Report -- As of the date of this SAR the Small ICBM was making excellent progress toward successful completion of full scale development (FSD). System component testing continues to be extremely successful and there is a high level of confidence in the program's technology. All missile and basing components were meeting technical performance requirements, and contract cost and schedule performance was within 1% of original FSD objectives. Unfortunately, the reduction of RDT&E funds to $700M in FY 88 and to $200M in FY 89 is resulting in a massive restructure of all existing contracts and major revisions in program content and schedule objectives. Restoring the program to current FSD status at a later date will entail major cost and schedule inefficiencies.

Small ICBM is expected to meet its mission requirements.

c. Changes Since "As Of" Date: None

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP (dated 1 Nov 86) threshold breaches.

9. (U) Schedule:

	Dev Estimate/ Approved Program	Current Estimate
a. (U) Milestones --		
(U) Initial Program Management Directive (Pres. directive)	Sep 83/ N/A	Sep 83
(U) Full Scale Develop.(JRMB II)	Dec 86/ N/A	Dec 86
(U) System Design Review	Mar 87/ N/A	May 87
(b)(1)		
(U) First Contract Award for Production	Dec 89/Dec 89	N/A (Ch-1)
(U) IOC	Dec 92/Dec 92	N/A (Ch-1)

b. (U) Previous Change Explanations -- The SDR was slipped two months due to the slip of the planned FSD decision from Oct to Dec.

c. (U) Current Change Explanations --

Ch-1: Until production and MILCON funds are restored contracts cannot be awarded nor can the IOC date be determined.

d. (U) References

(b)(1)

(U) Approved Program: PMD 0075(18), dated 2 Sept 87.

10. (U) Technical/Operational Characteristics:

	Dev Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. (U) Technical --			
Missile Weight (Lbs)	30,000/ 37,000	N/A	37,000
Range (NM)	6,000/ 6,000	N/A	6,000
Payload	-/1MK-21RVs (Ch-1)		1MK-21RVs (Ch-1)
(b)(1)			

c. (U) Previous Change Explanations -- Approved program and Current Estimate was changed from 30,000 lb to 37,000 lb missile in accordance with the sense of Congress expressed in the FY 1987 Authorization Conference report.

d. (U) Current Change Explanations -- (Ch-1) Reflects USD(A) baseline approval.

1/ Accuracy is defined in terms of Circular Error Probable (CEP).

10. (S) Technical/Operational Characteristics: (Cont)

(b)(1)

(U) Approved Program: PMD 0075(18), dated 2 Sep 87.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Changes	Current Estimate	
a. (U) Cost --				
Development (RDT&E)	9776.6	-6736.3	3040.3	
Procurement	22207.2	-22207.2	0.0	
Missile Flyaway	(9044.4)	(-9044.4)	0.0	
Other Weapon System	(7121.4)	(-7121.4)	0.0	
Support	(4191.0)	(-4191.0)	0.0	
Initial Spares	(1850.4)	(-1850.4)	0.0	
Construction (MILCON)	1727.2	-1727.2	0.0	
Total FY84 Base-Year	$33711.0	-30670.7	3040.3	1/
Escalation	11016.9	-10705.2	311.7	
Development (RDT&E)	(1873.2)	(-1561.5)	(311.7)	
Procurement	(8470.3)	(-8470.3)	(0.0)	
Construction (MILCON)	(673.4)	(-673.4)	(0.0)	
Total Then-Year	$44727.9	-41375.9	3352.0	1/
b. (U) Quantities --				
Development (RDT&E)	22	-19	3	
Procurement	623	-623	0	
Total	645	-642	3	

1/ (U) Does not reflect a FY 87 Congressional recision action of $276.6 (TYSM) currently being processed and will be reflected in future SAR submissions.

11. Program Acquisition Cost: (Cont)

c. Unit Cost ↔

	Dev Estimate	Changes	Current Estimate
Procurement:			
FY84 Base↔Year $	35.646	N/A	N/A
Then↔Year $	49.242	N/A	N/A
Program:			
FY84 Base↔Year $	52.265	+961.168	1013.433
Then↔Year $	69.346	+1047.987	1117.333

d. Approved Design to Cost Goal ↔ None

e. Foreign Military Sales ↔ None

f. Nuclear Costs ↔ N/A

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current [Then-Year] Dollars in Millions)

	Current Year		Budget Year
	Current Est (Dec 87 SAR)	UCR Baseline (30 Jun 87)	UCR Baseline (Dec 87 SAR)
a. Program Acquisition			
(1) Cost	3352.0 1/	44727.9	3352.0
(2) Quantity	3	645	3
(3) Unit Cost	1117.333	69.346	1117.333
b. Current Procurement	(FY 1988)	(FY 1988)	(FY 1989)
(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/ Does not reflect a FY 87 Congressional recision action of $276.6 (TY$M) currently being processed and will be reflected in future SAR submissions.

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	***	***	***	***
Quantity	***	***	***	***
Schedule	***	***	***	***
Engineering	***	***	***	***
Estimating	***	***	***	***
Other	***	***	***	***
Support	***	***	***	***
Subtotal	***	***	***	***
Current 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
Total Changes	-8297.8	-30677.5	-2400.6	-41375.9
Current Estimate	3352.0 1/	0.0	0.0	3352.0

1/ Does not reflect a FY 87 Congressional recision action of $276.6 (TY$M) currently being processed and will be reflected in future SAR submissions.

13. Cost Variance Analysis: (Cont)

a. Summary ** (Current (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Dev Estimate	9776.6	22207.2	1727.2	33711.0
Previous changes				
Quantity	***	***	***	***
Schedule	***	***	***	***
Engineering	***	***	***	***
Estimating	***	***	***	***
Other	***	***	***	***
Support	***	***	***	***
Subtotal	***	***	***	***
Current 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
Total Changes	-6736.3	-22207.2	-1727.2	-30670.7
Current Estimate	3040.3 1/	0.0	0.0	3040.3

b. Previous Change Explanations ** None

c. Current Change Explanations **

		FY84$	TY$
(1) RDT&E:	Revised Economic Escalation Indices (Economic)	***	-10.1
	Adjustment for Current and Prior Year Escalation (Estimating)	+23.0	+25.8
	Program reduction caused by FY88 Congressional cuts and replanned FY89 and beyond President's Budget	-6759.3	-8313.5
	Deletion of 19 flight test units (Other)	(-1989.5)	(-2449.6)
	Revised support estimate applicable to deletion of 19 flight test units (Other)	(-4769.8)	(-5863.9)

c. Current Change Explanations •• (Cont)

		FY84$	TY$
(2) Procurement:	Revised Economic Escalation Indices (Economic)	•••	235.0
	Program reduction caused by replanned FY89 and beyond President's Budget	-22207.2	-30912.5
	Deletion of 623 missiles (Quantity)	(-9044.4)	(-12604.8)
	Deletion of support requirement associated with 623 missiles (Support)	(-13162.8)	(-18307.7)
(3) MILCON:	Revised Economic Escalation Indices (Economic)	•••	7.3
	Program reduction caused by replanned (Other) FY89 and beyond President's Budget	-1727.2	-2407.9

1/ Does not reflect a FY 87 Congressional recision action of $276.6 (TY$M) currently being processed and will be reflected in future SAR submissions.

d. References •• FY88/89 President's Budget

14. Program Acquisition Unit Cost (PAUC) History: (Millions of then-year dollars)

a. Current Baseline Estimate to Current Estimate ••

PAUC (Initial Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
69.346	+77.400	+10638.354	0.000	0.000	+8.600	-3573.800	-6102.567	+1047.987	1117.333

15. Contract Information: (Then-Year Dollars in Millions as of 31 Mar 87)

a. RDT&E --

	Initial Contract Price		
	Target	Ceiling	Qty
Small ICBM Hard Mobile Launcher and Weapon Control System 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			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$559.8M	$592.8M	N/A	$559.8M	$559.8M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	0.0	0.0
Cum. Variances to Date (30 Nov 87)	$-7.4M	$-6.8M
Net Change	$-7.4M	$-6.8M

Explanation of Change: No program impact. The schedule variance is due to the Weapon Control System's Preliminary Design Review being slipped. The cost variance is due to some redesign effort and a contractor cost estimating error. Variance's are insignificant. The cumulative cost and schedule variances represent less than .6% of the estimated price at completion.

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.

a. RDT&E ** (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Post Boost Vehicle/Assembly & Test			
Martin Marietta, Denver CO	$333.5M	$376.0M	N/A
F04704-85-C-0039, FPIF			
Awarded: 26 June 1985			
Definitized: 26 June 1985			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$370.5M	$391.2M	N/A	$370.5M	$370.5M 1/

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-5.1M	$-4.9M
Cumulative Variances to Date (30 Nov 87)	$-17.7M	$-10.0M
Net Change	$-12.6M	$-5.1M

Explanation of Change: No program impact. Cost variance is caused by additional resources expended to manage/monitor subcontractors and prepare additional supporting data for upcoming system design reviews. The schedule variance is due to delays in component/piece parts procurement, deliveries, and fabrication resulting from longer than expected post boost vehicle and the instrumentation range safety system testing.

	Initial Contract Price		
	Target	Ceiling	Qty
Guidance and Control Integration			
Rockwell International (Autonetics)	$205.9M 1/	N/A	N/A
Anaheim CA			
F04704-84-C-0061, CPIF/AF			
Awarded: 25 May 1984			
Definitized: 26 May 1984			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$270.8M	N/A	N/A	$270.8M	$270.8M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-0.3M	$-1.4M
Cumulative Variances to Date (30 Nov 87)	$+3.8M	$-0.8M
Net Change	$+4.1M	$+0.6M

Explanation of Change: No program impact. The cost variance change is due to increased engineering efficiency. The schedule variance is insignificant.

1/ Includes basic cost, fee, and 100% of award fee pool at start of contract.

a. RDT&E -- (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
Missile Stage II			
Aerojet Nevada Rocket Operations	$186.4M 1/	$201.2M	N/A
Sacramento CA			
F04704-87-C-0050/FPIF/AF			
Awarded: 23 December 1986			
Definitized: 23 December 1986			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$186.4M	$201.2M	N/A	$186.4M	$186.4M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+0.4M	$-2.0M
Cumulative Variances to Date (30 Nov 87)	$-0.9M	$-4.6M
Net Change	$-1.3M	$-2.6M

Explanation of Change: No program impact. The cost variance change is due to higher than planned labor rates at the Nevada facility and additional hours expended to support design reviews. The schedule variance change is due to late component deliveries from subcontractors.

	Initial Contract Price		
	Target	Ceiling	Qty
Missile Stage III			
Hercules, Inc.	$173.3M 1/	$189.1M 1/	N/A
Magna UT			
F04704-87-C-0051/FPIF/AF			
Awarded: 23 December 1986			
Definitized: 23 December 1986			

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$173.3M	$189.1M	N/A	$173.3M	$173.3M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$+0.1M	$-1.4M
Cumulative Variances to Date (30 Nov 87)	$-4.2M	$-1.4M
Net Change	$-4.3M	$ 0.0M

Explanation of Change: No program impact. The cost variance is due to an unfavorable overhead rate charge. The schedule variance is due to delays in motor deliveries.

1/ Includes basic cost, fee, and 100% of award fee pool at start of contract.

a. RDT&E -- (Cont)

	Initial Contract Price		
	Target	Ceiling	Qty
System Support			
Martin Marietta, Denver, CO F04704-C-85-0040, CPFF/AF Awarded: 26 June 1985 Definitized: 26 June 1985	125.3M1/	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
128.1M	N/A	N/A	128.1M	128.1M

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ 0.2M	$-0.2M
Cumulative Variances to Date(30 Nov 87)	$-0.3M	$-0.2M
Net Change	$-0.5M	$ 0.0M

Explanation of Change: No program impact. Variance's are insignificant.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 83.3% (5yrs/6yrs)

(2) Percent Program Cost Appropriated: 94.0% ($3152.0/$3352.0)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY84-88)	Budget Year (FY89)	Balance to Complete FYDP	Balance to Complete Beyond FYDP	Total	
RDT&E	3152.0	200.0	0.0	0.0	3352.0	2/
Procurement	0.0	0.0	0.0	0.0	0.0	
MILCON	0.0	0.0	0.0	0.0	0.0	
Total	3152.0	200.0	0.0	0.0	3352.0	2/

1/ Includes basic cost, fee, and 100% of award fee pool at start of contract.

2/ Does not reflect a FY 87 Congressional recision action of $276.6 (TY$M) currently being processed and will be reflected in future SAR submissions.

16. Program Funding Summary: (Cont)

c. Annual Summary **

FISCAL YEAR	QTY	FY 84 Base-Year Dollars Flyaway Nonrec	Flyaway Rec	Flyaway Total	Then-Year Dollars Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E								
1984				321.9			328.3	3.8
1985				435.8			458.5	3.4
1986				538.6			581.2	2.8
1987				972.2			1084.0	2.7
1988				605.0			700.0	3.7
1989				166.8			200.0	3.8
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	2.3
1995				0.0			0.0	2.3
1996				0.0			0.0	2.3
1997				0.0			0.0	2.3
1998				0.0			0.0	2.3
1999				0.0			0.0	
Total	3			3040.3			3352.0 1/	

1/ Does not reflect a FY 87 Congressional recision action of $276.6 (TY$M) currently being processed and will be reflected in future SAR submissions.

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c. Annual Summary ** (Cont)

Procurement: None.

MILCON: None.

d. Obligations and Expenditures **

Then-Year Dollars (Current Estimate in Millions)			
Fiscal Year	Total	Obligated	Expended
Appropriation: RDT&E			
1984	328.3	327.8	325.5
1985	458.5	458.5	455.5
1986	581.2	578.7	560.3
1987	1084.0	788.3	421.2
1988	700.0	137.8	.5
To Complete	200.0	N/A	N/A
Total	3352.0 1/	2291.1	1763.0

17. Production Rate Data: N/A

18. Operating and Support Costs: N/A

1/ Does not reflect a FY 87 Congressional recision action of $276.6 (TY$M) currently being processed and will be reflected in future SAR submissions.

SAR-87-117

SELECTED ACQUISITION REPORT (RSC:DDCOMP (Q&A) 823)

PROGRAM: Common Strategic Rotary Launcher

AF-9 CSRL

AS OF DATE: December 31, 1987

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SAF/PAS
88-0115

1. Designation and Nomenclature (Popular Name): Common Strategic Rotary Launcher (CSRL)

2. DOD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

   Bomber Program Office — Maj Samuel Shutt
   Aeronautical Systems Division — Assigned: Aug 86
   Wright-Patterson AFB OH 45433 — AV 785-7057 COMM (513) 255-7057

4. Program Elements/Procurement Line Items:

   RDT&E: PE 63258F
   PE 64234F

   PROCUREMENT: APPN 3010 ICN B05200

   MILCON: N/A

   O&M: APPN 3400 PE 11113F (Shared Funding)

5. Related Programs: OAS/CMI, B-1B, B-2, SRAM II, ALCM, ACM, and future standoff conventional weapons.

6. Mission 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.

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 satisfactorily met or exceeded. Additional CSRL ground tests were initiated with the arrival of the flight test aircraft at Edwards AFB on 1 Aug 85. The ground 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.

b. Significant Developments Since Last Report -

During Nov 1987 the first ALCM was successfully launched from a B-1B using a CSRL. Also, during Nov 1987, Lot III production options for 23 launchers and 22 Integration Kits were exercised. The Air Force took delivery of the first production launcher during Dec 1987.

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

The CSRL is expected to satisfy the mission requirements.

c. Changes Since "As Of" Date - None

8. Decision Coordinating Paper (DCP) Threshold Breaches: No DCP

9. Schedule:

a. Milestone -

	Production Estimate/ Approved Program	Current Estimate
Demonstration/Validation	Jun 82 / NA	Jun 82
Source Selection	Jun 83 / NA	Jun 83
Full Scale Development	Jun 83 / Jun 83	Jun 83
Preliminary Design Review	Sep 83 / NA	Sep 83
Critical Design Review	Mar 84 / NA	Mar 84
B-52 CSRL Flight Test Initiation	Aug 85 / NA	Aug 85
Completion 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 / NA	Aug 86
IOT&E Final Report (AFOTEC)	Aug 86 / NA	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-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.

b. 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: None

d. References:

Production Estimate: PMD NR. R-Q 2087(5), dated 22 Apr 85
PMD NR. 4126 (3)/3142, dated 31 Oct 85

Approved Program: USD(A) Memo, dated 9 Feb 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 (ch-1)	4.4	4.4
Maximum time required to jettison full weapon load (sec)	60/45.1 (ch-1)	45.1	45.1
In-commission rate (%) **	93/ NA	93	93
Weapon system reliability (%)	96/96	97	97
Maximum design weight (lbs)	5000/4703 (ch-1)	4703	4703
b. Operational -			
Capability to carry/release AGM-86B (missiles)	8/ NA	8	8
Capability to carry/release B-61 (bombs)	8/ NA	8	8
Capability to carry/release B-28 (bombs)	4/ NA	4	4
Capability to carry/release B-83 (bombs)	8/ NA	8	8
Mean time to upload/download a weapon-configured CSRL in B-52H bomb bay (min)	60/56 (ch-1)	56	56
Mean time to perform single weapon exchange (min)	60/53 (ch-1)	53	53

* Worst case
** Percentage of CSRL's capable of performing the specific mission with no corrective maintenance required.

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: (ch-1) To reflect USD(A) baseline approval, 9 Feb 1988.

e. References:

Production Estimate: PMD NR. R-Q 2087(5), dated 22 Apr 85
PMD NR. 4126 (3)/3142, dated 31 Oct 85

Approved Program: USD(A) Memo, dated 9 Feb 1988.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Production Estimate	Change	Current Estimate
a. Cost -			
Development (RDT&E)	265.6	-26.1	239.5
Procurement	326.6	-88.0	238.6
Nonrecurring	(12.2)	(-6.2)	(6.0)
Group A - Integration	(66.3)	(-10.7)	(55.6)
Group B - Launcher	(172.7)	(-57.4)	(115.3)
Total Flyaway	(251.2)	(-74.3)	(176.9)
Other Weapon Systems Cost	(51.5)	(-4.5)	(47.0)
Initial Spares	(23.9)	(-9.2)	(14.7)
Construction (MILCON)	0.0	0.0	0.0
O&M	23.1	-1.8	21.3
Total FY82 Base-Year $	615.3	-115.9	499.4
Escalation	198.5	-64.3	134.2
Development (RDT&E)	(34.6)	(-6.2)	(28.4)
Procurement	(155.3)	(-57.5)	(97.8)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
O&M	(8.6)	(-0.6)	(8.0)
Total Then-Year $	813.8	-180.2	633.6
b. Quantities -			
Development (RDT&E: 1 used for destructive testing)	(7)	-	(7)
Procurement (includes retrofit of 6 FSD)	104	-	104
Total	104		104
c. Unit Cost -			
Procurement:			
FY82 Base-Year $	3.140	-0.846	2.294
Then-Year $	4.634	-1.399	3.235
Program:			
FY82 Base-Year $	5.916	-1.114	4.802
Then-Year $	7.825	-1.733	6.092

d. Approved Design-to-Cost Goal - N/A
e. Foreign Military Sales - N/A
f. Nuclear Costs - N/A

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	CURRENT EST DEC 87 SAR	UCR Baseline DEC 86 SAR	UCR Baseline DEC 87 SAR
a. Program Acquisition -			
(1) Cost	633.6	646.8	633.6
(2) Quantity	104	104	104
(3) Unit Cost	6.092	6.219	6.092
b. Current Procurement -	(FY88)	(FY88)*	(FY89)
(1) Cost	60.5	60.5	66.0
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	60.5	60.5	66.0
(2) Quantity	23	23	24
(3) Unit Cost	2.630	2.630	2.750

* Adjusted to reflect FY88 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	O&M	TOTAL*
Production Estimate	300.2	481.9	31.7	813.8
Previous Changes:				0.0
Economic	-0.1	-14.8	-0.4	-15.3
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-28.6	-67.4	-4.8	-100.8
Other				0.0
Support		-50.9		-50.9
Subtotal	-28.7	-133.1	-5.2	-167.0
Current Changes:				0.0
Economic	-0.5	-0.6	+0.1	-1.0
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-3.1	-43.5	+2.7	-43.9
Other				0.0
Support		+31.7		+31.7
Subtotal	-3.6	-12.4	+2.8	-13.2
Total Changes	-32.3	-145.5	-2.4	-180.2
Current Estimate	267.9	336.4	29.3	633.6

* MILCON: N/A

13. 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	-23.5	-44.5	-3.7	-71.7
Other				0.0
Support		-35.4		-35.4
Subtotal	-23.5	-79.9	-3.7	-107.1
Current Changes:				0.0
Quantity				0.0
Schedule				0.0
Engineering				0.0
Estimating	-2.6	-29.8	+1.9	-30.5
Other				0.0
Support		+21.7		21.7
Subtotal	-2.6	-8.1	+1.9	-8.8
Total Changes	-26.1	-88.0	-1.8	-115.9
Current Estimate	239.5	238.6	21.3	499.4

* MILCON: N/A

b. Previous Change Explantions -

RDT&E

Economic: Revised economic escalation indices.

Estimating: Refinement of estimate for engineering change orders.

Procurement

Economic: Revised economic escalation indices.

Estimating: Refinement of estimate due to favorable contract negotiations; Adjustments for prior and current year escalation.

Support: Reduction in weapon system support requirements.

O&M

Economic: Revised economic escalation indices.

Estimating: Refinement of estimate for engineering change orders.

c. Current Change Explanation: (Dollars in Millions)

	Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic).	N/A	-0.5
Refinement of prior estimates for launchers, gov't test and mission support (Estimating).	-3.0	-3.6
Adjustment for prior and current year escalation (Estimating).	+0.4	+0.5
(2) Procurement		
Revised economic escalation indices. (Economic).	N/A	-0.6
Reduction of hardware Requirements (Estimating)	-30.4	-44.2
Reduction of Weapon System Support Requirements (Support)	21.7	31.7
Adjustment for prior and current year escalation (Estimating).	+0.9	+1.1
Adjustment for FY90 and beyond escalation (Estimating).	-0.3	-0.4
(3) O&M		
Revised economic escalation indices (Economic).	N/A	+0.1
Refinement of outyear requirements based on current actuals (Estimating).	+2.0	+2.8
Adjustment for FY90 and beyond escalation (Estimating).	-0.1	-0.1

d. References:

Production Estimate: PMD NR. R-Q 2087(5), dated 22 Apr 85
PMD NR. 4126 (3)/3142, dated 31 Oct 85

14. 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	-0.157				-1.391		-.185	-1.733	6.092

15. Contract Information: (Millions of Then Year $)

a. RDT&E -

Common Strategic Rotary Launcher:

Boeing Military Airplance Co, Wichita KS		Initial Contract Price Target	Ceiling	Qty
F33657-83-C-0533, FPI				
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
$148.9	$169.3	7	$142.8	$142.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	+6.0	-0.3
Cumulative Variances To Date (31 Dec 87)	+8.7	-0.1
Net Change	+2.7	+0.2

Explanation of Change: Cost variance remains as an underrun. The schedule variance has improved and has no impact on the contract or program.

b. Procurement -

Common Strategic Rotary Launcher
Group B

Boeing Military Airplane Co, Wichita KS	Initial Contract Price Target	Ceiling	Qty
F33657-83-C-0533 FFP			
Award: Feb 86	$44.5	$44.5	5
Definitized: Feb 86			

Current Contract Price			Est Price at Completion	
Target	Ceiling	Qty	Contractor	PM
$141.1	N/A	54	$141.1	$141.1

Prev Cum Variances: N/A FFP
Cum Var to date: N/A FFP

Common Stragetic Rotary Launcher
Group A

Boeing Military Airplane Co, Wichita KS
F34601-86-C-1600 FPI
Award: Feb 86
Definitized: Feb 86

Initial Contract Price		
Target	Ceiling	Qty
$17.7	$18.7	3

Current Contract Price			Est Price at Completion	
Target	Ceiling	Qty	Contractor	PM
$50.4	$53.0	48	$50.4	$46.4

	Cost Var	Sch Var
Previous Cum Var	N/A	N/A
Cumulative Variance to date 31 Dec 87	+3.0	+0.7

Initial reporting of these production contracts.
Variance analysis - Cost variance is reported as an underrun due to favorable material pricing. The contractor is working ahead of schedule. 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: 58.3% (7 yrs/12 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 74.8% ($474.1M/$633.6M)
(Funds Appropriated to Date/Total Program Funding)

b. Appropriation Summary -

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93)	Total
RDT&E	267.0	0.9	-	-	267.9
Procurement	206.8	66.0	63.4	0.2	336.4
MILCON	-	-	-	-	-
O&M	0.3	6.1	19.1	3.8	29.3
Total	474.1	73.0	82.5	4.0	633.6

16. Program Funding Summary (Cont'd):

c. Annual Summary -

Fiscal Year	QTY	FY82 Base Year			Then Year			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1982				21.4			21.9	9.2
1983				59.4			63.6	4.9
1984				55.1			61.2	3.8
1985				49.5			56.7	3.4
1986				39.2			46.1	2.8
1987				9.7			11.8	2.7
1988				4.5			5.7	3.7
1989				0.7			0.9	3.8
Subtotal			N/A	239.5			267.9	

16. Program Funding Summary (Cont'd):

c. Annual Summary - *

Fiscal Year	QTY	FY82 Base Year			Then Year			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement								
1986	5	6.0	30.5	52.0			68.7	2.8
1987	26		40.4	56.7			77.6	2.7
1988	23		31.5	42.7			60.5	3.7
1989	24		35.0	45.1			66.0	3.8
1990	26		33.5	41.8			63.0	3.6
1991				0.1			0.2	3.3
1992				0.1			0.2	2.8
1993				0.1			0.2	2.3
Subtotal	104	6.0	170.9	238.6	0.0	0.0	336.4	
Appropriation: MILCON								
N/A							0.0	N/A
Appropriation: O&M (Qty represent A/C installs)								
1987	1			0.2			0.3	2.7
1988	0			0.0			0.0	3.7
1989	20			4.7			6.1	3.8
1990	21			4.6			6.2	3.6
1991	21			4.6			6.4	3.3
1992	21			4.6			6.5	2.8
1993	12			2.6			3.8	2.3
Subtotal	(96)			21.3			29.3	
Total	104	6.0	170.9	499.4	0.0	0.0	633.6	

* FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures -

	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1982	21.9	21.8	21.8
1983	63.6	59.8	59.8
1984	61.2	58.9	58.9
1985	56.7	56.2	55.6
1986	46.1	45.2	40.7
1987	11.8	11.3	2.8
1988	5.7	0.9	0.1
To Comp	0.9	0.0	0.0
Total	267.9	254.1	239.7
	Appropriation: Procurement		
1986	68.7	62.7	0.0
1987	77.6	69.2	0.0
1988	60.5	54.9	0.0
To Comp	129.6	0.0	0.0
Total	336.4	186.8	0.0
	Appropriation: MILCON		
Total	N/A	N/A	N/A
	Appropriation: O&M		
1987	0.3	0.3	0.0
1988	0.0	0.0	0.0
To Comp	29.0	0.0	0.0
Total	29.3	0.3	0.0

Reflects program office records as of 31 Jan 88

17. Production Rate Data: (Based upon the surge rate) *

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	27.7
1990	24	24	26	

* 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 FY88-90.

b. Cost Variance — Dollars in Millions
(Note: Subject to production rate limitations)

Item	Prod Estimate	Variance (CE-PdE)	Current Estimate	Variance (CE-Max)	Maximum
Prog Acq Cost (BY82$)	615.3	-115.9	499.4	0.0	499.4
(TY$)	813.8	-180.2	633.6	+5.2	628.4
PAUC (BY82$)	5.916	-1.114	4.802	0.0	4.802
(TY$)	7.825	-1.733	6.092	+.050	6.042

c. Schedule Variance — (Note: Subject to production rate limitations.

Item	Prod Estimate	Variance (CE-PdE)	Current Estimate	Variance (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

d. Deliveries To Date (Plan/Actual) — RDT&E 4/4
PROC 1/1

18. Operations and Support Cost:

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 cost have been priced within the Full Scale Development and production contracts. AFLC LSC Model, Version 1.1 (1979) was used to determine O&S 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

SAR-87-102

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: Titan IV

AF-32 TITAN IV

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name):

Titan IV, formerly Complementary Expendable Launch Vehicle (CELV)

2. DoD Component:

United States Air Force

3. Responsible Office and Telephone Number:

Assistant Deputy Commander for Launch Systems, Space Division, Los Angeles AFB, CA 90009
Col Victor W. Whitehead
Assigned: July 1, 1983
AV 833-2286; COMM (213)643-2286

Titan IV Systems Program Office
Space Divi[redacted]
Los Angel[redacted] 90009
Col Sebastian F. Coglitore
Assigned: August 1, 1987
AV 833-0210, COMM (213)643-0210

4. Progra[redacted] Procurement Line Items:

RDT&E: PE [redacted] (Shared funding)
PE 35171F (Shared funding)
PE 34111F (Shared funding)

PROCUREMENT: APPN 3020 ICN MSBSTR

5. Related Programs:

Defense Support Program; Milstar; Defense Systems Communications Satellite (DSCS); Space Shuttle Operations (IUS)

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 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 contract award in February 1985, the program has progressed in a number of technical areas. Program Design Reviews have been accomplished for all major sub-systems. A successful firing of one solid rocket motor was accomplished in December 1987. Two payload fairing separation tests and one test firing of the solid rocket motors are scheduled in early 1988. Major structural tests on all flight components are in progress. 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 has embarked upon a recovery plan which included the acquisition of 13 additional Titan IV Boosters, activation and operation of an existing Titan launch pad at Vandenberg AFB, CA (VAFB), the development and construction of a new Titan IV/Centaur launch pad at VAFB, and STS/Titan IV dual compatibility for all AF satellites launched from the e[redacted]t, in addition to the original 10 vehicle program which included t[redacted]ation and operation of Titan IV at Cape Canaveral AFS, FL (CCAFS). [redacted]esulting 23 vehicle Titan IV program was definitized by contract i[redacted]r 1987, to include the impacts of the April 1986 Titan 34D accide[redacted]the June 1986 NASA/Centaur Cancellation. (Note: The Vandenberg activation and operations costs are totally funded by classified programs, and are not included in this report).

b. Significant Developments Since Last Report -- As a result of further delays to the ILC of the STS, the DoD has embarked upon an increased capacity plan which includes the acquisition of 25 additional Titan IV Boosters and associated facility and plant enhancements, the modification of an additional launch pad at CCAFS, and an outyear replenishment procurement of 10 vehicles per year.

b. Significant Developments Since Last Report (Cont'd) -- The Titan IV system has not undergone any IOT&E at this time.

FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

The system is expected to satisfy mission requirements.

c. Changes Since "As of Date" -- A successful payload fairing separation test occurred in January 1988 and a second solid rocket motor test occurred in February 1988. The first Titan IV core, liquid rocket engines, payload fairing, and solid rocket motor segments have been delivered to Cape Canaveral AFS, FL.

8. Decision Coordinating Paper (DCP) Threshold Breaches:

None, there are no SDDMs, SCPs, or DCPs applicable to the Titan IV program.

9. Schedule:

a. Milestones --

	Development Estimate/ Approved Program	Current Estimate
Initial Contract Award	Feb 85/Feb 85	Feb 85
Production Start	Oct 85/Oct 85	Oct 85
System Preliminary Design Review	Apr 86/Apr 86	Apr 86
System Critical Design Review	Nov 86/Nov 86	Oct 86
First Delivery to CCAFS	Feb 88/Feb 88	Apr 88 (Ch-1)
Initial Launch Capability	Oct 88/Oct 88	Oct 88

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.

c. Current Changes -- (Ch-1) Payload fairing and solid rocket motor deliveries have been rescheduled to February 1988 and March 1988, thus delaying first delivery to CCAFS until April 1988.

d. Re[redacted]
Development Estimate: FY87 President's Budget, February 1986.
Approved Program: Same as Development Estimate.

10. Technical/Operational Characteristics:

	Dev Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. Technical --			
Systems Reliability (%)	98.0/98.0	N/A	98.0
Solid Rocket Motors:			
Length (ft)	112.2/112.2	N/A	112.2
Diameter (ft)	10.2/10.2	N/A	10.2
Thrust (M/lbs)	1.6/1.6	N/A	1.6
Core Vehicle:			
Stage One			
Length (ft)	86.5/86.5	N/A	86.5
Diameter (ft)	10.0/10.0	N/A	10.0
Engine Thrust (k-lbs)	546.0/546.0	N/A	546.0
Stage Two			
Length (ft)	32.6/32.6	N/A	32.6
Diameter (ft)	10.0/10.0	N/A	10.0
Engine Thrust (k-lbs)	104.0/104.0	N/A	104.0
Payload Fairing:			
Diameter (ft)	16.7/16.7	N/A	16.7
Length (ft)	86.0/86.0	N/A	86.0
b. Operational --			
Payload to geosynchronous (k-lbs)	10.0/10.0	N/A	10.0

c. Previous Change Explanations -- None.

d. Current Change Explanation -- None.

e. References--
Development Estimate: FY87 President's Budget, February 1986.
Approved Program: Same as Development Estimate.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)	$ 579.7	+638.4	$1218.1
Program Development	(488.7)	(+633.9)	(1122.6)
RDT&E Funded Centaurs	(91.0)	(+4.5)	(95.5)
Procurement	1570.8	+1441.6	3012.4
Total Flyaway	(1106.6)	(+1748.6)	(2855.2)
Other Weapon Systems Costs	(464.2)	(-307.0)	(157.2)
Construction (MILCON)	0.0	+172.4	172.4
Total FY 85 Base-Year $	2150.5	+2252.4	4402.9
Escalation	378.7	+331.9	730.6
Development (RDT&E)	(61.4)	(+79.7)	(141.1)
Procurement	(317.3)	(+229.6)	(546.9)
Construction (MILCON)	(0.0)	(+42.6)	(42.6)
Total Then-Year $	$ 2529.2	+2604.3	$ 5133.5
b. Quantities --			
Development (RDT&E)	-	-	-
Procurement	10	+13	23
Total	10	+13	23
c. Unit Cost --			
Procurement:			
FY 85 Base-Year $	$ 157.080	-26.106	$ 130.974
Then-Year $	188.810	-34.058	154.752
Program:			
FY 85 Base-Year $	215.050	-23.620	191.430
Then-Year $	$ 252.920	-29.724	$ 223.196

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	SAR Current Estimate (Dec 87 SAR)	UCR Baseline Estimate (Dec 86 SAR)	UCR Baseline Estimate (Dec 87 SAR)
a. Program Acquisition --			
(1) Cost	$5133.5	$4334.6	$5133.5
(2) Quantity	23	23	23
(3) Unit Cost	$ 223.196	$ 188.461	$ 223.196
b. Current Procurement --	(FY 1988)	(FY 1988) *	(FY 1989)
(1) Cost	$ 710.2	$ 710.2	$ 614.9
Less CY Adv Proc	-182.0	-182.0	-130.0
Plus PY Adv Proc	+152.5	+152.5	+272.5
Net Total	$ 680.7	$ 680.7	$ 757.4
(2) Quantity	6	6	5
(3) Unit Cost	113.450	113.450	151.480

* Differs from December 1986 SAR due to the 1988 Appropriations Act.

13. Cost Variance Analysis:

a. Summary --

(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	541.1	1888.1	0.0	2529.2
Previous Changes:				
Economic	-5.3	-51.5		-56.8
Quantity		+1793.2		+1793.2
Schedule		-36.2		-36.2
Engineering	+57.0	-438.1		-381.1
Estimating	+86.5	+642.3	+220.0	+948.8
Other				
Support	+20.0	-482.5		-462.5
Subtotal	+158.2	+1427.2	+220.0	+1805.4
Current Changes:				
Economic	-4.0	+14.6	+1.0	+11.6
Quantity				
Schedule				
Engineering	+139.0	+83.0		+222.0
Estimating	**+269.9**	+89.9	-6.0	**+353.8**
Other				
Support	**+155.0**	+56.5		**+211.5**
Subtotal	+559.9	+244.0	-5.0	+798.9
Total Changes	+718.1	+1671.2	+215.0	+2604.3
Current Estimate	1359.2	3559.3	215.0	5133.5

(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	+50.5	-361.3		-310.8
Estimating	+77.4	+497.4	+177.4	+752.2
Other				
Supp[illegible]	+19.3	-357.0		-337.7
Su[illegible]	+147.2	+1245.5	+177.4	+1570.1
Curren[illegible]ges:				
Quan[illegible]				
Sched[illegible]				
Engineering	+119.9	+74.2		+194.1
Estimating	**+236.8**	+71.9	-5.0	**+303.7**
Other				
Support	**+134.5**	+50.0		**+184.5**
Subtotal	+491.2	+196.1	-5.0	+682.3
Total Changes	+638.4	+1441.6	+172.4	+2252.4
Current Estimate	1218.1	3012.4	172.4	4402.9

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations --

(1) RDT&E

Economic: Revised economic escalation indices.

Engineering: Design effort for satellite dual compatibility; initial design effort for SLC-7, a new Titan IV launch pad at Vandenberg AFB, CA.

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.

Support: Additional support equipment for accelerated activation at the launch site.

(2) 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.

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; pr[redacted]ons for engineering change orders; contractor launch incentives [redacted]opellant requirements for increased launch schedule; unit price benef[redacted] increased quantity buy; adjustment for current and prior year escala[redacted]changes.

Support: Accelerated procurement of support equipment at the 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.

(3) MILCON

Estimating: Funds added to program to construct a new Titan IV launch pad at Vandenberg AFB, CA.

c. Current Change Explanations --	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	+0.0	-4.0
Initial development of an upgraded solid rocket motor. (Engineering)	+119.9	+139.0
Adjustment for current and prior year escalation. (Estimating)	+4.0	+4.3
Adjustment for FY 90 and beyond escalation. (Estimating)	-0.3	0.0
Lower Centaur unit price as a result of negotiations. (Estimating)	-4.9	-5.6
Additional payload integration requirements. (Estimating)	+6.2	+6.6
Initial funds for facility modifications at the launch sites. (Support)	+134.5	+155.0
Funding for Centaur development. (Estimating)	+231.8	+264.6
(2) Procurement		
Revised economic escalation indices. (Economic)	+0.0	+14.6
Initial hardware for an upgraded solid rocket motor. (Engineering)	+74.2	+83.0
Adjustment for current and prior year escalation. (Estimating)	-1.2	-1.4
Adjust[redacted]or FY 90 and beyond escalation. (Esti[redacted])	-7.8	0.0
Realign[redacted] of outyear funds to support programmatic changes. (Estimating)	-22.9	-27.2
Increased government involvement in plant inspections. (Estimating)	+16.9	+19.9
Additional tooling to support higher production capacity. (Estimating)	+33.4	+38.6

c. Current Change Explanations (Cont'd) --	(Dollars in Millions) Base-Year	Then-Year
Additional Federal Contract Research Center engineering support as a result of increased program scope. (Estimating)	+2.2	+2.5
Procurement of an additional payload fairing to support satellite integration on Titan IV. (Estimating)	+8.4	+10.0
Funds for engineering change orders based upon increased program scope. (Estimating)	+42.9	+47.5
Initial AGE requirements to support increased launch requirements. (Support)	+50.0	+56.5
(3) MILCON		
Revised economic escalation indices. (Economic)	0.0	+1.0
Adjustment for outyear escalation. (Estimating)	-0.8	0.0
Realignment of SLC-7 costs into outyears (Estimating).	-4.2	-6.0

d. References --
Development Estimate: FY87 President's Budget, February 1986.



4. 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	Eng	Est	Oth	Spt	Total	
252.920	-1.965	-64.990	-1.574	-6.917	+56.635	-	-10.913	-29.724	223.196

15. Contract Information: (Then-Year Dollars in Millions)

RDT&E/Procurement --
Titan IV:
Martin Marietta Corp., Denver, CO
F04701-85-C-0019, FPIF
Award: February 28, 1985
Definitized: March 1, 1985

Initial Contract Price		
Target	Ceiling	Qty
$2095.8	$2287.8	10

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$4194.2	$4506.0	23	$4448.4	$4366.1

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$ -4.8	$-29.9
Cumulative Variances To Date (29 Nov 87)	$-67.0	$-104.7
Net Change	$-62.2	$-74.8

Explanation of Change: The unfavorable Cost Variance is due to fabrication problems at Chemical Systems Division (solid rocket motors) and schedule recovery efforts at McDonnell Douglas (payload fairing). The negative schedule variance, based on a 100 day margin, worsened since last report due to manufacturing and fabrication problems at McDonnell Douglas and Chemical Systems Division. Due to the 100 day margin, no impacts are predicted to the Initial Launch Capability (ILC) date.

+ = favorable - = unfavorable

16. Program Funding Summary:
(Current Estimate in Millions of Dollars)

a. Program Status --
(1) Percent Program Complete: 44.4% (4 yrs/9 yrs)
(2) Percent Program Cost Appropriated: 53.0% ($2720.3/$5133.5)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs (FY85-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-92)	Balance To Complete Beyond FYDP (FY93)	Total
RDT&E	820.1	438.1	81.0	20.0	1359.2
Procurement	1900.2	614.9	975.2	69.0	3559.3
MILCON	0.0	25.0	190.0	0.0	215.0
Total	2720.3	1078.0	1246.2	99.0	5133.5

c. Annual Summary 1/ --

Fiscal Year	Qty	FY85 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate
Appropriation: RDT&E 2/								
1985				37.5			38.2	3.4
1986				248.8			259.7	2.8
1987				171.9			185.3	2.7
1988				301.1			336.9	3.7
1989				377.7			438.1	3.8
1990				22.6			27.1	3.6
1991				22.3			27.5	3.3
1992				20.8			26.4	2.8
1993				15.4			20.0	2.3
Subtotal				1218.1			1359.2	-
Appropriation: Missile Procurement								
1985				42.8			45.0	3.4
1986				421.3	299.3		458.4	2.8
1987	2	61.9	139.6	609.2	306.8	31.8	686.6	2.7
1988	6	206.5	465.9	608.0	182.0	152.5	710.2	3.7
1989	5	195.8	442.0	509.9	130.0	272.5	614.9	3.8
1990	5	195.8	442.0	333.4	42.0	311.8	413.8	3.6
1991	5	216.7	489.0	224.8		191.5	286.2	3.3
1992				211.2			275.2	2.8
1993				51.8			69.0	2.3
Sub	23		1978.5	3012.4	960.1	960.1	3559.3	-
Appropriation: MILCON								
1989				20.9			25.0	3.8
1990				48.7			60.0	3.6
1991				102.8			130.0	3.3
Subtotal				172.4			215.0	-
Total	23	876.7	1978.5	4402.9	960.1	960.1	5133.5	-

1/ FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 Congressional actions and FY89 Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

2/ FYs 86, 87, and 88 amounts include the purchase of two RDT&E funded Centaurs originally designated for Shuttle RDT&E missions. The missions have been redesignated on the Titan IV.

16. Program Funding Summary (Cont'd):
(Current Estimate in Millions of Dollars)

d. Obligations and Expenditures --
(Reflects Program Office records as of 30 November 1987)

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1985	38.2	38.2	38.2
1986	259.7	259.7	223.7
1987	185.3	185.3	74.3
1988	336.9	166.3	0.0
To Comp	539.1	-	-
Total	1359.2	649.5	336.2
Appropriation: Missile Procurement			
1985	45.0	45.0	45.0
1986	458.4	458.4	114.4
1987	686.6	686.6	175.6
1988	710.2	634.0	0.0
To Comp	1659.1	-	-
Total	3559.3	1824.0	335.0
Appropriation: MILCON			
To Comp	215.0	-	-
Total	215.0	0.0	0.0

17. Production Rate Data:

No Report. Production Rate less than six per year.

18. Operating and Support Costs:

a. Assumptions and Groundrules -- Launch costs are based upon actual contract values for the current Titan IV program and projected contract values for the follow-on missions. Range costs are based upon historical data from the Titan 34D program.

b. Costs --
(Then-Year Dollars in Millions)

Cost Element	Avg Annual Cost Per Titan IV Launch
Launch Support	155.3
Range Support	34.1
Total	189.4

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.

SAR-87-072

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SELECTED ACQUISITION REPORT(RCS: DD-COMP(Q&A)823)(U)

Program: Joint STARS (U)

AF-19 JSTARS

AS OF DATE: 31 December 1987

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SAF/PAS
88-0153-T

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. Program Elements/ Procurement Line Items:

RDT&E: 63770F
64770A
64770D
64770F
64616F

PROCUREMENT: APPN 3010 ICN JSTARS
APPN 2035A ICN 7310 BA1080

MILCON: 64770F

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

[redacted] CLEARED [redacted] MAR 25 1988 [redacted]

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ASD(PA) DFOISR 88-T-0752

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 permit 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 -- On 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 84 agreement by Air Force and Army Chiefs of Staff, the joint program began development of the airborne segment using the E-8A (a Boeing 707-320 class aircraft converted to military use). The Army Ground Station Module (GSM) FSED contract was awarded to Motorola Corporation in 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, completed refurbishment and modification of the first Joint STARS FSD aircraft. The radar design is progressing with brassboard and breadboard testing of selected critical LRU's meeting design expectations. Due to the complexity of the software design task, the software development schedule was re-structured into incremental builds with emphasis on Wide Area Surveillance. The Army Downsized Ground Station Module (DGSM) FSED contract was awarded to Motorola Corporation in March 1986. On 18 Dec 1986, the Army directed the Limited Procurement Urgent acquisition of nine Ground Station Modules. The basing of all Joint STARS testing was consolidated to the contractor's facility in Melbourne, FL, for test efficiency, although numerous military test ranges will still be used.

b.(U)Significant Developments Since Last Report -- During 1987, the Joint STARS program emphasized the design and test of the many pieces of equipment that comprise the airborne and ground segments of this complex system. Software

Development Units were produced to allow early testing of critical pieces of software on actual hardware. The particularly complex software algorithms for extracting moving targets from tough clutter models was successfully tested using this concept, with three operational but not flight qualified Programmable Signal Processors and Radar Data Processors working together at the Grumman laboratories. All of the computers and software that control the radar were programmed and tested using an antenna mass simulator. The first test aircraft completed rehabilitation and was delivered to Grumman on 31 July 1987. Although some of the modifications were behind, due to inconsistencies in the available design data on these 20 year old aircraft, work arounds were devised to hold the April 1988 first flight date. The second aircraft also fell behind because of differences in electrical and structural installations between it and the first aircraft. All of the software required for early flight test is designed and coded and is currently undergoing integration testing. A complete set of equipment for early testing is now installed in the aircraft with the exception of the radar. While the basic radar design was proven through the use of brassboard and breadboard components and no major technical problems remain at the component level, build of flight worthy components lag. In the main, this was due to late detailed design and vendor procurement. The first two antennas are now complete and in test. The Joint Program Office now expects to fly a non-radiating antenna in June 1988 to assess control software and equipment in an actual flight environment with the complete system to follow in Nov 1988. The Joint STARS Ground Station Module continues in development, with units in production to support the initial development and operational test of Joint STARS. Laboratory testing, engineering analysis, and early initial integration testing on Joint STARS airborne and ground segments have been successful, with both software and hardware working as planned. The OSD directed Operational Utility Evaluation 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 that Joint STARS would survive in Europe in wartime conditions and that survivability would be enhanced by an electronic self defense suite. The Defense Acquisition Board IIB was postponed to Apr 1988 to allow complete evaluation of required initial Joint STARS force structure. Joint STARS is expected to satisfy its mission requirements.

FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional Action and FY 89 Program decisions. Proper adjustments will be completed and reported in a future SAR.

c.(U)Changes Since "As of" Date -- None

8.(U)Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP dated 27 August 1985 or SDDM dated 26 September 1985 breaches. Note: Program Office submitted draft DCP for DAB IIB in Dec 1987.

9.(U)Schedule:

a.(U)Milestones --

	Planning Estimate/ Approved Program	Current Estimate
(U)Ground Station FSD Award	Aug 84/ NA	Aug 84
(U)Milestone IIA	Apr 85/Sep 85 Ch-3	Sep 85
(U)Radar/Aircraft FSD Award	May 85/ NA	Sep 85
(U)PDR Hardware	Jan 86/ NA	May 86
(U)Software	- / NA	Mar 87
(U)CDR Hardware	Aug 86/ NA	Dec 86
(U)Software	- / NA	N/A (Ch-1)
(U)System	- / NA	Nov 88 (Ch-1)
(U)Milestone IIB	- /TBD Ch-3	Apr 88 (Ch-2)
(U)DT&E Start	Nov 88/Nov 88	Nov 88
(U)Ground Station Production Award	- / NA	Jun 89
(U)First Delivery	- / NA	Oct 90
(b)(1)		
(U)Last Delivery	- / NA	Nov 94
(U)Radar/Aircraft Production Award	- / NA	Aug 90
(U)First Delivery	- / NA	Aug 91
(U)IOC	TBD / NA	TBD
(U)Last Delivery	- / NA	Sep 94

b.(U)Previous Change Explanations -- Milestone II decision was delayed due to affordability considerations and examination of alternatives. Also milestones were added and/or dates were established as a result of the Milestone IIA SDDM. Hardware CDR slipped due to software development review replan and subcontractor design delays. Milestone IIB was delayed to complete Phase I of the Operational Utility Evaluation. DT&E changed as a result of establishing a Single Test Site, which transferred testing from WPAFB 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) Software CDR has been replaced with a System CDR.

(CH-2) DAB IIB has been delayed due to re-evaluation of the Joint STARS force structure by the service secretaries.

(Ch-3) Reflects USD(A) Baseline Approval.

d.(U)References --

Planning Estimate: Army and Air Force R&D Descriptive Summaries. Joint STARS Program Management Directive, 21 Sep 1984.

Approved Program: SDDM dated 26 September 1985, subject Joint STARS Full-Scale Development Approval, USD(A) Memo, 9 Feb 1988.

10.(U) Technical/Operational Characteristics:

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a.(U) Technical--			
(b)(1)			

c.(U)Previous Change Explanations -- Added Characteristic. Completed hardware PDR permitted inclusion of current estimate.

d.(U)Current Change Explanations --
(CH-1) Correction of previous error.

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: DCP dated 26 August 1985. PE is in terms of goals, Approved Program is in terms of thresholds.

11.(U)Program Acquisition Cost (Current Estimate in Millions of Dollars)
Production costs based on directed production profiles.

Air Force and Army

	Planning Estimate	Changes	Current Estimate
a.(U)Cost --			
Development (RDT&E)	1185.3	+ 209.0	1,394.3
Procurement	TBD	+1,638.7	1,638.7
Flyaway		(1,155.5)	(1,155.5)
Other Wpn Sys Cost		(+ 342.4)	(342.4)
Initial Spares		(+ 140.8)	(140.8)
Construction (MILCON)	TBD	+ 36.0	36.0
Total: Constant FY 1983 $	1185.3	+1,883.7	3,069.0
Escalation	202.9	+ 786.9	989.8
Development (RDT&E)	(202.9)	(+ 38.3)	(241.2)
Procurement	(TBD)	(+ 736.5)	(736.5)
Construction (MILCON)	(TBD)	(+ 12.1)	(12.1)
Total Program Cost (Then-Year)	1388.2	+2,670.6	4,058.8

b.(U)Quantities --

Development (RDT&E)	(See individual Air Force
Procurement	and Army Sections)
Total	

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11.(U)Program Acquisition Cost (Cont'd)

(U)c. Unit Cost --

Procurement:
FY 83 Base-Year $
Then-Year $
Program:
FY 83 Base-Year $
Then-Year $

(See individual Air Force and Army Sections)

d.(U)Approved Design to Cost Goal -- See individual sections.
e.(U)Foreign Military Sales -- none
f.(U)Nuclear Costs -- none

Air Force Only

11.(U)Program Acquisition Cost (Current Estimate in Millions of Dollars)
Production costs based on directed production profile of 10 units (3 refurbished FSD and 7 production).

	Planning Estimate	Changes	Current Estimate
a.(U)Cost --			
Development (RDT&E)	963.3	+ 207.1	1,170.4
Procurement	TBD	+1,202.0	1,202.0
Flyaway		(+832.1)	(832.1)
Other Wpn Sys Cost		(+277.5)	(277.5)
Initial Spares		(+ 92.4)	(92.4)
Construction (MILCON)	TBD	+ 36.0	36.0
Total FY 83 Base-Year $	963.3	+1,445.1	2,408.4
Escalation	179.5	+ 618.0	797.5
Development (RDT&E)	(179.5)	(+ 37.5)	(217.0)
Procurement	(TBD)	(+568.4)	(568.4)
Construction (MILCON)	(TBD)	(+ 12.1)	(12.1)
Total Then-Year $	1,142.8	2,063.1	3,205.9
b.(U)Quantities --			
Development	TBD		(3)#
Procurement	TBD		10
Total	TBD		10#
c.(U)Unit Cost --			
Procurement:			
FY 83 Base-Year $	N/A	+ 120.200	+ 120.200
Then-Year $		+ 177.040	+ 177.040
Program:			
Fy 83 Base-Year $		+ 240.840	+ 240.840
Then-Year $		+ 320.590	+ 320.590

#The 3 Development units will be refurbished.

d.(U)Approved Design to Cost Goal -- TBD DAB II B - Apr 1988
e.(U)Foreign Military Sales -- none
f.(U)Nuclear Costs -- none

Army Only

11.(U)Program Acqusition Cost (Current Estimate in Millions of Dollars)

	Planning Estimate	Changes	Current Estimate
a.(U)Cost --			
Development (RDT&E)	222.0	+ 1.9	223.9
Procurement	TBD	+ 436.7	436.7
Flyaway		(323.4)	(323.4)
Other Wpn Sys Cost		(+ 64.9)	(64.9)
Initial Spares		(+ 48.4)	(48.4)
Total FY 83 Base-Year $	222.0	+ 438.6	660.6
Escalation	23.4	+ 168.9	192.3
Development (RDT&E)	(23.4)	(+ 0.8)	(24.2)
Procurement	(TBD)	(+168.1)	(168.1)
Total Then-Year $	245.4	+607.5	852.9
b.(U)Quantities --			
Development (RDT&E)	8	-	8
Procurement	TBD	+ 95	95
Total	TBD		103
c.(U)Unit Cost --			
Procurement:			
FY 83 Base-Year $	TBD	+ 4.597	4.597
Then-Year $	TBD	+ 6.366	6.366
Program:			
FY 83 Base-Year $	TBD	+ 6.414	6.414
Then-Year $	TBD	+ 8.281	8.281

d.(U)Approved Design to Cost Goal -- none
e.(U)Foreign Military Sales -- none
f.(U)Nuclear Costs -- none

12.(U)Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

Air Force only

	Current Year		Budget Year
	SAR Current Estimate (Dec 87 SAR)	UCR Baseline Estimate (Dec 86 SAR)	UCR Baseline Estimate (Dec 87 SAR)
a.(U)Program Acquisition --			
(1) Cost	3,205.9	3,200.1	3,205.9
(2) Quantity	10	10	10
(3) Unit Cost	320.590	320.010	320.590

b.(U)Current Procurement -- No Quantities in Current or Budget Year.

12.(U)Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

Army only

	Current Year		Budget Year
	SAR Current Estimate (Dec 87 SAR)	UCR Baseline Estimate (Dec 86 SAR)	UCR Baseline Estimate (Dec 87 SAR)
a.(U)Program Acquisition --			
(1) Cost	852.9	868.0*	852.9
(2) Quantity	103	103	103
(3) Unit Cost	8.281	8.427*	8.281
b.(U)Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	35.2	35.2	48.3
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Net Total	35.2	35.2	48.3
(2) Quantity	6	6	6
(3) Unit Cost	5.867	5.867	8.050

*Reflects the addition of FY93 and 94 procurement numbers which were previously reported as TBD in the 31 Dec 1986 SAR.

13.(U)Cost Variance Analysis: Air Force and Army
a.(U)Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1,388.2	-	-	1,388.2
Previous Changes:				
Economic	-38.1	-30.5	-0.6	-69.2
Quantity	-	+1,425.1	+ 53.2	+1,478.3
Schedule	-	+47.6	+1.4	+49.0
Engineering	-	-	-	-
Estimating	+285.6	+69.5	-5.9	+ 349.2
Other	-	-	-	-
Support	-	+ 659.4	-	+ 659.4
Subtotal	+247.5	+2,171.1	+ 48.1	+2,466.7
Current Changes:				
Economic	-7.1	+9.5	+0.2	+2.6
Quantity	-	-	-	-
Schedule	-	+6.2	-	+6.2
Engineering	+33.0	-3.6	-	+29.4
Estimating	-26.1	+143.9	-0.2	+117.6
Other	-	-	-	-
Support	-	+48.1	-	+48.1
Subtotal	- 0.2	+ 204.1	-	+ 203.9
Total Changes	+247.3	+2,375.2	+48.1	+2,670.6
Current Estimate	1,635.5	2,375.2	48.1	4.058.8

13.(U)Cost Variance Analysis (Cont'd):
(FY 83 Constant (Base-Year) Dollars 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	-	-	-	-
Engineering	-	-	-	-
Estimating	+203.3	+46.7	-4.5	+245.5
Other	-	-	-	-
Support	-	+452.2	-	+452.2
Subtotal	+203.3	+1,510.6	+36.1	+1,750.0
Current Changes:				
Quantity	-	-	-	-
Schedule	-	+0.7	-	+0.7
Engineering	+26.6	-3.0	-	+23.6
Estimating	-20.9	+ 99.4	-0.1	+ 78.4
Other	-	-	-	-
Support	-	+31.0	-	+31.0
Subtotal	+ 5.7	+ 128.1	-0.1	+ 133.7
Total Changes	+ 209.0	+1,638.7	+36.0	+1,883.7
Current Estimate	1,394.3	1,638.7	36.0	3,069.0

b.(U)Previous Change Explanations -- See individual Air Force and Army sections.

c.(U)Current Change Explanations -- See individual Air Force and Army sections.

d.(U)References --
Planning Estimate: FY 1986 President's Budget.

Air Force only

13.(U)Cost Variance Analysis:
a.(U)Summary --(Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	1,142.8	-	-	1,142.8
Previous Changes:				
Economic	-26.2	-28.4	-0.6	-55.2
Quantity	-	+1,000.0	+53.2	+1,053.2
Schedule	-	+24.8	+1.4	+26.2
Engineering	-	-	-	-
Estimating	+265.0	+223.0	-5.9	+482.1
Other	-	-	-	-
Support	-	+551.0	-	+551.0
Subtotal	+238.8	+1,770.4	+48.1	+2,057.3
Current Changes:				
Economic	-4.8	+7.8	+0.2	+3.2
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	+33.0	-	-	+33.0
Estimating	-22.4	-7.8	-0.2	-30.4
Other	-	-	-	-
Support	-		-	
Subtotal	+ 5.8	-	-	+5.8
Total Changes	+244.6	+1,770.4	+48.1	+2,063.1
Current Estimate	1,387.4	1,770.4	48.1	3,205.9

13.(U)Cost Variance Analysis (Cont'd): Air Force Only
(FY 83 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	963.3	-	-	963.3
Previous Changes:				
Quantity	-	+684.8	+40.6	+725.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+198.2	+152.4	-4.5	+346.1
Other	-	-	-	-
Support	-	+369.9	-	+369.9
Subtotal	+198.2	+1,207.1	+36.1	+1,441.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	+26.6	-	-	+26.6
Estimating	-17.7	-5.1	-0.1	-22.9
Other	-	-	-	-
Support	-		-	
Subtotal	+8.9	-5.1	-0.1	+3.7
Total Changes	+207.1	+1,202.0	+36.0	+1,445.1
Current Estimate	1,170.4	1,202.0	36.0	2,408.4

b.(U)Previous Change Explanations --

RDT&E
Economic: Revised economic escalation indices
Estimating: Refinement and rephasing of program estimate, deletion of 3rd aircraft and ADA implementation, Congressionally directed cuts, and addition of Self Defense Suite.

PROCUREMENT
Economic: Revised economic escalation indices.
Quantity: Addition of Procurement costs for 10 aircraft
Estimating: Production deferral of one year and rephasing of buy schedule.
Support: Addition of Procurement Support costs 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 FY88 MILCON project

c.(U)Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1)(U)RDT&E		
Revised economic escalation indices (Economic)	N/A	- 4.8
Adjustment for current and prior year escalation change (Estimating)	+ 4.6	+ 5.3
Congressional direction and partial funding for increased scope (3rd aircraft) (Estimating)	+ 7.2	+ 8.7

13.(U)Cost Variance Analysis (Cont'd):

Congressional Reductions and Budgetary constraints resulting in deferred development (Estimating)	- 2.2	- 2.5
Adjustment for FY90 and beyond escalation change (Estimating)	-0.7	-0.9
Correction of a previous error. Addition of Self Defense Suite now categorized as an engineering change vice the estimating change as reported in the 31 Dec 86 SAR.	0.0	0.0
Scope of work addition (Self Defense Suite)(Estimating)	(-26.6)	(-33.0)
Scope of work addition (Self Defense Suite)(Engineering)	(+26.6)	(+33.0)

(2)(U)PROCUREMENT

Revised economic escalation indices (Economic)	-	+7.8
Adjustment for FY90 and beyond escalation change (Estimating)	-5.1	-7.8

(3)(U)MILCON

Revised economic escalation indices (Economic)	-	+0.2
Adjustment for FY90 and beyond escalation change (Estimating)	-0.1	-0.2

13.(U)Cost Variance Analysis: Army Only

a.(U)Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	245.4	-	N/A	245.4
Previous Changes:				
Economic	-11.9	-2.1	-	-14.0
Quantity	-	+425.1	-	+425.1
Schedule	-	+22.8	-	+22.8
Engineering	-	-	-	-
Estimating	+20.6	-153.5	-	-132.9
Other	-	-	-	-
Support	-	+108.4	-	+108.4
Subtotal	+8.7	+400.7	N/A	+409.4
Current Changes:				
Economic	-2.3	+1.7	-	-0.6
Quantity	-	-	-	-
Schedule	-	+6.2	-	+6.2
Engineering	-	-3.6	-	-3.6
Estimating	-3.7	+151.7	-	+148.0
Other	-	-	-	-
Support	-	+ 48.1	-	+48.1
Subtotal	- 6.0	+ 204.1	N/A	+198.1
Total Changes	+ 2.7	+ 604.8	N/A	+607.5
Current Estimate	248.1	604.8	N/A	852.9

13.(U)Cost Variance Analysis (Cont'd):

(FY83 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	222.0	-	N/A	222.0
Previous Changes:				
Quantity	-	+326.9	-	+326.9
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+5.1	-105.7	-	-100.6
Other	-	-	-	-
Support	-	+82.3	-	+82.3
Subtotal	+5.1	+303.5	N/A	+308.6
Current Changes:				
Quantity	-	-	-	-
Schedule	-	+0.7	-	+0.7
Engineering	-	-3.0	-	-3.0
Estimating	-3.2	+ 104.5	-	+101.3
Other	-	-	-	-
Support	-	+31.0	-	+31.0
Subtotal	-3.2	+ 133.2	N/A	+130.0
Total Changes	+1.9	+ 436.7	N/A	+438.6
Current Estimate	223.9	436.7	N/A	660.6

b.(U)Previous Change Explanations

RDT&E
Economic: Revised economic escalation indices
Estimating: Refinement and rephasing of program estimate, and results of Congressionally directed cuts.

PROCUREMENT
Economic: Revised economic escalation indices
Quantity: Addition of procurement flyaway costs for 95 ground stations
Schedule: Two year schedule delay.
Estimating: Refinement and rephasing of program estimate
Support: Addition of procurment support costs associated with 95 ground stations

c.(U)Current Change Explanations --

	(Dollars in Millions) Base-Year	Then year
(1)(U)RDT&E		
Revised Dec 86 economic inflation indices (Economic)	N/A	- 2.3
Adjustment for current and prior year escalation change (Estimating)	+ 1.8	+ 2.2
Decreased costs due to refinement and rephasing of grass roots estimate (Estimating)	-0.4	- 0.4
Congressional reductions and Budgetary constraints resulting in deferred development (Estimating)	- 4.6	- 5.5

(2)(U)PROCUREMENT

Revised economic escalation indices (Economic)	N/A	+ 1.7
Rephasing of program production schedule resulting in deferral of 8 units from FY89 to FY95	N/A	+ 6.9
Increased Flyaway costs due to schedule deferral (Schedule)	N/A	(+ 5.3)
Increased Support costs due to schedule deferral (Support)	N/A	(+ 1.6)
Decreased costs for utilization of Airborn Radio Communication (ARC) 164 and Stroker Sub-assembly in lieu of more costly Surveillance and Control Data link and Raster Display Subsystem, respectively.	- 13.1	- 16.1
Decreased Flyaway costs due to engineering change (Engineering)	(- 3.0)	(- 3.6)
Decreased Support costs due to engineering change (Support)	(- 10.1)	(- 12.5)
Adjustment for Current & Prior Year escalation change (Estimating)	+ 0.1	+ 0.2
Adjustment for FY90 and beyond escalation change (Estimating)	- 1.3	- 2.0
Correction of a previous error. Reversal of entries in the 31 Dec 86 SAR calculated in error.		
3 year procurement delay due to unavailability of data link. FY87/88 procurement is Limited Procurement Urgent due to Department of Army urgency.	N/A	- 29.8
Decreased flyaway costs due to schedule delay (Schedule)	(N/A)	(- 22.8)
Decreased support costs due to schedule delay (Support)	(N/A)	(- 7.0)
Refinement of procurement estimate based on prototype actuals	+132.2	+193.8
Increased flyaway costs due to refined estimate (Estimating)	(+105.7)	(+153.5)

13.(U) Cost Variance Analysis (Cont'd):

Increased support costs due to refined estimate (Support)	(+ 26.5)	(+ 40.3)
31 Dec 86 Correction: 3 year procurement stretchout due to unavailability of data link. FY87/88 procurement is Limited Procurement Urgent due to Department of Army urgency	+ 15.0	+ 49.1
Increased flyaway costs due to schedule stretchout (Schedule)	(+ 0.7)	(+ 23.7)
Increased support costs due to schedule stretchout (Support)	(+ 14.3)	(+ 25.4)
Increased support costs due to refinement of a prior current estimate (Support)	+ 0.3	+ 0.3

14.(U)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 Est)	Changes								PAUC (Planning Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Tot	
571.400	-5.200	-351.800	+2.620	+3.300	+45.170	-	+55.100	-250.810	320.590

*This is not a true PAUC-- this number was derived by dividing RDT&E costs in the initial SAR by the 2 FSD units.

a.(U)Initial SAR Estimate to Current Baseline Estimate -- Army Only

*PAUC (Initial SAR Est)	Changes								PAUC (Planning Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Tot	
30.675	-0.142	-24.165	+0.282	-0.035	+0.147	-	+1.519	-22.394	8.281

* This is not a true PAUC--this number was derived by dividing RDT&E costs in the initial SAR by the 8 FSED units.

15.(U)Contract Information: (Then-Year Dollars in Millions)

a.(U)RDT&E

Initial Contract Price

Radar/Aircraft Platform	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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
681.8	684.0	2	727.2	[redacted]* 1,000.0

*This includes typical ECO historical levels and options that have not yet been exercised.

15.(U)Contract Information (Cont'd):

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-20.2	-34.5
Cumulative Variances To Date (12/31/87)	-133.2	-105.0
Net Change	-113.0	-70.5

Schedule variance is due mainly to late material deliveries from sub-contractor's. Further schedule variance is caused by prime contractor delays in system engineering, software engineering, and system test. A schedule slip of at least one year is expected. Cost variance is primarily caused by prime contractor problems in designing and implementing software. Additional cost variance is driven by problems with vendor hardware, especially in the area of radar equipment. No cost impact at completion is anticipated because the FPIF target equal to ceiling contract offers fixed price protection to the government.

	Initial Contract Price		
GSM FSED Contract	Target	Ceiling	Qty
Motorola Inc, Tempe AZ	31.5	35.4	6

DAAK-20-84-C-0879 FPIF
Award: 10 August 1984
Definitized: 10 August 1984

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
75.4	85.3	8	74.9	82.4

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-4.897	-3.624
Cumulative Variances to Date (12/31/87)	-8.780	-4.686
Net Change	-3.883	-1.062

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. The schedule variance is the result of sub-contractor slippage of harware deliveries. These delivery delays have in turn impacted both qualification testing and data items. Program office instituted workarounds to maintain program schedule.

16.(U)Program Funding Summary: (Current Estimate in Millions of Dollars)

a.(U)Program Status --

(1) Percent Program Completed: 50.0% (7/14)

(2) Percent Program Cost Appropriated: 30.3% (1,230.3/4,058.8)

b.(U)Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (82-88)	Budget Year (89)	Balance to Complete FYDP (90-92)	Beyond FYDP (93-95)	Total
RDT&E	1,177.9	257.3	130.2	70.1	1,635.5
Procurement	52.4	48.3	585.6	1,688.9	2,375.2
MILCON	0.0	0.0	48.1	0.0	48.1
Total	1,230.3	305.6	715.8	1,759.0	4,058.8

16.(U)Program Funding Summary (Cont'd):

c.(U)Annual Summary -- Air Force and Army

FY 90 and beyond numbers have not been totally adjusted to reflect the impacts of FY 88 Congressional Action and FY 89 Program Budget decisions. Proper adjustments will be completed and reported in a future SAR.

Fiscal Year	Qty	FY 83 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1982	-	-	-	37.7	-	-	36.7	9.2/7.6
1983	-	-	-	66.2	-	-	67.8	4.9
1984	-	-	-	102.4	-	-	108.8	3.8
1985	-	-	-	70.5	-	-	77.3	3.4
1986	-	-	-	177.1	-	-	198.7	2.8
1987	-	-	-	279.8	-	-	323.8	2.7
1988	-	-	-	303.7	-	-	364.8	3.7
1989	-	-	-	206.6	-	-	257.3	3.8
1990	-	-	-	60.7	-	-	78.1	3.6
1991	-	-	-	36.3	-	-	48.1	3.3
1992	-	-	-	2.9	-	-	4.0	2.8
1993				50.4			70.1	2.3
Sub Tot	-	-	-	1,394.3			1,635.5	

Appropriation: Procurement

(3010 is Air Force Procurement, 2035 is Army Procurement -- see individual Air Force and Army sections for funding profiles)

Appropriation: MILCON								
1990	-	-	-	19.4	-	-	25.6	3.6
1991	-	-	-	16.6	-	-	22.5	3.3
Sub Tot	-	-	-	36.0	-	-	48.1	-
Total	N/A	32.6	1,124.9	3,069.0	85.3	85.3	4,058.8	-

c.(U)Annual Summary -- Air Force only

Fiscal Year	Qty	FY 83 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1982	-	-	-	33.5	-	-	32.6	9.2
1983	-	-	-	30.7	-	-	31.3	4.9
1984	-	-	-	38.7	-	-	41.0	3.8
1985	-	-	-	44.5	-	-	48.6	3.4
1986	-	-	-	139.8	-	-	156.6	2.8
1987	-	-	-	257.0	-	-	297.3	2.7
1988	-	-	-	288.6	-	-	346.6	3.7
1989	-	-	-	191.2	-	-	238.1	3.8
1990	-	-	-	56.8	-	-	73.1	3.6
1991	-	-	-	36.3	-	-	48.1	3.3
1992	-	-	-	2.9	-	-	4.0	2.8
1993	-	-	-	50.4	-	-	70.1	2.3
Sub Tot	(3)#	-	-	1,170.4	-	-	1,387.4	-

16.(U)Program Funding Summary (Cont'd):

Appropriation: Procurement

1990	-	5.0	29.4	56.0	40.9	-	77.4	3.6
1991	1	15.2	35.4	82.3	26.4	22.9	116.8	3.3
1992	1	4.5	58.8	101.6	18.0	38.4	147.5	2.8
1993	8	3.4	680.4	962.1	-	24.0	1,428.7	2.3
Sub Tot	10#	28.1	804.0	1,202.0	85.3	85.3	1,770.4	-

Appropriation: MILCON

1990	-	-	-	19.4	-	-	25.6	3.6
1991	-	-	-	16.6	-	-	22.5	3.3
Sub Tot	-	-	-	36.0	-	-	48.1	-
Total	10#	28.1	804.0	2,408.4	85.3	85.3	3,205.9	-

The 3 FSD units will be refurbished and used as Production Units.

c.(U)Annual Summary -- Army only

Fiscal Year	Qty	FY 83 Base-Year Dollars			Then-Year Dollars			Escl Rate
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	(%)
Appropriation: RDT&E								
1982	-	-	-	4.2	-	-	4.1	7.6
1983	-	-	-	35.5	-	-	36.5	4.9
1984	-	-	-	63.7	-	-	67.8	3.8
1985	-	-	-	26.0	-	-	28.7	3.4
1986	-	-	-	37.3	-	-	42.1	2.8
1987	-	-	-	22.8	-	-	26.5	2.7
1988	-	-	-	15.1	-	-	18.2	3.7
1989	-	-	-	15.4	-	-	19.2	3.8
1990	-	-	-	3.9	-	-	5.0	3.6
Sub Tot	8	-	-	223.9	-	-	248.1	-
Appropriation: Procurement								
1987	3	0.1	10.6	14.2	-	-	17.2	2.7
1988	6	0.2	22.0	28.0	-	-	35.2	3.7
1989	6	0.2	25.5	37.3	-	-	48.3	3.8
1990	17	0.8	53.2	74.9	-	-	99.8	3.6
1991	14	0.6	39.6	54.8	-	-	74.9	3.3
1992	11	0.6	37.6	49.4	-	-	69.2	2.8
1993	12	0.6	42.1	58.1	-	-	83.2	2.3
1994	18	0.9	62.5	85.7	-	-	125.6	2.3
1995	8	0.5	25.8	34.3	-	-	51.4	2.3
Sub Tot	95	4.5	318.9	436.7	-	-	604.8	
TOTAL	103	4.5	318.9	660.6	-	-	852.9	

16.(U)Program Funding Summary (Cont'd):

d.(U)Obligations and Expenditures -- Air Force and Army

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
	Appropriation: RDT&E		
1982	36.7	36.6	36.6
1983	67.8	67.8	67.8
1984	108.8	103.7	97.0
1985	77.3	76.3	56.9
1986	198.7	196.7	74.9
1987	323.8	318.1	182.0
1988	364.8	126.6	2.2
To Complete	457.6	-	-
Total	1,635.5	925.8	517.4
	Air Force only		
1982	32.6	32.6	32.6
1983	31.3	31.3	31.3
1984	41.0	41.0	41.0
1985	48.6	48.6	48.6
1986	156.6	156.1	67.7
1987	297.3	292.3	175.6
1988	346.6	120.5	1.6
To Complete	433.4	-	-
Total	1,387.4	722.4	398.4
	Army only		
1982	4.1	4.0	4.0
1983	36.5	36.5	36.5
1984	67.8	62.7	56.0
1985	28.7	27.7	8.3
1986	42.1	40.6	7.2
1987	26.5	25.8	6.4
1988	18.2	6.1	0.6
To Complete	24.2	-	-
Total	248.1	203.4	119.0
	Appropriation: Procurement		Army Only
1987	17.2	14.7	0.7
1988	35.2	12.8	0.1
To Complete	552.4	-	-
Total	604.8	27.5	0.8

* Reflects Program Office records

17.(U)Production Rate Data:

Deliveries (Plan/Actual) -- Air Force Only

	To Date
RDT&E	0/0
Procurement	0/0

Deliveries (Plan/Actual) -- Army Only

	To Date
RDT&E	3/3
Procurement	0/0

18.(U)Operating and Support Costs: N/A

SAR-87-094

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: Sensor Fuzed Weapon

AF-28 SFW

AS OF DATE: December 31, 1987

INDEX

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SAF/PAS
88-0128-T

1. Designation and Nomenclature (Popular Name): CBU-97/B, Sensor Fuzed Weapon (SFW)

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

Deputy for Air-to-Surface Ballistic Weapons
Armament Division
Eglin AFB, FL 32542

PD: Col Edwin W. Lippincott
Assigned: Feb 1, 1988
AV 872-2580; COMM (904)882-2580

4. Program Elements/Procurement Line Items:

RDT&E: PE 64607F
PE 64604F Project 643086 (Shared Funding)
PE 64602F Project 643244 (Shared Funding)

PROCUREMENT: PE 28030F APPN 3080 ICN 813520 (Shared Funding)

RELEASED
MAR 14 1988 TO

5. Related Programs: SUU-64/B Tactical Munitions Dispenser
CNU-411 Container
FZU-39 Proximity Sensor

OASD(PA) DFOISR 88-T-0554

6. Mission and Description: The objective of the Sensor Fuzed Weapon (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 will enhance 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 Sensor Fuzed Weapon (SFW) design. The development of the SFW was divided into two phases--Risk Reduction and Full Scale Development. 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, completing the 15 month Risk Reduction Phase. On 25 November 1985, SAF/AL authorized the SFW program to proceed into the Full Scale Development phase. The FSD contract option was signed on 29 November 1985. A second SFW live submunition drop was successfully completed 5 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. The 30 September 1987 SAR revised several program milestones as a result of technical problems related to the BLU 108/B structure.

b. Significant Developments Since Last Report -- *

A significant pre-CDR test program is underway to confirm design performance at the component, subsystem and system levels. There will be 9 munition level tests during this phase. Three of these tests have been completed. The second test demonstrated very stable inert submunition dispense and generated an excellent ground pattern.

During Sep - Oct 87, tactical infrared (IR) sensor countermeasure testing was completed at White Sands Missile Range with the Office of the Test Director (OTD) and at Eglin AFB FL, over 500 sensor passes were conducted against targets equipped with various obscurant, suppressant and decoy countermeasures. As of Dec 87, 30 warhead producibility tests, in a series of 38, have been conducted with excellent results.

Significant Dev (Cont'd):

During a rocket sled test, 25 Nov 87, a submunition with inert skeets successfully performed all the design functions from parachute deployment at 500 KTS through skeet release. A live BLU-108/B test, 4 Dec 87, confirmed all submunition functions and resulted in 3 of 4 skeets detecting and firing on targets.

The SFW system is expected to satisfy the mission requirement.

c. Changes since "As of Date" -- The third CBU-97/B was successfully tested 7 Jan 88. The BLU-108/Bs contained sequencers, parachutes, launcher structures, rocket motors, altimeters and inert skeets.

Supplemental altimeter countermeasure and HAVE NOTE (electromagnetic susceptibility) testing was completed Jan 88 at Rome Air Development Center (RADC). During Feb 88, the SFW sensor demonstrated very good overall performance in a cold weather detection environment. Over 5000 target encounters were conducted over various threat vehicles.

Three Live BLU-108s were dropped simultaneously at Sandia on 27 Jan 88. This test showed excellent "many-on-many" skeet performance against a large target array. Skeet fratricide resistance exceeded the effectiveness model predictions. On 11 and 13 Feb 88, 2 live BLU-108/B submunitions were launched at 500 KCAS from a rocket sled at Sandia. Submunition performance was very good. This was the first demonstration of live skeet release over a target array using a rocket sled.

* Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional Direction and FY89 Amended Budget Decisions.

8. Decision Coordinating Paper (DCP) Threshold Breaches: No DCP.

9. Schedule:

a. Milestones --

	Development Estimate/ Approved Program	Current Estimate
Advanced Development Contract Start	Jul 84/ NA	Jul 84
Preliminary Design Review (Risk Reduction Phase Completion)	Oct 85/ NA	Oct 85
Milestone II (SAF/AL)	Nov 85/Nov 85	Nov 85
Critical Design Review	Jul 87/Mar 88	Mar 88
Complete DT&E/IOT&E	Jun 89/Sep 89	Sep 89
Milestone III (AFSARC)	Nov 88/Aug 89	Aug 89
Production Contract Award	Dec 88/ NA	Oct 89
IOC (First Delivery to Inventory)	Jul 90/Jun 91 (Ch-1)	Apr 91

b. Previous Change Explanations -- The Critical Design Review date was moved from Jul 87 to Oct 87 based on contractor hardware procurement and test delays and then slipped from Oct 87 to Mar 88 due to design problems on the BLU 108/B structure. These slips caused subsequent slips in other milestone areas for DTE/IOTE (from Jun 89 to Sep 89), Production Decision (from Nov 88 to Aug 89), and First Delivery to Inventory (from Jul 90 to Apr 91).

c. Current Change Explanations -- Ch-1 Reflects USD(A) Basline Approval.

9. Schedule (Cont'd):

d. References --

Development Estimate: OSD/CAIG Briefing, May 1986 (Approved by OSD)
(Production Estimate based on Competitive Dual Source)

Approved Program: PMD 4064(7)/64607F/64604F, dated 28 Sep 87 and FY89 President's Budget; USD(A) Memo,9 Feb 1988.

10. Technical/Operational Characteristics:

a. Technical --	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
Submunition Capacity: (Number of Submunitions/ Number of Integrated warheads or Sensors per Submunition)	(10/4) (10/4)		10/4
A/C Interoperability [1]			
CBU-97/B Weight [2]			
Temperature	-40° to +150°F/-40° to +150°F		-40° to +150°F
System Reliability			
CBU-97/B	.90/.90		.90
Shelf Life	10yrs/10yrs		10yrs
Service Life	1yr cumulative/1yr cumulative		1yr cumulative
Maintenance Concept [3]			
b. Operational --			
Carriage Parameters			
Combat Load [4]			
Maximum Altitude	40,000'MSL/ NA		40,000'MSL
Maximum Airspeed	700 KCAS/ NA		700 KCAS
Acceleration (Gs)	Aircraft limits/ NA		Aircraft limits
Release Parameters			
Altitude	200 AGL-20,000MSL/NA		200 AGL-20,000MS
Attitude	+45 to -45 degree/NA		+45 to -45 degre
Airspeed	200-650 KCAS/ NA		200-650 KCAS
Acceleration	+.5 to 4.5 Gs/ NA		+.5 to 4.5 Gs
Sortie Preperation per 4 weapons			
ICT Requirement [5]	30 min/ NA		30 min
Std upload proc [6]	56 min/ NA		56 min
Mean time to break out and deliver [7]	40 min/ NA		40 min
Targets [8]			
Type of Kill [9]	M,F, or K/ NA		M,F, or K
Kills per pass	Multiple/Multiple		Multiple

10. Technical/Operational Characteristics (Cont'd):

c. Previous Change Explanations -- None

d. Current Change Explanations -- None

e. References --

Development Estimate: OSD/CAIG Briefing, May 1986 (Approved by OSD).

Approved Program: PMD 4064(7)/64607F/64604F, dated 28 Sep 87 and FY89 PB, USD(A) Memo. 9 Feb 1988.

1. Compatible with A-7, A-10, F-4, F-15, F-16, F-111, B52 G/H; Plan for compatability with Jaguar, Tornado, Harrier, Mirage V. This applies to Development Estimate, Approved Program, and Current Estimate.

2. 1000 pound class area munition (SUU-64B dispenser). This applies to Development Estimate, Approved Program, and Current Estimate.

3. No scheduled testing, calibration, or maintenance. This applies to Development Estimate, Approved Program, and Current Estimate.

4. (12) F15, (12) F111, (4) F16, (4) F4, (5) A7, (6) A10, and (30) B52. This applies to Development Estimate, Approved Program, and Current Estimate.

5. Integrated Combat Turnaround (ICT) times are based on uploading four CBU-97/B's per applicable aircraft loading procedures.

6. Standard uploading procedure times are based on uploading four CBU-97/B's per applicable aircraft loading procedures.

7. MTBD is defined as the average time to break out of storage four CBU-97/B's, upload on trailer, prepare for transport, and deliver to flight line.

8. Vanguard/Reinforced Regimental Advanced Guard (RRAG) Tanks, APCs, Self-propelled artillery are primary targets. Secondary targets include trucks and other support vehicles. This applies to Development Estimate, Approved Program, and Current Estimate.

9. Mobility (M), Firepower (F), or Catastrophic (K) kills are as defined in the Joint Munitions Effectiveness Manual.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost —	Development Estimate	Changes	Current Estimate*
Development (RDT&E)	80.0	+16.1	96.1
Procurement	1139.8	+332.2	1472.0
Total Flyaway	(1127.7)	(+329.0)	(1456.7)
Other Weapon System Cost	(12.1)	(+3.2)	(15.3)
Initial Spares	(0.0)	(0.0)	(0.0)
Construction (MILCON)	0.0	0.0	0.0
TOTAL FY 79 BASE-YEAR$	1219.8	+348.3	1568.1
Escalation	1186.0	+458.6	1644.6
Development (RDT&E)	(47.7)	(+9.7)	(57.4)
Procurement	(1138.3)	(+448.9)	(1587.2)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
TOTAL THEN-YEAR $	2405.8	+806.9	3212.7
b. Quantities --			
Development (RDT&E)	84	+5	89
Procurement	14000	+5803	19803
Total	14084	+5808	19892
c. Unit Cost --			
Procurement:			
FY79 Base-Year$	0.081	-0.007	0.074
Then-Year$	0.163	-0.009	0.154
Program:			
FY79 Base-Year$	0.087	-0.008	0.079
Then-Year$	0.171	-0.009	0.162

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales — None.

f. Nuclear Costs — None.

* Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional Direction and FY89 Amended Budget Decisions.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Estimate Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	3,212.7	3,163.9	3,212.7
(2) Quantity	19892	19892	19892
(3) Unit Cost	0.162	0.159	0.162
b. Current Procurement -	(FY 1988)	(FY 1988)	(FY 1989)
(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	-0.7	-12.5	—	-13.2
Quantity	+2.3	+763.4	—	+765.7
Schedule	—	-9.0	—	-9.0
Engineering	—	—	—	—
Estimating	+6.1	—	—	+6.1
Other	—	—	—	—
Support	—	+8.2	—	+8.2
Subtotal	+7.7	+750.1	—	+757.8
Current Changes:				
Economic	-0.7	+25.0	—	+24.3
Quantity	—	—	—	—
Schedule	—	+25.0	—	+25.0
Engineering	—	—	—	—
Estimating	+18.8	-18.3	—	+0.5
Other	—	—	—	—
Support	—	-0.7	—	-0.7
Subtotal	+18.1	+31.0	—	+49.1
Total Changes	+25.8	+781.1	—	+806.9
Current Estimate	153.5	3059.2	—	3212.7

13. Cost Variance Analysis (Cont'd):

(FY 1979 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	80.0	1139.8	—	1219.8
Previous Changes:				
Quantity	+1.4	+340.6	—	+342.0
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	+3.8	—	—	+3.8
Other	—	—	—	—
Support	—	+3.7	—	+3.7
Subtotal	+5.2	+344.3	—	+349.5
Current Changes:				
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	+10.9	-11.6	—	-0.7
Other	—	—	—	—
Support	—	-0.5	—	-0.5
Subtotal	+10.9	-12.1	—	-1.2
Total Changes	+16.1	+332.2	—	+348.3
Current Estimate	96.1	+1472.0	—	1568.1

b. Previous Change Explanations --

RDT&E

Economic: Revised economic escalation indices
Quantity: Increase RDT&E units by five for Life Cycle Surveillance Testing using funds already appropriated.
Estimating: Offset of quantity increase - reduced management flexibility in executing into 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.

Procurement

Economic: Revised economic escalation indices
Quantity: Increased flyaway costs to procure 5,803 additional SFWs in accordance with the revised Program Management Directive (PMD) to incorporate latest assessment of Air Force quantity requirements.
Schedule: Impact of revised schedule in accordance with the revised PMD to incorporate latest assessment reflected in the FY88-92 NCAA.
Support : Increased data costs associated with 5,803 SFWs added to the program

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)	N/A	-0.7
Adjusted for Current and Prior Year Escalation Offset (Estimating)	+0.5	+0.7
Increase for SEEK EAGLE Test Requirements (Estimating)	+10.4	+18.1
(2) Procurement		
Revised Economic Escalation Indices (Economic)	N/A	+25.0
First procurement buys originally scheduled for FY89 were slipped to FY90. (Schedule)	N/A	+25.0
New pricing methodology used Risk Reduction Hardware Actuals. Competition starts 2 years earlier (3rd lot versus 5th lot) (Estimating)	-11.6	-18.3
Data price adjustment based on actuals (Support)	-0.5	-0.7

d. References -- Development Estimate: OSD/CAIG Briefing, May 1986 (OSD approved)

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 Estimate)
	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 (Curr Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
0.171	+.001	-.012	+.001	-	-	-	+.001	-.009	0.162

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 Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
$96.0	$96.0	89	$96.0	$96.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-24.2M	-5.6M
Cumulative Variances To Date (29 Nov 87)	-3.9M	-4.4M
Net Change	+20.3M	+1.2M

15. Contract Information (Cont'd):

In June 87, the contractor implemented an Over Target Baseline (OTB) at which time all variances were reset to zero and the remainder of the work on contract was rebaselined.

Cost and schedule variances continue to reflect an unfavorable trend. The current values reflect performance since the OTB.

The current variances result from a 5 month slip in CDR and cost associated with redesign, rework and manufacturing of the BLU 108/B structure. As reported in our previous UCR, the BLU 108/B structure design problems have been resolved and several tests have been conducted to verify the revised design.

The SFW is a fixed price incentive firm contract. Government liability is limited to ceiling and the program office has budgeted to ceiling. Progress payments to the contractor have been reduced as a result of poor cost and schedule performance.

b. Procurement -- None

c. MILCON -- None

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 35.3% (6 yrs/17 yrs)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 3.9% ($126.7/$3212.7)
(Funds Appropriated To Date in Millions/Total Program Funding in Millions)

b. Appropriation Summary -- *

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY83-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Balance to Complete Beyond FYDP (FY93-99)	Total
RDT&E	126.7	26.8	-0-	-0-	153.5
Procurement	-0-	-0-	714.6	2344.6	3059.2
MILCON	-0-	-0-	-0-	-0-	-0-
Total	126.7	26.8	714.6	2344.6	3212.7

* Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional Direction and FY89 Amended Budget Decisions.

16. Program Funding Summary (Cont'd):

c. Annual Summary -- *

Fiscal Year	Qty	Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1983				2.9			4.2	4.9
1984				11.3			16.7	3.8
1985				23.1			35.4	3.4
1986				15.7			24.6	2.8
1987				14.4			23.3	2.7
1988				13.4			22.5	3.7
1989				15.3			26.8	3.8
Subtotal	89	**	**	96.1	--	--	153.5	N/A
Appropriation: Procurement								
1990	390	10.3	87.3	98.2			183.0	3.6
1991	865	14.1	103.3	118.4			226.5	3.3
1992	1635	13.3	140.8	155.7			305.1	2.8
1993	2170	0	156.7	158.4			317.5	2.3
1994	2890	0	184.9	187.0			383.4	2.3
1995	2830	0	178.2	180.2			377.8	2.3
1996	2770	0	173.9	175.9			377.3	2.3
1997	2710	0	170.1	172.0			377.5	2.3
1998	2590	0	162.5	164.3			368.9	2.3
1999	953	0	61.3	61.9			142.2	2.3
Subtotal	19803	37.7	1419.0	1472.0	--	--	3059.2	N/A

c. Annual Summary --

Appropriation: MILCON								
Subtotal	--	--	--	--	--	--	--	--
Total	19892	37.7	1419.0	1568.1	--	--	3212.7	N/A

* Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 Congressional Direction and FY89 Amended Budget Decisions.

** Information not available.

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1983	4.2	4.2	4.2
1984	16.7	16.7	16.7
1985	35.4	35.2	35.1
1986	24.6	24.5	11.8
1987	23.3	22.9	2.2
1988	22.5	8.5	N/A
1989	26.8	N/A	N/A
TOTAL	153.5	112.0	70.0

17. Production Rate Data:

a. Annual 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	390	N/A
1991	1275	N/A	865	N/A
1992	1500	N/A	1635	N/A
1993	2000	N/A	2170	N/A
1994	2500	N/A	2890	N/A
1995	2700	N/A	2830	N/A
1996	2880	N/A	2770	N/A
1997		N/A	2710	N/A
1998		N/A	2590	N/A
1999		N/A	953	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$)	N/A	N/A	1568.1	N/A	N/A
(TY$)	N/A	N/A	3212.7	N/A	N/A
PAUC (BY$)	N/A	N/A	0.079	N/A	N/A
(TY$)	N/A	N/A	0.162	N/A	N/A

17. Production Rate Data (Cont'd): SFW, December 31, 1987

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	1/90	N/A	N/A
Duration (in Months)	N/A	N/A	127	N/A	N/A
End Date (Mo/Yr)**	N/A	N/A	7/00	N/A	N/A

* Projected date of Contract Award
** Projected date of last delivery

d. Deliveries (Plan/Actual) —

	To Date
RDT&E	7/5
Procurement	0/0

18. Operating and Support Costs: N/A

3.

SAR-87-103

SELECTED ACQUISITION REPORT (RCS: DD-COMP (O&A) 823)

PROGRAM: JOINT TACTICAL COMMUNICATIONS (TRI-TAC) PROGRAM

AF-33 TRI-TAC

AS OF DATE: 31 December 1987

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SAF/PAS

88-0161-T

1. Designation/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 Program: N/A

CLEARED
MAR 08 1988 10

OASD(PA) DFOISR 88-T-0725

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). TRI-TAC is a continuing program.

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 is 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-137 and CV-3591), Modular Tactical Communications Centers (MTCC), 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, OUSD (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.

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.

b. Significant Developments Since Last Report--

CNCE. 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. As the CNCE program is 96 percent complete with final deliveries expected in October 1988 this will be the last report on CNCE and will be included in the section titled other for future submissions.

TROPO. 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). This system is expected to satisfy its mission requirements and comply with all performance requirements. 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).

Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 Amended Budget Decisions.

c. Changes Since December 31, 1987--None.

8. Decision Coordinating Paper (DCP) Threshold Breaches: N/A

Schedule	Production Estimate/ Approved Program	Current Estimate
(1) CNCE		
a. Milestones		
Contract Award	May 75/NA	May 75
Preliminary Design Review - Hardware	Dec 75/NA	Dec 75
Preliminary Design Review - Software	Aug 76/NA	Aug 76
Critical Design Review - Hardware	Apr 77/NA	Apr 77
Critical Design Review - Software Part I	Aug 77/NA	Aug 77
Critical Design Review - Software Part II	Jan 78/NA	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/NA	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(Ch-1)	Aug 84
Initial Operational Capability 1/	N/A	N/A
First Delivery	Aug 86/Aug 86	Aug 86
Last Delivery	Mar 88/Oct 88	Oct 88

b. Previous Change Explanations -- CNCE production award slipped one month from Jul 84 to Aug 84 due to difficult negotiations. 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) Reflects USD(A) Baseline Approval

d. References --

Production Estimate: FY 85 President's Budget, January 1984.

Approved Program: FY 88/89 President's Budget, USD(A) Memo, 9 Feb 88.

1/ There is no directed or defined IOC for CNCE.

	Production Estimate/ Approved Program	Current Estimate
(2) TROPO		
a. Milestones		
Production Begins	Apr 82/Apr 82	Apr 82
Initial Operational Capability 1/	N/A	N/A
First Delivery	Dec 84/Oct 84 (Ch-2)	Oct 84
Last Delivery 2/	Dec 86/Dec 86	Dec 86
Follow-on Production	Mar 85/Sep 85(Ch-2)	Sep 85
First Delivery (CH-1)	- /NA	Aug 87
Last Delivery (CH-1)	- /NA	May 88
Competitive Procurement (CH-1)	- /NA	May 87
First Delivery (CH-1)	- /NA	Dec 89
Last Delivery (CH-1)	- /NA	May 91

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.

c. Current Change Explanations -- (CH-1) Additional milestones not previously reported (first delivery for follow-on production through last delivery of competitive procurement). (Ch-2) Reflects USD(A) Baseline Approval.

d. References --

Production Estimate: FY 85 President's Budget, January 1984.

Approved Program: FY 88/89 President's Budget, Amended February 1988, USD(A) Memo, 9 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 Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(1) CNCE			
Capacity			
(Digital Channels)	756/756	756 (CH-1)	756
(Analog Channels)	390/390	390 (CH-1)	390
Weight (lbs)	10,000/10,000	8,900 (CH-1)	8,900
Mean Time Between Incidents (MTBI) (Hrs)	50/50	N/A	94
Mean Corrective Time (MCT) (MINS)	15/15	N/A	9.4
(2) TROPO			
Capacity (Digital Channels)	60/60	60	60
Range (Miles, Nominal)			
V-2	150/150	150	150
V-3	100/100	100	100

10. Technical/Operational Characteristics (Cont'd)

2. TROPO	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
Weight (lbs)			
V-2	9,300/9,300	9,016	9,016
V-3	6,200/6,200	6,077	6,077
Mean Time Between Failures (MTBF) (Hrs)			
V-2	308/308	N/A	520
V-3	472/472	N/A	800
Mean Time to Repair (MTTR) (Mins)	15-45/15-45	N/A	15-30

b. Operational

(1) CNCE

Footprint (No. of Shelters)	1/1	1 (CH-1)	1
Maximum Set Up/Tear Down Times (Min)	45/45	45 (CH-1)	45

(2) TROPO

Footprint			
V-2 (No. of Shelters)	1	1	1
(No. of Antennas)	2	2	2
V-3 (No. of Shelters)	1	1	1
(No. of Antennas)	1	1	1
Maximum Set Up/Tear Down (Minimum/Full Cite)			
Times (Hrs)			
V-2	2/4(Ch-2)	4/4	4/4
V-3	1/1(CH-2)	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.

d. Current Change Explanations -- (CH-1) Demonstrated performance during FOT&E (Ch-2) Reflects USD(A) Baseline Approval.

e. References --

Production Estimate: FY 85 President's Budget, January 1984

Approved Program: FY 88/89 President's Budget, Amended February 1988, USD(A) Memo, 9 February 1988.

10. Program Acquisition Cost: (Current Estimate in Millions of Dollars)
System TRI-TAC (CNCE)

a. Cost --	Production Estimate	Changes	Current Estimate
Development	112.8	- 0.1	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	+148.1	260.9
Escalation	36.9	+144.8	181.7
Development	(36.9)	(- 0.3)	(36.6)
Procurement	-	(+145.1)	(145.1)
Construction	-	-	-
Total Then-Year $	149.7	+292.9	442.6
b. Quantities --			
Development	4	-	4
Procurement	-	+68	68
Total	4	+68	72
c. Unit Cost --			
Procurement:			
FY 76 Base-Year $	-	+ 2.179	2.179
Then-Year $	-	+ 4.313	4.313
Program:			
FY 76 Base-Year $	28.200	-24.576	3.624
Then-Year $	37.425	-31.278	6.147

d. Approved Design to Cost Goal -- None

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

a. Cost	Production Estimate	Changes	Current Estimate
Development	37.3	+ 4.5	41.8
Procurement	306.4	+ 11.4	317.8
Total Flyaway	(285.1)	(+ 1.2)	(286.3)
Peculiar Spt Eqp	(17.1)	(+ 6.1)	(26.5)
Other Wpn Costs	(4.2)	(+ 4.1)	(8.3)
Initial Spares	-	-	-
Construction	-	-	-
Total FY 76 Base-Year $	343.7	+ 15.9	359.6
Escalation	353.6	+ 11.4	365.0
Development	(11.2)	(+ 4.7)	(15.9)
Procurement	(342.4)	(+ 6.7)	(349.1)
Construction	-	-	-
Total Then-Year $	697.3	+ 27.3	724.6

11. Program Acquisition Cost (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

b. Quantities --	Production Estimate	Changes	Current Estimate
Development	9	-	9
Procurement	350	+124	474
Total	359	+124	483
c. Unit Cost --			
Procurement:			
FY 76 Base-Year $	0.875	- 0.205	0.670
Then-Year $	1.854	- 0.447	1.407
Program:			
FY 76 Base-Year $	0.957	- 0.212	0.745
Then-Year $	1.942	- 0.442	1.500

d. Approved Design to Cost Goal -- None

e. Foreign Military Sales -- Sales to date are 8 units for the United Arab Emirates for a total of $34.8M

11. Program Acquisition Cost (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (Support/Systems Integration/Other)

a. Cost	Production Estimate	Changes	Current Estimate
Development	80.7	+ 1.4	82.1
Procurement	589.8	-257.5	332.3
Total Flyaway	-	-	-
Peculiar Spt Eqp	-	-	-
Other Wpn Costs	(478.0)	(-184.9)	(293.1)
Initial Spares	(111.8)	(- 72.6)	(39.2)
Construction	-	-	-
Total FY 76 Base-Year $	670.5	-256.1	414.4
Escalation	707.7	-294.2	413.5
Development	(35.8)	(+ 3.4)	(39.2)
Procurement	(671.9)	(-297.6)	(374.3)
Construction	-	-	-
Total Then-Year $	1378.2	-550.3	827.9
b. Quantities --	N/A		
c. Unit Cost --	N/A		

d. Approved Design to Cost Goal -- None

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)
System: TRI-TAC (CNCE)

	Current Year		Budget Year
	Current Est (Dec 87)	UCR Baseline (Dec 86)	UCR Baseline (Dec 87)
a. Program Acquisition --			
(1) Cost	442.6	444.3	442.6
(2) Quantity	72	72	72
(3) Unit Cost	6.147	6.171	6.147
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(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)
ystem: TRI-TAC (TROPO)

a. Program Acquisition --			
(1) Cost	724.6	789.2	724.6
(2) Quantity	483	449	483
(3) Unit Cost	1.500	1.758	1.500
b. Current Procurement --	(FY 1988)	(FY 1988)*	(FY 1989)
(1) Cost	74.4	74.4	88.9
Less CY Adv Proc	0	0	0
Plus PY Adv Porc	0	0	0
Net Total	74.4	74.4	88.9
(2) Quantity	62	62	73
(3) Unit Cost	1.200	1.200	1.218

* Differs from December 1986 SAR based on FY 87 Appropriations Act.

13. Cost Variance Analysis
System: Joint Tactical Communications (TRI-TAC) Program

a. Summary - Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	314.7	1910.5	N/A	2225.2
Previous Changes				
Economic	-2.8	-102.9	-	-105.7
Quantity	-	+296.2	-	+296.2
Schedule	-	+ 19.1	-	+ 19.1
Engineering	+15.7	+ 4.2	-	+ 19.9
Estimating	+12.6	-148.5	-	-135.9
Other	-	-	-	-
Support	- 5.2	- 22.0	-	- 27.2
Subtotal	+20.3	+ 46.1	-	+ 66.4
Current Changes				
Economic	- 0.2	+ 9.7	-	+ 9.5
Quantity	-	+ 16.1	-	+ 16.1
Schedule	-	+ 18.8	-	+ 18.8
Engineering	-	-	-	-
Estimating	- 6.3	-259.3	-	-265.6
Other	-	-	-	-
Support	- 0.2	-75.1	-	-75.3
Subtotal	- 6.7	-289.8	-	-296.5
Total Changes	+13.6	-243.7	-	-230.1
Current Estimate	328.3	1666.8	-	1995.1

(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	-	+ 118.1	-	+118.1
Schedule	-	-	-	-
Engineering	+ 7.2	+ 2.0	-	+ 9.2
Estimating	+ 5.7	- 68.9	-	- 63.2
Other	-	-	-	-
Support	- 3.7	- 16.0	-	- 19.7
Subtotal	+ 9.2	+ 35.2	-	+ 44.4
Current Changes				
Quantity	-	+ 7.5	-	+ 7.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 3.3	- 107.4		- 107.4
Other	-	-	-	-
Support	- 0.1	- 33.2		- - 33.3
Subtotal	- 3.4	-133.1	-	-136.5
Total Changes	+ 5.8	- 97.9	-	- 92.1
Current Estimate	236.6	798.3	-	1034.9

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	- 0.5	- 11.0	-	- 11.5
Quantity	-	+278.8	-	+278.8
Schedule	-	-	-	-
Engineering	-	+ 4.2	-	+ 4.2
Estimating	+ 0.4	- 5.0	-	- 4.6
Other	-	-	-	-
Support	- 0.1	+ 27.8	-	+ 27.7
Subtotal	- 0.2	+294.8	-	+294.6
Current Changes				
Economic	- 0.1	+ 0.2	-	+ 0.1
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+ 0.1	- 0.2	-	- 0.1
Other	-	-	-	-
Support	- 0.2	- 1.5	-	- 1.7
Subtotal	- 0.2	- 1.5	-	- 1.7
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	- 2.2	-	- 2.0
Other	-	-	-	-
Support	- 0.2	+ 14.1	-	+ 13.9
Subtotal	0.0	+149.2	-	+149.2
Current Changes				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 0.1	-	- 0.1
Other	-	-	-	-
Support	- 0.1	- 0.9	-	- 1.0
Subtotal	- 0.1	- 1.0	-	- 1.1
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 - -

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	-0.1
Adjustment for current and prior year escalation. (Estimating)	0.0	+0.1
Revised estimate for Peculiar Support Equipment based on maintenance concept. (Support)	-0.1	-0.2
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+0.2
Adjustment for prior year economic escalation impact. (Estimating)	-0.1	-0.2
Refined hardware peculiar support equipment requirements. (Support)	-0.9	-1.5

d. References --

Production Estimate: FY 85 President's Budget, January 1984.

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	- 35.3	-	- 36.5
Quantity	-	+139.8	-	+139.8
Schedule	-	+ 19.1	-	+ 19.1
Engineering	+15.7	-	-	+ 15.7
Estimating	+ 2.9	- 67.2	-	- 64.3
Other	-	-	-	-
Support	- 1.1	+ 19.2	-	+ 18.1
Subtotal	+16.3	+ 75.6	-	+ 91.9
Current Changes				
Economic	-	+ 4.4	-	+ 4.4
Quantity	-	+ 16.1	-	+ 16.1
Schedule	-	+ 18.8	-	+ 18.8
Engineering	-	-	-	-
Estimating	- 7.1	-101.6	-	-108.7
Other	-	-	-	-
Support	-	+ 4.8	-	+ 4.8
Subtotal	- 7.1	- 57.5	-	- 64.6
Total Changes	+ 9.2	+ 18.1	-	+ 27.3
Current Estimate	57.7	666.9	-	724.6

(FY 1976 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	37.3	306.4	N/A	343.7
Previous Changes:				
Quantity	-	+ 58.1	-	+ 58.1
Schedule	-	-	-	-
Engineering	+ 7.2	-	-	+ 7.2
Estimating	+ 1.3	- 29.2	-	- 27.9
Other	-	-	-	-
Support	- 0.7	+ 7.9	-	+ 7.2
Subtotal	+ 7.8	+ 36.8	-	+ 44.6
Current Changes				
Quantity	-	+ 7.5	-	+ 7.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 3.3	- 35.2	-	- 38.5
Other	-	-	-	-
Support	-	+ 2.3	-	+ 2.3
Subtotal	- 3.3	- 25.4	-	- 28.7
Total Changes	+ 4.6	+ 11.4	-	+ 15.9
Current Estimate	41.8	317.8	-	359.6

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.
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.
Schedule: Rephasing of schedule due to quantity deletions.
Estimating: Refined estimate for other programmatic costs associated with TROPO production. Adjustment for Prior Year economic escalation.
Support: Increased support costs associated with a net increase of 18 units (FY 88-92).

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Deletion of Electronic Counter Counter Measure (ECCM) Capability due to budget restrictions. (Estimating)	-3.3	- 7.1
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+ 4.4
Increased quantity of TROPOs from 440 to 474.	+9.8	+20.9
Flyaway costs associated with quantity increase of 34 units. (Quantity)	(+7.5)	(+16.1)
Support costs associated with quantity increase of 34 units. (Support)	(+2.3)	(+ 2.3)
Rephasing of production schedule due to competition and programmatic reductions. (Schedule)	N/A	+18.8

3. Cost Variance Analysis (Cont'd)

c. Current Change Explanations --(Cont'd)

	(Dollars in Millions) Base-Year	Then-Year
Procurement (Cont'd)		
Refinement of current production estimate based upon competition of production units and a change in the quantity mix being procured. (Estimating)	-35.1	-101.4
Adjustment for current and prior year economic escalation. (Estimating)	- 0.1	- 0.2

d. References -

Production Estimate: FY 85 President's Budget, January 1984

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	- 1.1	- 56.6	-	- 57.7
Quantity	-	-122.4	-	-122.4
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+ 9.3	- 76.3	-	- 67.0
Other	-	-	-	-
Support	- 4.0	- 69.0	-	- 73.0
Subtotal	+ 4.2	-324.3	-	-320.1
Current Changes:				
Economic	- 0.1	+ 5.1	-	+ 5.0
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+ 0.7	-157.5	-	-156.8
Other	-	-	-	-
Support	-	- 78.4	-	- 78.4
Subtotal	+ 0.6	-230.8	-	-230.2
Total Changes	+ 4.8	-555.1	-	-550.3
Current Estimate	121.3	706.6	-	827.9

(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	- 37.5	-	- 33.3
Other	-	-	-	-
Support	- 2.8	- 38.0	-	- 40.8
Subtotal	+ 1.4	-150.8	-	-149.4
Current Changes:				
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	- 72.1	-	- 72.1
Other	-	-	-	-
Support	-	- 34.6	-	- 34.6
Sub total	0.0	-106.7	-	-106.7
Total Changes	+ 1.4	-257.5	-	-256.1
Current Estimate	82.1	332.3	-	414.4

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.
Support: DOD transferred management responsibility of JTE to Army. Development of Tactical Generic Replacement Cable, 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.
Support: Refined estimate for spares.
Adjustment for correction of categories in previous December 1985 SAR. (Quantity/Estimating)

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised economic escalation indices. (Economic)	N/A	- 0.1
Adjustment for current and prior year escalation. (Estimating)	+ 0.1	+ 0.2
Integration planning and interface equipment development extended through FY 1993. (Estimating)	+ 2.0	+ 5.0
Deletion of the Tactial Generic Replacement Cable due to budget restrictions. (Estimating)	- 2.1	- 4.5
(2) Procurement		
Revised economic escalation indices. (Economic)	N/A	+ 5.1
Decreased various items of TRI-TAC equipment produced by the other services because of budget constraints. (Estimating)	-72.0	-157.2

13. Cost Variance Analysis (Cont'd):
System: TRI-TAC (Support/Systems Integration/Other)

c. Current Change Explanations--(Cont'd)

Adjustment for current and prior year economic escalation. (Estimating)	- 0.1	- 0.3
Adjustment in spares to support Prime Mission Equipment. (Support)	-34.6	-78.4

d. References --

Production Estimate: FY 1985 President's Budget, January 1984

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*	-0.161	-31.471	-	+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	-0.066	-0.176	+0.078	+0.033	-0.358	-	+0.047	-0.442	1.500

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- No Active Contracts

b. Procurement

1. CNCE Production Phase II *

Martin Marietta, Orlando, FL
F19628-83-C-0051, FFP
Award: August 31, 1984
Definitized: August 31, 1984

Initial Contract Price

Target	Ceiling	Qty
16.8	N/A	N/A

Current Contract Price (CH-1)

Target	Ceiling	Qty
478.3	N/A	78

Estimated Price At Completion

Contractor	Program Manager
478.3	478.3

2. TROPO (FOLLOW-ON)

Raytheon Corp, Marlborough, MA
F-19628-85-C-0070, FFP
Award: September 10, 1985
Definitized: September 10, 1985

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

3. TROPO

Raytheon Corp, Marlborough, MA
F19628-87-C-0087
Award: 29 May 1987, FFP
Definitized: 29 May 1987

Initial Contract Price

Target	Ceiling	Qty
27.8	N/A	19

Current Contract Price

Target	Ceiling	Qty
27.8	N/A	19

Estimated Price At Completion

Contractor	Program Manager
27.8	27.8

b. Procurement Cont'd

4. TROPO (CH-3)

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			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
38.5	N/A	46	38.5	38.5

5. TROPO

Raytheon Corp, Marlborough, MA
F19628-82-C-0009, FFP
Award: April 9, 1982
Definitized: April 9, 1982

Initial Contract Price		
Target	Ceiling	Qty
193.0	N/A	110

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
251.6	N/A	161	251.6	251.6

* Will be deleted from subsequent SARs because unit deliveries will be completed.

CPP data not available for FFP contracts.

15. Contract Information: (Cont'd)

1/ Price includes $93.0M Army funds and $13.0M REDCOM funds.

2/ Price includes $93.1 Army funds.

3/ Price includes $22.2M Army funds.

4/ Price includes $13.8M Army funds.

Explanation of changes:

(CH-1) Increased price due to additional 20 units being added to contract.
(CH-2) New contract, not previously reported.
(CH-3) New contract, not previously reported.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)
System: Joint Tactical Communications (TRI-TAC) Program

a. Program Status --

(1) Percent Program Completed: 76.2% (16/21 yrs)

(2) Percent Program Cost Appropriated: 65.7% ($1,311.7M/$1,995.1M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Current & Prior Year	Budget Year	Balance to Complete FYDP	Beyond FYDP	Total
	(FY 73-88)	(FY 89)	(FY 90-92)	FY93	
RDT&E	305.8	4.3	13.2	5.0	328.3
Procurement	1005.9	164.4	388.8	107.7	1666.8
MILCON	-	-	-	-	-
Total	1311.7	168.7	402.0	112.7	1995.1

c. Annual Summary -- FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional action and FY 89 Program Budget decisions. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)
System: Joint Tactical Communications (TRI-TAC) Program

c. Annual Summary (Continued)

FISCAL YEAR	QTY	FY 76 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			Escl Rate
		FLYAWAY			ADVANCE PROC			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1973				2.3			1.8	4.4
1974				4.7			4.0	7.9
1975				9.9			9.3	10.8
1976				22.3			22.3	7.0
1977				5.9			6.0	3.2
1977				35.1			37.6	3.8
1978				28.2			32.0	6.2
1979				21.5			27.5	8.4
1980				18.6			26.4	9.7
1981				11.7			18.5	11.9
1982				15.0			25.3	9.2
1983				24.7			43.7	4.9
1984				11.1			20.3	3.8
1985				5.1			9.7	3.4
1986				2.3			4.4	2.8
1987				3.5			7.0	2.7
1988				4.8			10.0	3.7
1989				2.0			4.3	3.8
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	
Appropriation: Procurement								
1980				8.0			12.8	9.7
1981		9.7	8.9	23.0			39.3	11.9
1982		5.2	25.5	64.3	7.7		113.5	9.2
1983			50.4	72.0	8.5	3.8	131.9	4.9
1984			39.0	57.7		12.4	109.1	3.8
1985		1.1	39.0	59.8			116.8	3.4
1986		3.6	32.5	76.5			154.1	2.8
1987		1.7	38.8	78.6			164.2	2.7
1988			31.0	75.9			164.2	3.7
1989			34.8	73.6			164.4	3.8
1990			43.5	68.9			158.6	3.6
1991			39.6	53.9			127.2	3.3
1992			17.0	42.6			103.0	2.3
1993				43.5			107.7	2.3
Subtotal		21.3	400.0	798.3	16.2	16.2	1666.8	
Total		21.3	400.0	1034.9	16.2	16.2	1995.1	

16. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars)
System: Joint Tactical Communications (TRI-TAC Program)

d. Obligations and Expenditures --

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	TOTAL	OBLIGATED 1/	EXPENDED 1/
Appropriation: RDT&E			
1973	1.8	1.8	1.8
1974	4.0	4.0	4.0
1975	9.3	9.3	9.3
1976	22.3	22.3	22.3
197T	6.0	6.0	6.0
1977	37.6	37.6	37.6
1978	32.0	32.0	32.0
1979	27.5	27.5	27.5
1980	26.4	26.4	26.4
1981	18.5	18.5	18.5
1982	25.3	25.3	25.3
1983	43.7	43.7	43.7
1984	20.3	20.3	20.3
1985	9.7	9.7	9.7
1986	4.4	4.4	3.5
1987	7.0	7.0	1.6
1988	10.0	0.1	0.1
To Complete	22.5		
Total	328.3	295.9	289.6
Appropriation: Procurement			
1980	12.8	12.8	12.8
1981	39.3	39.3	39.3
1982	113.5	113.5	113.5
1983	131.9	131.9	131.9
1984	109.1	109.1	94.1
1985	116.8	116.8	101.1
1986	154.1	153.3	94.8
1987	164.2	141.4	51.2
1988	164.2	1.0	0
To Complete	660.9	-	-
Total	1,666.8	819.1	638.7

1/ Reflects Program Office records as of 3 February 1988.

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	Budget Year	Balance to Complete FYDP	Beyond FYDP	Total
	(FY75-88)	(FY-89)	(FY 90-92)		
RDT&E	149.3	-	-	-	149.3
Procurement	293.3	-	-	-	293.3
MILCON	-	-	-	-	-
Total	442.6	-	-	-	442.6

c. Annual Summary

FISCAL YEAR	QTY	FY 76 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			Escl Rate (%)
		FLYAWAY			ADVANCE PROC			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1975				1.9			1.8	10.8
1976				18.4			18.4	7.0
197T				3.7			3.8	3.2
1977				20.4			21.9	3.8
1978				12.9			14.7	6.2
1979				11.6			14.8	8.4
1980				8.5			12.1	9.7
1981				5.9			9.3	11.9
1982				8.1			13.7	9.2
1983				10.7			18.9	4.9
1984				5.5			10.0	3.8
1985				2.6			5.0	3.4
1986				1.4			2.7	2.8
1987				0.6			1.2	2.7
1988				0.5			1.0	3.7
Subtotal	4			112.7			149.3	

16. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (CNCE)

c. Annual Summary (Cont'd) --

FISCAL YEAR	QTY	FY 76 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			Escl Rate (%)
		FLYAWAY			ADVANCE PROC			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: Procurement								
1983	3		20.5	20.7			37.9	4.9
1984	3		14.4	16.0			30.3	3.8
1985	19	1.1	39.0	43.4			84.9	3.4
1986	17	0.3	25.2	28.3			57.0	2.8
1987	26	0.3	34.2	39.8			83.2	2.7
Subtotal	68	1.7	133.3	148.2			293.3	
Total	72	1.7	133.3	260.9			442.6	

d. Obligations and Expenditures --

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	TOTAL	OBLIGATED 1 /	EXPENDED 1/
Appropriation: RDT&E			
1975	1.8	1.8	1.8
1976	18.4	18.4	18.4
197T	3.8	3.8	3.8
1977	21.9	21.9	21.9
1978	14.7	14.7	14.7
1979	14.8	14.8	14.8
1980	12.1	12.1	12.1
1981	9.3	9.3	9.3
1982	13.7	13.7	13.7
1983	18.9	18.9	18.9
1984	10.0	10.0	10.0
1985	5.0	5.0	5.0
1986	2.7	2.7	2.2
1987	1.2	1.2	0.3
1988	1.0	0	0
Total	149.3	148.3	146.9

16. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (CNCE)

d. Obligations and Expenditures (Cont'd) --

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	TOTAL	OBLIGATED 1/	EXPENDED 1/
	Appropriation: Procurement		
1983	37.9	37.9	37.9
1984	30.3	30.3	27.3
1985	84.9	84.9	80.9
1986	57.0	56.8	55.5
1987	83.2	73.4	41.9
To Complete	-	-	-
Total	293.3	283.3	243.5

1/ Reflects Program Office records as of 3 February 1988.

16. Program Funding Summary (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

a. Program Status --

(1) Percent Program Completed: 77.8% (14/18 yrs)
(2) Percent Program Cost Appropriated: 51.9% ($376.4M/$724.6M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Current & Prior Yrs	Budget Year	Balance to Complete FYDP	Beyond FYDP	Total
	(FY75-88)	(FY-89)	(FY 90-92)		
RDT&E	57.7	-	-		57.7
Procurement	318.7	88.9	259.3		666.9
MILCON	-	-	-		-
Total	376.4	88.9	259.3		724.6

c. Annual Summary

FISCAL YEAR	QTY	FY 76 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			Escl Rate (%)
		FLYAWAY			ADVANCE PROC			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1975				0.1			0.1	10.8
1976				-			-	-
1977				1.0			1.0	3.2
1978				10.0			10.7	3.8
1979				9.1			10.3	6.2
1980				6.5			8.3	8.4
1981				3.6			5.1	9.7
1982				1.1			1.8	11.9
1983				0.4			0.7	9.2
1984				1.1			2.0	4.9
1985				1.5			2.7	3.8
1986				0.5			1.0	3.4
1987				0.4			0.7	2.8
1988				2.4			4.8	2.7
1989				4.1			8.5	3.7
1990				-			-	-
Subtotal	9			-			-	-
				41.8			57.7	

6. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

c. Annual Summary (Cont'd) --

FISCAL YEAR	QTY	FY 76 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			Escl Rate
		FLYAWAY			ADVANCE PROC			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: Procurement								
1981	3	9.7	8.9	21.8			37.2	11.9
1982	36	5.2	25.5	31.5	7.7		55.7	9.2
1983	34		29.9	35.0	8.5	3.8	64.2	4.9
1984	32		24.6	26.4		12.4	50.0	3.8
1985	-		-	-			-	-
1986	8	3.3	7.3	11.8			23.7	2.8
1987	10	1.4	4.6	6.5			13.5	2.7
1988	62		31.0	34.4			74.4	3.7
1989	73		35.8	39.8			88.9	3.8
1990	95		44.6	49.6			114.2	3.6
1991	83		40.7	42.1			99.5	3.3
1992	38		18.1	18.9			45.6	2.8
Subtotal	474	19.6	271.0	317.8	16.2	16.2	666.9	
Total	483	19.6	271.0	359.6	16.2	16.2	724.6	

d. Obligations and Expenditures --

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	TOTAL	OBLIGATED 1/	EXPENDED 1/
Appropriation: RDT&E			
1975	0.1	0.1	0.1
1976	-	-	-
1977	1.0	1.0	1.0
1978	10.7	10.7	10.7
1979	10.3	10.3	10.3
1980	8.3	8.3	8.3
1981	5.1	5.1	5.1
1982	1.8	1.8	1.8
1983	0.7	0.7	0.7
1984	2.0	2.0	2.0
1985	2.7	2.7	2.7
1986	1.0	1.0	1.0
1987	0.7	0.7	0.3
1988	4.8	4.8	0.4
Total	57.7	49.2	44.4

16. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (TROPO)

d. Obligations and Expenditures (Cont'd) --

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	TOTAL	OBLIGATED 1/	EXPENDED 1/
	Appropriation: Procurement		
1981	37.2	37.2	37.2
1982	55.7	55.7	55.7
1983	64.2	64.2	64.2
1984	50.0	50.0	38.0
1985	-	-	-
1986	23.7	23.5	6.0
1987	13.5	7.9	0.1
1988	74.4	0	0
To Complete	348.2	-	-
Total	666.9	238.5	201.2

1/ Reflects Program Office records as of 3 February 1988.

16. Program Funding Summary (Current Estimate in Millions of Dollars)
System: TRI-TAC (Support/Systems Integration/Other)

a. Program Status --

(1) Percent Program Completed: 76.2% (16/21 yrs)
(2) Percent Program Cost Appropriated: 59.5% ($492.7M/827.9M)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

	Current & Prior Yrs (FY75-88)	Budget Year (FY-89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY 93)	Total
RDT&E	98.8	4.3	13.5	5.0	121.3
Procurement	393.9	75.5	129.5	107.7	706.6
MILCON	-	-	-	-	-
Total	492.7	79.8	142.7	112.7	827.9

c. Annual Summary

FISCAL YEAR	QTY	FY 76 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			Escl Rate (%)
		FLYAWAY			ADVANCE PROC			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1973				2.3			1.8	4.4
1974				4.7			4.0	7.9
1975				7.9			7.4	10.8
1976				3.9			3.9	7.0
197T				1.2			1.2	3.2
1977				4.7			5.0	3.8
1978				6.2			7.0	6.2
1979				3.4			4.4	8.4
1980				6.5			9.2	9.7
1981				4.7			7.4	11.9
1982				6.5			10.9	9.2
1983				12.9			22.8	4.9
1984				4.1			7.6	3.8
1985				2.0			3.7	3.4
1986				0.5			1.0	2.8
1987				0.5			1.0	2.7
1988				0.2			0.5	3.7
1989				2.0			4.3	3.8
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	

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	FY 76 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			Escl Rate (%)
		FLYAWAY			ADVANCE PROC			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: Procurement								
1980				8.0			12.8	9.7
1981				1.2			2.1	11.9
1982				32.8			57.8	9.2
1983				16.3			29.8	4.9
1984				15.3			28.8	3.8
1985				16.4			31.9	3.4
1986				36.4			73.4	2.8
1987				32.3			67.5	2.7
1988				41.5			89.8	3.7
1989				33.8			75.5	3.8
1990				19.3			44.4	3.6
1991				11.8			27.7	3.3
1992				23.7			57.4	2.8
1993				43.5			107.7	2.3
Subtotal				332.3			706.6	
Total				414.4			827.9	

d. Obligations and Expenditures --

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	TOTAL	OBLIGATED 1/	EXPENDED 1/
Appropriation: RDT&E			
1973	1.8	1.8	1.8
1974	4.0	4.0	4.0
1975	7.4	7.4	7.4
1976	3.9	3.9	3.9
1977T	1.2	1.2	1.2
1977	5.0	5.0	5.0
1978	7.0	7.0	7.0
1979	4.4	4.4	4.4
1980	9.2	9.2	9.2
1981	7.4	7.4	7.4
1982	10.9	10.9	10.9
1983	22.8	22.8	22.8
1984	7.6	7.6	7.6
1985	3.7	3.7	3.6
1986	1.0	1.0	1.0
1987	1.0	1.0	0.9
1988	0.5	0.1	0.1
To Complete	22.5		
Total	121.3	98.4	98.2

16. Program Funding Summary (Cont'd) (Current Estimate in Millions of Dollars)
System: TRI-TAC (Support/Systems Integration/Other)

d. Obligations and Expenditures (Cont'd) --

FISCAL YEAR	Then-Year Dollars (Current Estimate in Millions)		
	TOTAL	OBLIGATED 1/	EXPENDED 1/
Appropriation: Procurement			
1980	12.8	12.8	12.8
1981	2.1	2.1	2.1
1982	57.8	57.8	57.8
1983	29.8	29.8	29.8
1984	28.8	28.8	28.8
1985	31.9	31.9	20.2
1986	73.4	73.0	33.3
1987	67.5	60.1	9.2
1988	89.8	1.0	0
To Complete	312.7		
Total	706.6	297.3	194.0

1/ Reflects Program Office records as of 3 February 1988.

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 Rate (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	+ 4 mos	27	-	27
End Date (Mo/Yr)	6/88	+ 4 mos	10/88	-	10/88

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	4/4
Procurement	43/43

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	+15.9	359.6	-133.6	493.2
	(TY $)	697.3	+27.3	724.6	-263.6	988.2
PAUC	(BY $)	0.957	-0.212	0.745	-0.071	0.674
	(TY $)	1.942	-0.442	1.500	-0.150	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	83/83
V3	22/22

1/ Maximum economic rate assumes Army/ Marine quantities will be procured on the same production line.

18. Operating and Support Costs: N/A

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)
PROGRAM: WWMCCS INFORMATION SYSTEM (WIS)

AS OF DATE: December 31, 1987

AF-34 WIS

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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: Brig Gen Carl G. O'Berry
Assigned: June 1, 1986
AUTOVON: 356-5053
COMMERCIAL: (703) 285-5053

4. Program Elements/Procurement Line Items*:

130084 AF
130051 Army
130095 DA
130062 ~~USMC~~ N
130073 MC

RDT&E: 33152A/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: 33152H

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*Program Elements: 33152F (RDT&E), 11310P, 12322F, 27414F, 27415F, 27416F, 21131F, 41840F, 33151F (Procurement), and 21131F and 33152F (O&M) contain Air Force unique funds inappropriately charged to the WIS Program and have been removed per OSD approval.

all WIS!

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OASD(PA) DFOISR 88-T-0532

UNCLASSIFIED

5. Related Programs: None

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 allows the AMHS development to proceed independently of the LAN, and not jeopardize the Block A LAN installation schedule.

A three-release concept has been 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)

b. Significant Developments Since Last Report --

FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

Block A

LAN equipment installations have been completed at the Operational Support Facility (OSF), and the FORSCOM and PACOM operational test sites (OTSs). The other OTS at TAC will be installed in early 1988. Preliminary site visits have been completed at all 31 sites. Final site design reviews have been completed at 28 sites.

IBM has continued development of the AMHS. A critical design review is scheduled for April 1988.

The WIS is expected to satisfy the mission requirements.

c. Changes Since December 31, 1987--

A 73% congressional reduction in program funds in FY88 has caused a significant disruption to program plans. New plans are being formulated and coordinated through the Office of the Secretary of Defense. A second Program Review is scheduled for March 1988, at which time a program restructuring will be presented. Results of the program restructuring will be reflected in the next SAR.

The WIS restructuring effort, while driven by the reduction in available RDT&E funds, is allowing the WIS JPMO to address some 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 "flash 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 precludes a flash 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.

8. Decision Coordinating Paper (DCP) Threshold Breaches: The OT&E completion date of FY88 established by July 2, 1985 Block A Defense Systems Acquisition Review Council (DSARC) (and Secretary of Defense Decision Memorandum, September 11, 1985) slipped to FY89, as a result of the addition of centralized security architecture, the lengthy contract negotiations on the LAN, and the development time and additional testing requirements for

8. Decision Coordinating Paper (DCP) Threshold Breaches: (Cont'd)

the AUTODIN interface of the AMHS. Notification of this breach was forwarded to the Office of the Secretary of Defense (OSD) in August 1987. In response, OSD requested a Block A program review. In support of the program review, a new DCP was prepared and coordinated with the Services and Agencies, and was forwarded to OSD in October 1987. As a result of the FY88 congressional reductions in RDT&E funding, an amended DCP will be forwarded to OSD in conjunction with the March 1988 program review. Restructuring will slip IOT&E to FY90.

9. Schedule:

a. Milestones --

Block A	Development Estimate/ Approved Program	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 (Ch-1)
Start DT&E (Phase I/II) System	May 87/ NA	Nov 89 (Ch-2)
Start System IOT&E	Oct 87/ NA	Apr 90 (Ch-3)
Start Low-rate Deployment (up to site #15)	Nov 87/ NA	N/A (Ch-6)
Start LAN Deployment	Nov 87/ NA	Nov 89 (Ch-4)
Initial Operational Capability System	Nov 87/May 89(Ch-11)	Jun 90 (Ch-5)
Deployment Approval LAN (sites 16 and on)	Nov 87/ NA	N/A (Ch-6)
Obligation Approval AMHS	Nov 87/ NA	Jun 90 (Ch-7)
Common User Contract Award		
-WIS Workstation	N/A / N/A	Nov 88
AMHS follow-on	N/A / N/A	Jun 90 (Ch-8)
Transition Component (TC)) Deployment Decision	N/A / N/A	N/A (Ch-9)
Finish DT&E (Phase I/II System)	N/A / N/A	Mar 90 (Ch-3)
Completion of Block A IOT&E	-/Jul 90(Ch-11)	Jul 90 (Ch-11)
Blocks B and C	**Planning Estimate/ Approved Program**	**Current Estimate**
DAB I/II (Block B)	N/A / N/A	Sep 89 (Ch-10)
*JMPE Contract Award	Jun 86/N/A	**TBD
Start OT&E	N/A	**TBD
Start Deployment	N/A	**TBD
Initial Operational Capability	N/A	**TBD
DAB I/II (Block C)	N/A	**TBD

* 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

Common User Contract Award slipped from June to October 1984 due to late receipt of user requirement comments for inclusion in the Request for Proposal (RFP), which caused a corresponding extension of the RFP period to allow adequate time for vendor preparation of their proposals.

Systems Support Contract Award slipped initially from July 1984 to January 1985 due to change in procurement strategy which redefined this effort as a Small Business Program Set-Aside (8-A); the second slip, from January to February 1985, was due to administrative contractual delays associated with 8-A processing; the last slip, from February to July 1985, was due to funding constraints which resulted in "descoping" this effort and reaccomplishing the Statement of Work.

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 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.

Start Low Rate Deployment is delayed from November 1987 to October 1988 as a result of the slippage occurring in the DT&E and OT&E schedules.

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.

9. Schedule: (Cont'd)

Block A (Cont'd)

Deployment Approval is delayed from November 1987 to December 1988 as a result of the slippage in the OT&E schedule. LAN deployment decision slipped from February 1989 to June 1989 as a result of software development slip. AMHS deployment decision slipped from February 1989 to December 1989 as a result of slip in AMH development.

The Block A Deployment Decision slipped from December 1988 to February 1989 to allow for sufficient time for test report generation and review.

Blocks B and C

Slip in DAB from January to May 1987 is due to reduction of RDT&E funding in the FY87 President's Budget for support of Block B development effort.

Block B DAB II was moved to March 1988 due to Deputy Secretary of Defense direction to delay deployment and acquisition by one year due to fiscal constraints.

AB

c. Current Change Explanations --

Block A

(Ch-1) 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.

9. Schedule: (Cont'd)

Block A (Cont'd)

(Ch-2) 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.

(Ch-3) Completion of DT&E and the start of IOT&E must slip as a direct result of the delay in DT&E, see Ch-2.

(Ch-4) The LAN deployment decision by OSD, and the resultant purchase of COTS hardware, will not be made until after operational testing. This has caused a significant slip in the milestone.

(Ch-5) The system IOC date will slip as a consequence of the delay in IOT&E.

(Ch-6) The low rate/full rate deployment decisions for the LAN and AMHS have been replaced by single decision milestones.

(Ch-7) The AMHS obligation approval by OSD will not be made until after the completion of IOT&E. This OSD policy is consistent with the policy on LAN deployment, see Ch-4.

(Ch-8) These common user hardware contract award dates have been slipped because of delays in the AMHS software development.

(Ch-9) 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

(Ch-10) 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.

(Ch-11) Reflects USD(A) Baseline Approval.

d. References --

Block A

Development Esiimate/Approved Program: SDDM, dated September 11, 1985, subject "Decision Memorandum on the World-Wide Military Command and Control System (WWMCCS) Information System (WIS), Block A."; USD(A) Memo, 9 Feb 1988

Block B and C

Planning Estimate: FY85 RDT&E Descriptive Summary.

Approved Program: FY85 RDT&E Descriptive Summary and FY87 RDT&E Descriptive Summary.

10. Technical/Operational Characteristics:

a. Technical--	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
Block A			
Availability 1/			
Routine Operational Availability	95%/95%	N/A	95%
Crisis Operational Availability	98%/98%	N/A	98%
MTBF (Workstation/Printer)	1500 hrs/1500 hrs	N/A	1500 hrs
Diagnostics Automated Message Handling (AMH) Processor 2/	NA Det Rate/ NA	N/A	90% Fault Det Rate
Response Time			
Simple (Priority)	8-10 Sec/8-10 Sec	N/A	8-10 Sec
Complex (Priority)	2-4 Min/2-4 Min	N/A	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.

Block B and C	Plan Estimate/ Appr Program	Demonstrated Performance	Current Estimate
Availability 1/			
Routine Operational Availability	98%/98%	N/A	98%
Crisis Operational Availability	99.8%/99.8%	N/A	99.8%
MTBF (Workstation/Printer)	2000 Hrs/2000 Hrs	N/A	2000 Hrs
MTBF (WIS System)	160 Hrs/160 Hrs	N/A	160 Hrs
Diagnostics Automated Message Handling (AMH) Processor 2/	NA Det Rate/ NA	N/A	95% Fault Det Rate
Response Time			
Simple (Priority)	2-5 Sec/2-5 Sec	N/A	2-5 Sec
Complex (Priority)	1-3 Min/1-3 Min	N/A	1-3 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 95% for the AMH processor.

10. Technical/Operational Characteristics: (Cont'd)

b. Operational--	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
Block A			
Security 3/	System High/ NA	N/A	System High
Useability 4/	20 Hrs Training/ NA	N/A	20 Hrs Training
Automated Message Handling (AMH) Peak MSG Rec/Day 5/	2000/2000	N/A	2000
Automated Message Handling (AMH) Peak MSG Rec/Hour	300/300	N/A	300
Automated Message Handling (AMH) Peak MSG Trans/Hour	100/100	N/A	100

3/ 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.

4/ 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.

5/ 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 3/	Controlled Mode/ NA	N/A	Controlled Mode
Useability 4/	8 Hrs Training/ NA	N/A	8 Hrs Training
Automated Message Handling (AMH) Peak MSG Rec/Day 5/	3500/3500	N/A	3500
Automated Message Handling (AMH) Peak MSG Rec/Hour	500/500	N/A	500
Automated Message Handling (AMH) Peak MSG Trans/Hour	150/150	N/A	150

3/ 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.

Blocks B and C (Cont'd)

4/ 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.

5/ 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.

c. Previous Change Explanations --

Blocks A, B and C None.

d. References --

Block A

Development Estimate/Approved Program: SDDM, dated 11 September 1985, subject "Decision Memorandum on the World-Wide Military Command and Control System (WWMCCS) Information System (WIS), Block A."

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)

	Planning/Dev Estimate	Changes	Current Estimate
a. Cost--			
Development	$ 545.3	$+329.0	$ 874.3
Procurement	642.3	-142.1	500.2
MILCON	1.9	-1.9	0
Operation and Maintenance (O&M)	237.5	-134.0	103.5
Total FY82 Base-Year	$1,427.0	$ +51.0	$1,478.0
Escalation			
Development (RDT&E)	$ 132.3	$+127.9	$ 260.2
Procurement	223.8	-15.1	208.7
MILCON	.5	-.5	0
Operation and Maintenance (O&M)	73.4	-39.6	33.8
Total Then-Year	$1,857.0	$+123.7	$1,980.7

	Planning/Dev Estimate	Changes	Current Estimate
b. Quantities --			
Development (RDT&E)	1	-	1
Procurement	34	-	34
Total	35	-	35

11. Program Acquisition Cost (Current Estimate in Millions of Dollars) (Cont'd)

	Planning/Dev Estimate	Changes	Current Estimate
c. Unit Cost --			
Procurement: N/A			
Program:			
FY82 Base-Year $	40.771	+1.458	42.229
Then-Year $	53.057	+3.534	56.591

d. Approved Design to Cost Goal -- Office of the Assistant Secretary of Defense for Acquisition and Logistics approved a request for waiver from Design to Cost by memorandum, dated November 12, 1985. The waiver was granted because the program intends to purchase commercial-off-the-shelf equipment in lieu of Design for Production equipment.

e. 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.

f. Nuclear Costs -- None

12. Program Acquisition/Current Procurement Unit Cost Summary:

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	1980.7	2306.0	1980.7
(2) Quantity	35	35	35
(3) Unit Cost 1/	56.591	65.886	56.591
b. Current Procurement -- 2/	(FY 1988) N/A	(FY 1988) N/A	(FY1989) 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	-153.7	-42.8	-	-12.3	-208.8
Quantity	-	-	-	-	-
Schedule	+23.2	-	-	-	+23.2
Engineering	+30.9	-	-	-	+30.9
Estimating	+585.4	+130.0	-	-139.8	+575.6
Other	-	-	-	-	-
Support	-	-	-2.4	-	-2.4
Subtotal	+485.8	+87.2	-2.4	-152.1	+418.5
Current Changes:					
Economic	-0.1	+8.4	-	+0.3	+8.6
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	-28.8	-252.8	-	-21.8	-303.4
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-28.9	-244.4	0	-21.5	-294.8
Total Changes	+456.9	-157.2	-2.4	-173.6	+123.7
Current Estimate	1134.5	708.9	0	137.3	1980.7

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	+335.5	+50.0	-	-117.5	+268.0
Other	-	-	-	-	-
Support	-	-	-1.9	-	-1.9
Subtotal	+361.2	+50.0	-1.9	-117.5	+291.8
Current Changes:					
Economic	0	0	-	-	0
Quantity	-	-	-	-	-
Schedule	0	-	-	-	-
Engineering	-	-	-	-	-
Estimating	-32.2	-192.1	-	-16.5	-240.8
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-32.2	-192.1	0	-16.5	-240.8
Total Changes	+329.0	-142.1	-1.9	-134.0	+51.0
Current Estimate	874.3	500.2	0	103.5	1478.0

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 was due to funding constraints. Technical problems have lead to schedule slippage.
Engineering:	Support of 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), National Military Command System Information System (NIS); 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.

PROCUREMENT

Economic:	Revised OSD inflation indices.
Estimating:	Appropriation transfer of funds to RDT&E; additional year of cost added to the 5-year FYDP period; initial identification of "Balance to Complete" fund 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.

O&M

Economic:	Revised OSD inflation 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; and refinement and rephasing of estimate to align program with FY87

13. Cost Variance Analysis: WIS Total Program (Cont'd)

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.

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	-0.1
Adjustment for current and prior years escalation change (Estimating)	-2.2	-2.5
Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments (Estimating)	-30.0	-26.3
(2) PROCUREMENT		
Revised OSD inflation indices (Economic)	N/A	+8.4
Adjustment for current and prior years escalation change (Estimating)	+0.4	+0.5
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 (Estimating)	-89.6	-121.5
Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments (Estimating)	-102.9	-131.8

13. Cost Variance Analysis: WIS Total Program (Cont'd)

c. Current Change Explanation (Cont'd)--

	(Dollars in Millions) Base-Year$	Then-Year$
(3) OPERATIONAL AND MAINTENANCE		
Revised OSD inflation indices (Economic)	N/A	+0.3
Adjustment for current and prior years escalation change (Estimating)	-0.2	-0.2
Deletion of PEs 21131F contains Air Force unique funds inappropriately charged to the WIS Program and have been removed per OSD approval (Estimating)	-15.8	-20.9
Impact due to procurement funding reductions in DNA (Estimating)	-0.5	-0.7

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	-5.5	-15.9	-	-	-21.4
Quantity	-	-	-	-	-
Schedule	+0.8	-	-	-	+0.8
Engineering	-	-	-	-	-
Estimating	-14.4	-156.4	-	-	-170.8
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-19.1	-172.3	0	0	-191.4
Current Changes:					
Economic	-1.6	+2.1	-	-	+0.5
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	+3.5	-2.0	-	-	+1.5
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	+1.9	+0.1	0	0	+2.0
Total Changes	-17.2	-172.2	0	0	-189.4
Current Estimate	292.0	285.2	0	0	577.2

13. Cost Variance Analysis: Block A (Cont'd)
(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	-121.7	-	-	-136.3
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-14.6	-121.7	0	0	-136.3
Current Changes:					
Economic	0	0	-	-	-
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	-	-6.6	-	-	-6.6
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	0	-6.6	0	0	-6.6
Total Changes	-14.6	-128.3	0	0	-142.9
Current Estimate	239.7	206.4	0	0	446.1

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.

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.

c. Current Change Explanations --

	(Dollars in Millions) Base-Year$	Then-Year$
(1) RDT&E		
Revised OSD inflation indices (Economic)	N/A	-1.6
Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments (Estimating)	0	+3.5
(2) PROCUREMENT		
Revised OSD inflation indices (Economic)	N/A	+2.1
Adjustment for current and prior years escalation change (Estimating)	+0.2	+0.2
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 (Estimating)	-5.4	-6.6
Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments (Estimating)	+1.0	+4.4

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	-148.2	-26.9	-	-12.3	-187.4
Quantity	-	-	-	-	-
Schedule	+22.4	-	-	-	+22.4
Engineering	+30.9	-	-	-	+30.9
Estimating	+599.8	+286.4	-	-139.8	+746.4
Other	-	-	-	-	-
Support	-	-	-2.4	-	-2.4
Subtotal	+504.9	+259.5	-2.4	-152.1	+609.9
Current Changes:					
Economic	+1.5	+6.3	-	+0.3	+8.1
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	-32.3	-250.8	-	-21.8	-304.9
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-30.8	-244.5	0	-21.5	-296.8
Total Changes	+474.1	+15.0	-2.4	-173.6	+313.1
Current Estimate	842.5	423.7	0	137.3	1403.5

*Changed name from "Blocks B and C" to "Blocks Other" since program pre-Full-Scale Development Costs, not included in Block A, are accounted for in this section. Blocks B and C will be tracked separately beginning with the SAR following their respective DABs.

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	+350.1	+171.7	-	-117.5	+404.3
Other	-	-	-	-	-
Support	-	-	-1.9	-	-1.9
Subtotal	+375.8	+171.7	-1.9	-117.5	+428.1
Current Changes:					
Economic	-	-	-	-	-
Quantity	-	-	-	-	-
Schedule	-	-	-	-	-
Engineering	-	-	-	-	-
Estimating	-32.2	-185.5	-	-16.5	-234.2
Other	-	-	-	-	-
Support	-	-	-	-	-
Subtotal	-32.2	-185.5	0	-16.5	-234.2
Total Changes	+343.6	-13.8	-1.9	-134.0	+193..9
Current Estimate	634.6	293.8	0	103.5	1031.9

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), National Military Command System Information system (NIS), 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.

PROCUREMENT

Economic:	Revised economic escalation indices.
Estimating:	Appropriation transfer of funds to RDT&E; additional year of cost added to the 5-year FYDP period; initial identification of "Balance to Complete" fund 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.

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

13. Cost Variance Analysis: Blocks Other (Cont'd)

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.

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	+1.5
Adjustment for current and prior years escalation change (Estimating)	-2.2	-2.5
Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments (Estimating)	-30.0	-29.8
(2) PROCUREMENT		
Revised OSD inflation indices (Economic)	N/A	+6.3
Adjustment for current and prior years escalation change (Estimating)	+0.2	+0.3
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 (Estimating)	-84.2	-114.9
Impact due to congressional reductions in FY88 appropriation and outyear funding adjustments (Estimating)	-101.5	-136.2

13. Cost Variance Analysis: Blocks Other (Cont'd)

	(Dollars in Millions) Base-Year$	Then-Year$
(3) OPERATIONAL AND MAINTENANCE		
Revised OSD inflation indices (Economic)	N/A	+0.3
Adjustment for current and prior years escalation change (Estimating)	-0.2	-0.2
Deletion of PEs 21131F contains Air Force unique funds inappropriately charged to the WIS Program and have been removed per OSD approval (Estimating)	-15.8	-20.9
Impact of procurement funding cuts in DNA (Estimating)	-0.5	-0.7

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. Planning/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	-5.720	--	+0.663	+.883	+7.777	-0.069	--	+3.534	56.591

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
$115.7	$125.3	N/A	$115.7	$115.7

Variance	Cost Variance	Schedule
Previous Cumulative Variance	$+0.4	$-1.5
Cumulative Variances to Date (12/31/87)	+1.6	-2.9
Total	$+1.2	$-1.4

Explanation of Variance: The unfavorable schedule variance continues due to unforeseen problems encountered during the testing phase. The positive cost variance is due to personnel understaffing and lower than planned computer usage.

System Integration	Initial Contract Price Target Price	Ceiling	Qty
International Business Machines Corp (IBM) Federal System Division F1928-84-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

	Cost	Schedule
Initial Variance	-3.4	-1.0

Explanation of Variance: The negative schedule variance is due to delays in software development, which delayed the software testing and continues to have a ripple effect through the schedule. The negative

15. Contract Information: (Then-Year Dollars in Millions) (Cont'd)

a. RDT&E (Cont'd)

cost variance is due to higher than estimated manpower and material requirements associated with numerous activities, in addition, to higher than expected subcontractor costs.

b. Procurement --

System Integration	Initial Contract Price Target Price	Ceiling	Qty
International Business Machines Corp (IBM) Federal System Division F1928-84-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
$41.3	$41.3	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: 54% (7 years/13 years)

(2) Percent Program Cost Appropriated: 28.3% ($560.4/$1980.7)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Budget Prior Yrs (FY82-88)	Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93 - 94)	Total
RDT&E	448.4	96.4	422.4	167.3	1134.5
Procurement	71.6	31.3	432.3	173.7	708.9
O&M	40.4	19.7	58.5	18.7	137.3
Total	560.4	147.4	913.2	359.7	1980.7

c. Annual Summary --

FY90 and beyond numbers have not been completely adjusted to reflect the impacts of FY88 congressional actions and FY89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

PROGRAM: WIS TOTAL PROGRAM

AS OF DATE: December 31, 1987
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	-	-	-	88.0	-	-	103.4	2.8
1987	-	-	-	116.8	-	-	141.8	2.7
1988	-	-	-	38.8	-	-	48.9	3.7
1989	-	-	-	73.8	-	-	96.4	3.8
1990	-	-	-	108.0	-	-	145.8	3.6
1991	-	-	-	103.2	-	-	143.6	3.3
1992	-	-	-	93.2	-	-	133.0	2.8
1993	-	-	-	84.8	-	-	123.7	2.3
1994	-	-	-	29.3	-	-	43.6	2.3
SUBTOTAL	1	0	0	874.3	0	0	1134.5	-
APPROPRIATION: PROCUREMENT								
1983	-	-	-	.4	-	-	.5	4.9
1984	-	-	-	.1	-	-	.1	3.8
1985	-	-	-	15.1	-	-	17.8	3.4
1986	-	-	-	18.9	-	-	23.0	2.8
1987	-	-	-	20.7	-	-	26.1	2.7
1988	-	-	-	3.1	-	-	4.0	3.7
1989	-	-	-	23.2	-	-	31.3	3.8
1990	-	-	-	96.1	-	-	133.7	3.6
1991	-	-	-	113.1	-	-	161.5	3.3
1992	-	-	-	93.9	-	-	137.2	2.8
1993	-	-	-	90.8	-	-	135.8	2.3
1994	-	-	-	24.8	-	-	37.9	2.3
SUBTOTAL	34	0	0	500.2	0	0	708.9	-
APPROPRIATION: O&M								
1986	-	-	-	8.4	-	-	9.8	2.8
1987	-	-	-	10.9	-	-	13.1	2.7
1988	-	-	-	14.0	-	-	17.5	3.7
1989	-	-	-	15.2	-	-	19.7	3.8
1990	-	-	-	13.2	-	-	17.8	3.6
1991	-	-	-	13.2	-	-	18.3	3.3
1992	-	-	-	15.7	-	-	22.4	2.8
1993	-	-	-	12.8	-	-	18.7	2.3
1994	-	-	-	-	-	-	-	-
SUBTOTAL	0	0	0	103.5	-	-	137.3	-
TOTAL	35	0	0	1478.0	0	0	1980.7	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

BLOCK A

AS OF DATE: December 31, 1987
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	-	-	-	7.5	-	-	8.3	3.8
1985	-	-	-	36.4	-	-	41.7	3.4
1986	-	-	-	67.1	-	-	78.9	2.8
1987	-	-	-	63.5	-	-	77.1	2.7
1988	-	-	-	12.3	-	-	15.5	3.7
1989	-	-	-	29.4	-	-	38.4	3.8
1990	-	-	-	15.0	-	-	20.3	3.6
1991	-	-	-	8.5	-	-	11.8	3.3
1992	-	-	-	-	-	-	-	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	2.3
SUBTOTAL	1	0	0	239.7	0	0	292.0	-
APPROPRIATION: PROCUREMENT								
1985	-	-	-	1.6	-	-	1.8	3.4
1986	-	-	-	12.2	-	-	14.9	2.8
1987	-	-	-	16.6	-	-	20.7	2.7
1988	-	-	-	2.9	-	-	3.8	3.7
1989	-	-	-	23.2	-	-	31.3	3.8
1990	-	-	-	56.3	-	-	78.4	3.6
1991	-	-	-	73.8	-	-	105.4	3.3
1992	-	-	-	19.8	-	-	28.9	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	2.3
SUBTOTAL	34	0	0	206.4	0	0	285.2	-
TOTAL	35	0	0	446.1	0	0	577.2	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

BLOCKS (OTHER)

AS OF DATE: December 31, 1987
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	-	-	-	20.9	-	-	24.5	2.8
1987	-	-	-	53.3	-	-	64.7	2.7
1988	-	-	-	26.5	-	-	33.4	3.7
1989	-	-	-	44.4	-	-	58.0	3.8
1990	-	-	-	93.0	-	-	125.5	3.6
1991	-	-	-	94.7	-	-	131.8	3.3
1992	-	-	-	93.2	-	-	133.0	2.8
1993	-	-	-	84.8	-	-	123.7	2.3
1994	-	-	-	29.3	-	-	43.6	2.3
SUBTOTAL	1	0	0	634.6	0	0	842.5	-
APPROPRIATION: PROCUREMENT								
1983	-	-	-	.4	-	-	.5	4.9
1984	-	-	-	.1	-	-	.1	3.8
1985	-	-	-	13.5	-	-	16.0	3.4
1986	-	-	-	6.7	-	-	8.1	2.8
1987	-	-	-	4.1	-	-	5.4	2.7
1988	-	-	-	0.2	-	-	0.2	3.7
1989	-	-	-	0	-	-	0	3.8
1990	-	-	-	39.8	-	-	55.3	3.6
1991	-	-	-	39.3	-	-	56.1	3.3
1992	-	-	-	74.1	-	-	108.3	2.8
1993	-	-	-	90.8	-	-	135.8	2.3
1994	-	-	-	24.8	-	-	37.9	2.3
SUBTOTAL	34	0	0	293.8	0	0	423.7	-
APPROPRIATION: O&M								
1986	-	-	-	8.4	-	-	9.8	2.8
1987	-	-	-	10.9	-	-	13.1	2.7
1988	-	-	-	14.0	-	-	17.5	3.7
1989	-	-	-	15.2	-	-	19.7	3.8
1990	-	-	-	13.2	-	-	17.8	3.6
1991	-	-	-	13.2	-	-	18.3	3.3
1992	-	-	-	15.7	-	-	22.4	2.8
1993	-	-	-	12.8	-	-	18.7	2.3
1994	-	-	-	-	-	-	-	2.3
SUBTOTAL	0	0	0	103.5	0	0	137.3	-
TOTAL	35	0	0	1031.9	0	0	1403.5	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

PROGRAM: WIS - ARMY

AS OF DATE: December 31, 1987
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	-	-	-	22.3	-	-	27.1	2.7
1988	-	-	-	14.9	-	-	18.8	3.7
1989	-	-	-	17.7	-	-	23.1	3.8
1990	-	-	-	29.9	-	-	40.3	3.6
1991	-	-	-	26.9	-	-	37.4	3.3
1992	-	-	-	19.7	-	-	28.1	2.8
1993	-	-	-	15.8	-	-	23.0	2.3
1994	-	-	-	-	-	-	-	2.3
SUBTOTAL	0	0	0	206.9	0	0	266.6	-
APPROPRIATION: PROCUREMENT								
1983	-	-	-	.4	-	-	.5	4.9
1984	-	-	-	.1	-	-	.1	3.8
1985	-	-	-	11.8	-	-	13.9	3.4
1986	-	-	-	7.6	-	-	9.3	2.8
1987	-	-	-	10.4	-	-	13.1	2.7
1988	-	-	-	1.2	-	-	1.6	3.7
1989	-	-	-	9.2	-	-	12.4	3.8
1990	-	-	-	28.2	-	-	39.2	3.6
1991	-	-	-	38.0	-	-	54.3	3.3
1992	-	-	-	40.0	-	-	58.5	2.8
1993	-	-	-	37.1	-	-	55.4	2.3
1994	-	-	-	-	-	-	-	2.3
SUBTOTAL	8	0	0	184.0	0	0	258.3	-
TOTAL	8	0	0	390.9	0	0	524.9	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

PROGRAM: WIS - NAVY

AS OF DATE: December 31, 1987
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	-	-	-	10.0	-	-	12.2	2.7
1988	-	-	-	3.2	-	-	4.0	3.7
1989	-	-	-	3.6	-	-	4.7	3.8
1990	-	-	-	5.7	-	-	7.7	3.6
1991	-	-	-	4.0	-	-	5.6	3.3
1992	-	-	-	4.6	-	-	6.6	2.8
1993	-	-	-	4.7	-	-	6.8	2.3
1994	-	-	-	4.7	-	-	7.0	2.3
SUBTOTAL	0	0	0	72.1	0	0	91.0	-
APPROPRIATION: PROCUREMENT								
1987	-	-	-	2.0	-	-	2.6	2.7
1988	-	-	-	0.1	-	-	0.1	3.7
1989	-	-	-	1.0	-	-	1.3	3.8
1990	-	-	-	22.4	-	-	31.1	3.6
1991	-	-	-	28.1	-	-	40.3	3.3
1992	-	-	-	24.4	-	-	35.6	2.8
1993	-	-	-	24.8	-	-	37.0	2.3
1994	-	-	-	24.8	-	-	37.9	2.3
SUBTOTAL	8	0	0	127.6	0	0	185.9	-
TOTAL	8	0	0	199.7	0	0	276.9	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

PROGRAM: WIS - AIR FORCE

AS OF DATE: December 31, 1987
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								
1983	-	-	-	4.6	-	-	5.0	4.9
1984	-	-	-	22.5	-	-	25.0	3.8
1985	-	-	-	30.5	-	-	35.0	3.4
1986	-	-	-	51.7	-	-	60.7	2.8
1987	-	-	-	84.4	-	-	102.5	2.7
1988	-	-	-	20.7	-	-	26.1	3.7
1989	-	-	-	52.5	-	-	68.6	3.8
1990	-	-	-	72.4	-	-	97.8	3.6
1991	-	-	-	72.3	-	-	100.6	3.3
1992	-	-	-	68.9	-	-	98.3	2.8
1993	-	-	-	64.4	-	-	93.9	2.3
1994	-	-	-	24.5	-	-	36.6	2.3
SUBTOTAL	1	0	0	569.5	0	0	750.1	-
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	3.7
1989	-	-	-	7.4	-	-	10.0	3.8
1990	-	-	-	30.3	-	-	42.2	3.6
1991	-	-	-	29.5	-	-	42.0	3.3
1992	-	-	-	25.7	-	-	37.5	2.8
1993	-	-	-	28.4	-	-	42.5	2.3
1994	-	-	-	-	-	-	-	2.3
SUBTOTAL	14	0	0	133.2	0	0	188.9	-
APPROPRIATION: O&M								
1986	-	-	-	8.4	-	-	9.8	2.8
1987	-	-	-	10.6	-	-	12.8	2.7
1988	-	-	-	13.4	-	-	16.8	3.7
1989	-	-	-	14.1	-	-	18.3	3.8
1990	-	-	-	12.8	-	-	17.2	3.6
1991	-	-	-	12.4	-	-	17.2	3.3
1992	-	-	-	14.6	-	-	20.8	2.8
1993	-	-	-	11.6	-	-	16.9	2.3
SUBTOTAL	0	0	0	98.0	0	0	129.8	
TOTAL	15	0	0	800.7	0	0	1068.8	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

PROGRAM: WIS - MARINE CORPS

AS OF DATE: December 31, 1987
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	-	-	-	.6	-	-	.8	2.7
1988	-	-	-	.2	-	-	.3	3.7
1989	-	-	-	.2	-	-	.2	3.8
1990	-	-	-	.2	-	-	.2	3.6
1991	-	-	-	.1	-	-	.2	3.3
1992	-	-	-	.1	-	-	.2	2.8
1993	-	-	-	-	-	-	-	2.3
1994	-	-	-	-	-	-	-	2.3
TOTAL	0	0	0	2.2	0	0	2.8	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

PROGRAM: WIS - DCA

AS OF DATE: December 31, 1987
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	-	-	-	6.1	-	-	7.4	2.8
1987	-	-	-	1.0	-	-	1.3	2.7
1988	-	-	-	0.1	-	-	0.1	3.7
1989	-	-	-	4.4	-	-	5.9	3.8
1990	-	-	-	15.1	-	-	21.0	3.6
1991	-	-	-	12.5	-	-	17.9	3.3
1992	-	-	-	1.8	-	-	2.6	2.8
1993	-	-	-	-	-	-	0	2.3
1994	-	-	-	-	-	-	-	-
SUBTOTAL	35	0	0	42.2	0	0	57.6	-
TOTAL	35	0	0	67.9	0	0	84.4	-

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

PROGRAM: WIS - DNA

AS OF DATE: December 31, 1987
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: PROCUREMENT								
1986	-	-	-	1.1	-	-	1.4	2.8
1987	-	-	-	.1	-	-	.2	2.7
1988	-	-	-	1.5	-	-	1.9	3.7
1989	-	-	-	1.1	-	-	1.5	3.8
1990	-	-	-	-	-	-	-	3.6
1991	-	-	-	4.8	-	-	6.8	3.3
1992	-	-	-	1.9	-	-	2.8	2.8
1993	-	-	-	.6	-	-	.9	2.3
1994								2.3
SUBTOTAL	1	0	0	11.1	0	0	15.5	-
APPROPRIATION: O&M								
1987	-	-	-	.3	-	-	.3	2.7
1988	-	-	-	.6	-	-	.7	3.7
1989	-	-	-	1.1	-	-	1.4	3.8
1990	-	-	-	.4	-	-	.6	3.6
1991	-	-	-	.8	-	-	1.2	3.3
1992	-	-	-	1.1	-	-	1.6	2.8
1993	-	-	-	1.2	-	-	1.7	2.3
1994	-	-	-	-	-	-	-	2.3
SUBTOTAL	0	0	0	5.5	0	0	7.5	-
TOTAL	1	0	0	16.6	0	0	23.0	-

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures--Reflects program office records as of January 31, 1987.

AS OF DATE: December 31, 1987
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	100.4	81.9
1987	141.8	108.2	41.4
1988	48.9	10.4	1.9
To Complete	686.1	N/A	N/A
Total	1134.5	373.3	273.3
	APPROPRIATION: PROCUREMENT		
1983	.5	.5	.5
1984	.1	.1	.1
1985	17.8	17.8	17.8
1986	23.0	19.5	12.0
1987	26.1	23.7	4.2
1988	4.0	0.1	
To Complete	637.4	N/A	N/A
Total	708.9	61.7	34.6
	APPROPRIATION: O&M		
1986	9.8	0.4	0
1987	13.1	7.8	0.3
1988	17.5	0	0
To Complete	96.5	N/A	N/A
Total	137.5	8.2	0.3

17. Productions Rate Data: N/A

18. Operating and Support Costs: N/A

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SAR-87-054

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: PHALANX CIWS

AS OF DATE: December 31, 1987

INDEX

N-30 PHALANX CIWS

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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

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: 24229 Subhead 84E2 APPN 1507 ICN 4110
SCN: Ship Class: BB PE: 24220N APPN 1611
LSD/LHD 24411N
FFG 24224N
CG's & DDG's 24292N
CVN/CV SLEP 24112N

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. The AO, AO Jumbo, LPDX/LKDX, and LPD SLEP classes are deleted due to previous error. The CIWS has not nor is currently projected to be installed on these ships.

~~AS AMENDED~~

~~APR 7 1988~~

~~Classified by OPNAVINST 5513.1B~~
~~Declassify on: 31 December 1994~~ This Page is Unclassified

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OASD(PA) DPOISR 88-T-0875

6. Mission and Description: CIWS is designed as a fast reaction terminal defense against low and high flying high speed maneuvering anti-ship missiles penetrating outer Fleet defenses. CIWS is an automatic self-contained unit consisting of search and track radars, digitalized fire control system and a 20 MM M61A1 gun 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. Significant Historical Developments -- Five 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. ALP for Block I production under the FY 1986 and FY 1987 Production contracts was approved on 12 March 1986.

b. Significant Developments Since Last Report — A sixth EPIC flag level review panel convened in October 1987. 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.

The CIWS Second Source — General Electric, Pittsfield has been established as a second source producer and initial production contract was placed 18 February 1987.

c. Changes Since "As Of" Date -- None

8. Decision Coordinating Paper (DCP) Threshold Breaches: None. DCP #88 Revision 1, approved 17 November 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/May 87	Apr 88 (CH-1)
Block I Approval for Full Production	Nov 87/Feb 88	Aug 88 (CH-2)

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 May 87 to Dec 87 due to late delivery of Production Suitability Model and lost range availability. Block I Approval for Full Production slipped from Nov 87 to May 88 due to rescheduling of OPEVAL.

c. Current Change Explanations —

(CH-1) OPEVAL (BLK I) commencement further 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.

(CH-2) BLK 1 Approval for Full Production further slipped from May 88 to Aug 88 due to rescheduling of OPEVAL.

d. References —

Production Estimate: — DCP #88, Rev 1, dated 17 Nov 1977.

Approved Program: — DAE Baseline, 17 Feb 1988.

FY 1988/1989 Amended Biennial Budget.

10. Technical/Operational Characteristics:

PHALANX CIWS BLOCK 0

a. Technical —	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(1) (U) Weight (lbs)	12,000/12,600	10,750	12,600
(2) (U) Deck Space (Including space required for operation)	224 sq ft/ 224 sq ft	224 sq ft	224 sq ft

b. Operational —

(b)(1)

(4) (U) Reliability (MTBF)			
High stress profile	60 hrs/40 hrs	71 hrs (188 hrs) 4/	60 hrs
Low stress profile	120 hrs/not stated	not tested	120 hrs
(5) (U) Maintainability (MTTR)	2.2 hrs/3 hrs	2.73 hrs	2.2 hrs
(6) (U) Availability (inherent)			
High stress profile	.96/.93	.96 (.99) 5/	.96
Low stress profile	.98/not stated	not tested	.98

(b)(1)

c. Previous Change Explanations —

An MTBF of 71 hours was achieved and includes all system software "drop outs." If the non-tactical system software "drop outs" were excluded, the potential system MTBF would be 188 hours.

An AI = 0.96 was achieved using the observed MTBF of 71 hours; however, using the potential MTBF of 188 hours, the system has a potential AI = 0.99.

Prototype system weighed 12,000 pounds. The contractor reduced the weight of the OSM to 10,750 pounds. Engineering upgrades since initial delivery have increased the weight to 12,100 pounds.

PHALANX weight specifications increased as a result of manufacturing changes, engineering change proposals, and increase in weight of outside purchased parts (OSP).

NOTES:

1/ Against 0.52 RCS in clear environment.
2/Mean First Target Reaction Time (up to 5° El).
3/Mean Second Target Reaction Time (up to 5° El).
4/Not counting 10 of 16 critical plus major software (No-go indications) 71 hours achieved 188 hours potential.
5/0.96 using 71 hours MTBF, 0.99 using 188 hours MTBF.

d. Current Change Explanations -- None.

e. References --

Production Estimate: DCP #88, Rev 1, dated 17 November 1977.

Approved Program: Test and Evaluation Master Plan No. 142 Rev 2 (Block 0) dated 6 March 1980.

FY 1988/1989 Amended Biennial Budget.

10. Technical/Operational Characteristics:

PHALANX CIWS BLOCK I

	Prod Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical --			
(1)(U) Weight (lbs)	13,600/13,600	13,600	13,600
(2)(U) Deck Space (Including space required for operation)	224 sq ft/ 224 sq ft	224 sq ft	224 sq ft
b. Operational --			
(b)(1)			
(4)(U) Reliability (MTBF)			
High stress profile	70 hrs/40 hrs	not tested	70 hrs
Low stress profile	120 hrs/not stated	not tested	120 hrs
(5)(U) Maintainability (MTTR)	2.2 hrs/2.2 hrs	not tested	2.2 hrs
(6)(U) Availability (inherent)			
High stress profile	.97/.97	not tested	.97
Low stress profile	.98/not stated	not tested	.98
(b)(1)			

c. Previous Change Explanations -- None.

NOTES:

1/ Against 0.52 RCS in clear environment. LPRF Pd = 1.0, HPRF Pd = .97.
2/Mean Target Reaction Time (up to 10° El).
3/Mean Target Reaction Time (above 10° El).

UNCLASSIFIED

Current Change Explanations — PHALANX weight specification reflects Block 1 vice Block 0 system. Block I operational changes occur in reaction time, high stress profile reliability, inherent reliability, acquisition range and fire rate. Reaction times are reported for low and high pulse repetition frequencies (LPRF/HPRF) and vary with elevation angle (above and below 10°). Block 1 Baseline 1 System has dual fire rate capacity. Also a nominal increase in system reliability is realized. Demonstrated Performance values reflect Block 1 Baseline 1 testing.

e. References —

Production Estimate: DCP #88, Rev 1, dated 17 November 1977.

Approved Program: DAE Baseline, 17 Feb 1988.

FY 1989 Amended Biennial Budget.

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost —	Production Estimate	Changes	Current Estimate
Development	$ 154.8	$ 99.4	$ 254.2
Procurement	2021.4	369.2	2390.6
M61A1 Gun/Barrel	(22.5)	(- 0.9)	(21.6)
Weapons Group	(1518.0)	(- 29.9)	(1488.1)
Other (Proc Support)	(212.8)	(369.7)	(582.5)
TOTAL SAILAWAY	(1753.3)	(338.9)	(2092.2)
Peculiar Support	(45.3)	(- 1.2)	(44.1)
Initial Spares	(222.8)	(31.5)	(254.3)
Construction	-	-	-
Total: (Constant FY 84$)	$ 2176.2	$ 468.6	$ 2644.8
Escalation	305.5	-341.8	- 36.3
Development	(3.2)	(- 54.0)	(- 50.8)
Procurement	(302.3)	(-287.8)	(14.5)
Construction	-	-	-
Total Then-Year $	$ 2481.7	$ 126.8	$ 2608.5
b. Quantities —			
Development (RDT&E)	3	0	3
Procurement	617	+5	622
Total	620	+5	625
c. Unit Cost —			
Procurement:			
FY 84 Base-Year $	3.276	0.567	3.843
Then-Year $	3.766	0.101	3.867
Program:			
FY 84 Base-Year $	3.510	0.722	4.232
Then-Year $	4.003	0.171	4.174

UNCLASSIFIED

d. 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.

e. Foreign Military Sales — Australia: 6, Israel: 14, Japan: 55, Pakistan: 7, Taiwan: 7, United Kingdom: 30, Greece: 4, Portugal: 2, Saudi Arabia: 14, SDAF: 6.

f. Nuclear Costs — None.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Estimate Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition —			
(1) Cost	2608.5	2662.9	2608.5
(2) Quantity	625	638	625
(3) Unit Cost	4.174	4.174	4.174
b. Current Procurement —	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	128.5	128.5	73.1
Less CY Adv Proc	-	-	-
Plus PY Adv Proc	-	-	-
Net Total	128.5	128.5	73.1
(2) Quantity	28	28	16
(3) Unit Cost	4.589	4.589	4.569

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	- 43.9	- 299.0	-	- 342.9
Quantity	-	+ 59.3	-	+ 59.3
Schedule	-	+ 26.9	-	+ 26.9
Engineering	-	+ 186.4	-	+ 186.4
Estimating	+ 96.8	+ 98.3	-	+ 195.1
Other	-	-	-	-
Support	-	+ 56.4	-	+ 56.4
Subtotal	+ 52.9	+ 128.3	-	+ 181.2

13. Cost Variance Analysis (Cont'd):

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Current Changes:				
Economic	+ 0.1	- 4.6	-	- 4.5
Quantity	-	- 45.5	-	- 45.5
Schedule	-	+ 6.8	-	+ 6.8
Engineering	-	-	-	-
Estimating	- 7.6	+ 2.9	-	- 4.7
Other	-	-	-	-
Support	-	- 6.5	-	- 6.5
Subtotal	- 7.5	- 46.9	-	- 54.4
Total Changes	+ 45.4	+ 81.4	-	+ 126.8
Current Estimate	203.4	2405.1	-	2608.5

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	-	+ 45.0	-	+ 45.0
Schedule	-	-	-	-
Engineering	-	+ 147.3	-	+ 147.3
Estimating	+ 105.6	+ 187.6	-	+ 293.2
Other	-	-	-	-
Support	-	+ 37.5	-	+ 37.5
Subtotal	+ 105.6	+ 417.4	-	+ 523.0
Current Changes:				
Economic	-	-	-	-
Quantity	-	- 34.5	-	- 34.5
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	- 6.2	- 6.0	-	- 12.2
Other	-	-	-	-
Support	-	- 7.7	-	- 7.7
Subtotal	- 6.2	- 48.2	-	- 54.4
Total Changes	+ 99.4	+ 369.2	-	+ 468.6
Current Estimate	254.2	2390.6	-	2644.8

b. Previous Change Explanations --

RDT&E

Economic:	Revised escalation rates
Estimating:	Revised cost estimates to improve capability to counter lower altitude, high velocity targets with smaller cross sections

PROCUREMENT

Economic:	Revised escalation rates
Quantity:	Requirements for 3 additional WPN systems and 17 additional SCN units for net increase of 20 units
Schedule:	Schedule shift of WPN systems from FY85-88 to FY89-92 and SCN systems from FY85 and 89 to FY88, 90-92
Estimating:	Current hardware contracts allowed revised out year hardware estimates
Support:	Increase support costs due to associated increase in quantity requirements

c. Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised escalation rates (Economic)	N/A	+ 0.1
Decrease associated with Congressional marks (Estimating)	- 6.2	- 7.6
(2) PROCUREMENT		
Revised escalation rates (Economic)	N/A	- 4.6
SCN decrease of 13 systems (Quantity)	- 34.5	- 45.5
Schedule shift of WPN and SCN to buyout CG units in FY88 vice FY89-90, deletion of DDG units in FY88 and 1 ship in FY89, shift in CVN units to FY88 from FY90 & 93, addition of LHD units in FY84 and a shift in units from FY90 to 91. (Schedule)	-	+ 6.8
Current hardware contracts have allowed revised out year hardware estimates. (Estimating)	- 6.0	+ 2.9
Decrease in support costs due to associated decrease in quantity (Support)	- 7.7	- 6.5

14. 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	Spt	Other	Total	
4.003	-0.556	-0.010	0.054	0.298	0.305	.080	0.000	0.171	4.174

15. Contract Information: (Then-Year Dollars in Millions)

a. PROCUREMENT --

FY 85 Production
General Dynamics
Pomona, California
N00024-85-C-7002, FFP
Awarded: 4 September 1985
Definitized: 9 October 1985

Initial Contract Price		
Target	Ceiling	Qty
$117.5	N/A	69

Current Contract Price		
Target	Ceiling	Qty
$221.6	N/A	69

Estimated Price At Completion	
Contractor	Program Manager
$221.6	$221.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances:	+ 4.1	-5.5
Cumulative Variances To Date:	- 8.4	-2.1
	-12.5	-3.4

Explanation of Change: Variance centered in weapon group and hardware fabrication support.

Reference: 09/87 CPR.

FY 86 Production
General Dynamics
Pomona, California
N00024-86-C-5412, FPI
Awarded: 7 August 1986
Definitized: 8 July 1987

Initial Contract Price		
Target	Ceiling	Qty
$188.2	$200.5	57

Current Contract Price		
Target	Ceiling	Qty
$216.3	$238.6	58

Estimated Price At Completion	
Contractor	Program Manager
$216.3	$238.6

	Cost Variance	Schedule Variance
Previous Cumulative Variances:	-3.4	+2.8
Cumulative Variances To Date:	+1.7	-3.5
	+5.1	-6.3

Explanation of Change: The quantity change 57 to 58 units was due to contract definitization. The quantity of 57 was used for fair share planning purposes. General Dynamics reflects an unfavorable 5.5% schedule variance and a favorable 2.7% cost variance. Variance centered in the low value material area. This contract is approximately 31.2% complete. Estimate of cost at completion is within the contract budget baseline.

Reference: NSWC/Silver Spring Contract Status Report dated 28 January 1988.

	Initial Contract Price		
FY 87 Production	Target	Ceiling	Qty
General Dynamics	$154.1	$170.0	65
Pomona, California			
N00024-87-C-5456, FPI			
Awarded: 31 July 1987			
Definitized:			

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$169.5	$185.9	65	$169.5	$185.9

	Cost Variance	Schedule Variance
Previous Cumulative Variances:	0	0
Cumulative Variances To Date:	-1.1	+.1
	-1.1	+.1

Explanation of Change: General Dynamics reflects a favorable .1 schedule variance and an unfavorable 1.1 cost variance. Variance due to a transfer of hardware from the FY 85 Production contract to the FY 87 contract. This contract is approximately 3% complete. Estimate of cost at completion is within the contract budget baseline.

Reference: NSWC/Silver Spring Contract Status Report dated 28 January 1988.

The FY 84 Production contract N00024-84-C-7000 is fully delivered and is deleted from this SAR submission.

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: 80% or 12 of 15 years

(2) Percent Program Cost Appropriated: 79.6% or $2,077.0/$2,608.5

b. Appropriation Summary —

Appropriation	Current & Prior Yrs (FY77-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93)	Total
	(Then-Year Dollars in Millions)				
RDT&E	154.9	5.3	43.2	-	203.4
WPN	1304.2	21.6	121.7	-	1447.5
SCN	617.9	51.5	288.2	-	957.6
Total	2077.0	78.4	453.1	-	2608.5

c. Annual Summary —

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
		Appropriation: RDT&E						
1978	3			183.9			123.4	6.8
1979				5.3			3.9	8.4
1980				2.6			2.1	10.59
1981				2.3			2.1	10.61
1982				1.5			1.4	7.6
1983				1.3			1.3	4.9
1984				1.2			1.2	3.8
1985				3.5			3.7	3.4
1986				4.1			4.4	2.8
1987				5.7			6.3	2.7
1988				4.4			5.1	3.7
1989				4.4			5.3	3.8
1990				11.5			14.2	3.6
1991				14.9			19.0	3.3
1992				7.6			10.0	2.8
Subtotal	3			254.2			203.4	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary —

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
				Appropriation: WPN				
7T			48.9	48.9			26.8	3.56
1977			43.0	43.0			25.0	3.78
1978	21		106.1	119.2			77.4	6.8
1979	19		70.6	88.6			63.4	8.72
1980	51		146.4	165.8			130.7	11.8
1981	52		155.0	177.1			155.8	11.6
1982	49		142.6	174.0			166.2	14.3
1983	37		105.3	121.2			122.4	9.0
1984	40		116.4	123.9			130.2	8.0
1985	36		140.1	144.8			157.2	3.40
1986	32		111.3	113.7			127.5	2.8
1987	24		77.0	79.2			92.0	2.7
1988	5		23.3	24.6			29.6	3.7
1989	5		15.6	17.4			21.6	3.8
1990	10		29.8	33.0			42.2	3.6
1991	9		24.1	25.1			33.0	3.3
1992	10		33.6	34.6			46.5	2.8
Subtotal	400		1388.9	1534.1			1447.5	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

Fiscal Year	Qty	FY 84 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
				Appropriation: SCN				
1978	10		42.9	52.6			45.2	8.2
1979	8		26.5	32.5			28.6	9.6
1980	15		35.2	43.0			40.9	9.9
1981	16		43.6	53.1			52.3	9.6
1982	11		37.2	45.5			46.2	7.5
1983	22		50.3	60.7			62.6	3.8
1984	16		46.5	56.4			59.5	3.6
1985	12		43.5	53.1			57.4	2.1
1986	17		53.6	64.9			72.4	1.2
1987	12		38.3	46.7			53.8	1.6
1988	23		68.7	83.1			98.9	3.7
1989	11		34.5	42.0			51.5	3.8
1990	12		44.7	54.5			68.6	3.6
1991	19		71.0	86.5			111.6	3.3
1992	18		66.9	81.8			108.0	2.8
Subtotal	222		703.3	856.6			957.6	
Total	625		2092.2	2644.8			2608.5	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1978 and Prior	123.4	121.0	121.0
1979	3.9	3.9	3.9
1980	2.1	2.1	2.1
1981	2.1	2.1	2.1
1982	1.4	1.4	1.4
1983	1.3	1.3	1.3
1984	1.2	1.2	1.2
1985	3.7	3.7	3.6
1986	4.4	4.2	4.2
1987	6.3	6.3	3.5
1988	5.1	3.0	0.0
To Complete	48.5		
Total	203.4	150.2	144.3
	Appropriation: WPN		
197T	26.8	26.8	26.8
1977	25.0	25.0	25.0
1978	77.4	77.4	75.9
1979	63.4	63.4	61.0
1980	130.7	130.7	118.8
1981	155.8	156.0	152.3
1982	166.2	166.2	161.1
1983	122.4	123.9	121.7
1984	130.2	129.8	119.8
1985	157.2	157.2	141.0
1986	127.5	127.5	53.0
1987	92.0	81.9	8.9
1988	29.6	2.5	.4
To Complete	143.3		
Total	1447.5	1268.3	1065.7

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

d. Obligations and Expenditures —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: SCN		
1977			
1978	45.2	45.2	45.2
1979	28.6	28.6	28.6
1980	40.9	40.9	40.9
1981	52.3	52.3	52.3
1982	46.2	46.2	46.2
1983	62.6	54.8	51.6
1984	59.5	48.9	41.1
1985	57.4	45.4	24.6
1986	72.4	55.9	16.1
1987	53.8	30.1	3.8
1988	98.9	-	-
To Complete	339.7	-	-
Total	957.6	448.3	350.4

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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		28	132
1989		18	132
1990		30	132
1991		37	132
1992		28	132

b. Cost Variance —

Item		Production Estimate	Variance (CE less PDE)	Current Estimate	Variance (CE less Max)	Maximum Economic
Prog Acq Cost	(BY $)	2176.2	+ 468.6	2644.8	0.000	2644.8
	(TY $)	2481.7	+ 126.8	2608.5	0.000	2608.5
PAUC	(BY $)	3.510	+ 0.722	4.232	0.000	4.232
	(TY $)	4.003	+ 0.171	4.174	0.000	4.174

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):

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	-96	194	0	194
End Date (Mo/Yr)	9/85	N/A	9/94	N/A	9/94

d. Deliverables (Plan/Actual) --

	To Date
RDT&E	3/ 3
SCN	222/123
WPN	394/298

18. Operating and Support Costs: N/A

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SAR-87-053

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: P-3C ORION

N-29 P3C

AS OF DATE: DECEMBER 31, 1987

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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. W.L. VINCENT
   Naval Air Systems Command — Assigned: January 2, 1986
   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
   NG&RE: 0502341N

5. Related Programs: Harpoon, Proteus, LRAACA

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[redacted]

OASD(PA) DFOISR 88-T-0936

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. It is planned to shutdown the P-3C line after the FY88 procurement. The six FY88 aircraft has been appropriated but not authorized by Congress and will be funded from the National Guard and Reserve Appropriation.

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.

Excluded from this Selected Acquisition Report are the 237 P-3C aircraft procured in FY83 & prior & the $4,305.2M - FY83 & prior funding.

All reference to the P-3G program has been deleted from this SAR report since the P-3G program is now referred to as the Long Range Air ASW Capability Aircraft (LRAACA) program.

The Update IV (UIV) avionics suite will be incorporated into P-3C aircraft only through the P-3 UIV Retrofit program. Therefore, all UIV related RDT&E, APN-1, and MILCON costs have been deleted from the P-3C SAR.

The P-3C aircraft has a demonstrated performance of successfully completing its current assigned missions.

8. Decision Coordinating Paper (DCP) Threshold Breaches:
Not Applicable since DCP thresholds were not established for this program.

9. Schedule

a. Milestones

	Prod. Est./Apprv'd 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
Update IV Fleet Oper.	Aug 91/ N/A	N/A (CH-1)

b. Previous Change Explanations: None

c. Current Change Explanations: (CH-1) Update IV Fleet Operational Milestone has been deleted 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

d. References--

Production Estimate - Master Milestones List dated 23 April 1978
Approved Program - Amended FY88/FY89 Biennial Budget dtd Feb 1988
DAE Baseline Approved February 1988

10. Technical/Operational Characteristics:

a. Technical	Prod. Estimate/ Approved Program	Demonstrated Performance	Current Estimate
Weight (lbs)			
(1) Empty	66,726/ 66,726	66,726	66,726
(2) Normal T.O.	135,000,135,000	135,000	135,000
(3) Max. T.O.	139,760/139,760	139,760	139,760
w/Ext. Stores	142,000/142,000	142,000	142,000
Dimensions			
(1)Lgth/Wing Span	116'10"/99'8"/ 116'10"/99'8"	116'10"/99'8"	116'10"/99'8"
(2)Ht/Ht folded	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
(2)Maximum(Mil.Pwr)	392/392	392	392
Radius(NM)Full Fuel ASW loading			
(1)Max(no loiter)	2003NM/25000 2003NM/25000	2003NM/25000	2003NM/25000
(2)Norm(loiter 1/2 flt time 6hr loiter)	875/875	875	875
Ceil/Alt.			
(1)Serv.Ceil(Cmbt Wt)	30,000/30,000	30,000	30,000
(2)Cruise Alt.(low)	1,500/ 1,500	1,500	1,500
(high)	25,000/25,000	25,000	25,000
(3)loit Alt(low/high)	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% goal	95.59%	90%
Maintainability			
(1)SDLM Cycle	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	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 - Amended FY88/FY89 Biennial Budget dtd Jan 1988
DAE Baseline Approved February 1988

11. Program Acquisition Cost (Current Estimate in Millions of Dollars)

a. Cost	(1) Production Estimate (FY83-FY92)	(2) Changes	(3) Current Estimate (FY83-FY89)
Development	280.1	- 215.1	65.0
Procurement	3453.2	-1948.4	1504.8
Flyaway:			
Airframe & Changes	(1477.7)	(- 830.7)	(647.0)
Engine & Accessories	(253.6)	(- 150.6)	(103.0)
Electronics & Comm	(881.6)	(- 552.7)	(328.9)
Armament & Other GFE	(20.9)	(- 12.7)	(8.2)
TOTAL FLYAWAY	(2633.8)	(-1546.7)	(1087.1)
Ground Support Equip.	(185.7)	(- 90.9)	(94.8)
Training Equip. & Other	(570.1)	(- 268.7)	(301.4)
TOTAL SUPPORT	(755.8)	(- 359.6)	(396.2)
Initial Spares	(63.6)	(- 42.1)	(21.5)
MILCON	2.6	+ 6.4	9.0
TOTAL FY84 Base-Year $	3735.9	-2157.1	1578.8
Escalation	1287.7	-1097.1	190.6
Development	(51.5)	(- 45.2)	(6.3)
Procurement	(1236.0)	(-1053.0)	(183.0)
MILCON	(.2)	(+ 1.1)	(1.3)
TOTAL THEN-YEAR $	5023.6	-3254.2	1769.4
b. Quantities --			
Development	0	-	0
Production	80	- 42	38
TOTAL	80	- 42	38
c. Unit Cost --			
Procurement:			
FY84 Base-Year $	43.165	$- 3.565	$ 39.600
Then-Year $	58.615	$-14.200	$ 46.415
Program			
FY84 Base-Year $	46.699	$- 5.152	$ 41.547
Then-Year $	62.795	$-16.232	$ 46.563

d. Approved Design to Cost Goal -- Not Applicable

e.. 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.

f.. Nuclear Costs: None

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

		Current Year		Budget Year
		SAR Current Estimate DEC 87 SAR	UCR Baseline Estimate DEC 86 SAR	UCR Baseline Estimate DEC 87 SAR
A.	Program Acquisition			
(1)	Cost	1769.4	2006.6	1769.4
(2)	Quantity	38	32	38
(3)	Unit Cost	46.563	62.706	46.563
B.	Current Procurement---	(FY 1988)	(FY 1988)	(FY 1989)
(1)	Cost	214.6	2.9	1.9
	Less CY Adv Proc	- 0.0	- 0.0	- .0
	Plus PY Adv Proc	+ 0.0	+ 0.0	+ .0
	Net Total	214.6	2.9	1.9
(2)	Quantity	6	0	0
(3)	Unit Cost	35.767	0	0

13. Cost Variance Analysis:

A. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate	331.6	4689.2	2.8	5023.6
Previous Changes	-	-	-	-
Economic	- 21.0	- 414.4	-	- 435.4
Schedule	+104.3	+ 212.0	-	+ 316.3
Quantity	-	-1897.2	-	-1897.2
Estimating	+ 14.4	- 686.9	-	- 672.5
Support	-	- 338.4	+ 10.2	- 328.2
Subtotal	+ 97.7	-3124.9	+ 10.2	-3017.0
Current Changes:				
Economic	- .2	+ 33.2	-	+ 33.0
Quantity		+ 176.0		+176.0
Schedule	-		-	-
Estimating	-357.8	- 46.5	-	-404.3
Support	-	- 39.2	- 2.7	- 41.9
Subtotal	-358.0	+ 123.5	- 2.7	- 237.2
TOTAL CHANGES	-260.3	-3001.4	+ 7.5	-3254.2
Current Estimate	71.3	1687.8	10.3	1769.4

13. Cost Variance Analysis (Cont'd):
(FY 1984 Constant Dollars (Base Year) in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate	280.1	3453.2	2.6	3735.9
Previous Changes	-	-	-	-
Schedule	+ 81.1	+ 161.2	-	+ 242.3
Quantity		-1506.0	-	-1506.0
Estimating	+ 8.4	- 504.2	-	- 495.8
Support		- 201.4	+ 8.6	- 192.8
Subtotal	+ 89.5	-2050.4	+ 8.6	-1952.3
Current Changes:				
Quantity		+ 175.9		+ 175.9
Schedule	-	-	-	-
Estimating	-304.6	- 34.0	-	- 338.6
Support	-	- 39.9	- 2.2	- 42.1
Subtotal	-304.6	+ 102.0	- 2.2	- 204.8
Total Changes	-215.1	-1948.4	+ 6.4	-2157.1
Current Estimate	65.0	1504.8	9.0	1578.8

b. Previous Change Explanation

RDT&E
ECONOMIC -- Revised economic escalation indices
SCHEDULE -- Inclusion of FY92 funding
ESTIMATING Deletion of P-3G program 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 aircraft
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 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); Construction of Operational Training Bldg - NAS Moffett (2.7M)

13. Cost Variance Analysis (Cont'd):

c. Current Change Explanations --

		(Dollars in Millions) Base Year $	Then Year $
(1) RDT&E			
Revised Jan 87 economic escalation rates	(ECONOMIC)	N/A	- .2
Congressional Reductions; Deletion of UIV funding in the P-3C Program.	(ESTIMATING)	-304.6	-357.8
(2) PROCUREMENT			
Revised Jan 87 economic escalation rates	(ECONOMIC)	N/A	+ 33.2
FY88 NG&RE 6 A/C Congressional Approp.	(QUANTITY)	+175.9	+ 176.0
Decreased support/spares requirements	(SUPPORT)	- 34.0	- 39.2
Congressional Recissions/reductions	(ESTIMATING)	- 39.9	- 46.5
(3) MILCON			
Cancellat. of Oper. Trng Bldg - NAS Moffett	(SUPPORT)	- 2.2	- 2.7

d. References --

Production Estimate: FY 1988 Congressional Data Sheets dated Jan 1987
Current Estimate: Amended FY88/FY89 Biennial Budget dated Feb 1988.

14. Program Acquisition Unit Cost (PAUC) History:

A. Initial SAR Estimate to Current Baseline Estimate

PAUC (Initial SAR Est.)			Changes (Then Year Dollars in Millions)						PAUC (Baseline Estimate)
	ECON	QTY	SCH	ENG	EST	SPT	Other	Total	
62.795	-	-	-	-	-	-	-	-	62.795

B. Current Baseline Estimate to Current Estimate:

PAUC (Initial SAR Est)	Changes (Then Year Dollars in Millions)								PAUC (Baseline Estimate)
	ECON	QTY	SCH	ENG	EST	SPT	Oth	Total	
62.795	-10.589	+24.109	+ 8.324		-28.337	- 9.739		-16.232	46.563

15. Contract Information: (Then Year Dollars in Millions)

	Initial Contract Price		
	Target	Ceiling	Qty
A. RDT&E: None			
B. PROCUREMENT			
AIRFRAME			
Lockheed California Co. N0001985-C-0016 FFP, AWARD: JUN 1986 Definitized: Sep 1986	167.9	N/A	9

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
167.9	N/A	9	167.9	167.9

. Variance Analysis: FFP Contract

Lockheed California Co. N0001986-C-0086 FFP (Advanced Acq. Contr.) AWARD: DEC 1986 Definitization: Mar 1988 est.	104.0	N/A	9

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
170.4	N/A	9	170.4	170.4

. Variance Analysis: FFP Contract

15. Contract Information (Cont'd) (Then-Year Dollars in Millions)

B. PROCUREMENT (cont'd)

	Initial Contract Price		
	Target	Ceiling	Qty
AIRFRAME			
Lockheed California Co. N0001984-C-0008 FFP, AWARD: DEC 1984 Definitized: FEB 1986	165.8	N/A	9

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
165.8	N/A	9	165.8	165.8

Variance Analysis: FFP Contract

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 55.6% (5/9)

(2) Percent Program Cost Appropriated: 99.11% ($1753.7/1769.4)

b. Appropriation Summary --

Appropriation	Current & Prior Yrs. (FY83-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP	Total
RDT&E	57.4	5.0	8.9		71.3
PROCUREMENT	1,685.9	1.9	0.0		1,687.8
MILCON	10.3	0.0	0.0		10.3
TOTAL	1,753.6	6.9	8.9		1,769.4

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

Fiscal Year	Qty	FY84 Base-Year Dollars			Then-Year Dollars			Escl Rate
		FLYAWAY		Total	Advance Proc		Total	
		Non-Rec	Rec		Debit	Credit		%
Appropriation: RDT&E*								
1984	-	-	-	8.7	-	-	8.9	3.8
1985	-	-	-	23.7	-	-	24.9	3.4
1986	-	-	-	12.1	-	-	13.0	2.8
1987	-	-		5.1	-	-	5.7	2.7
1988	-	-		4.3	-	-	4.9	3.7
1989	-	-		4.2	-	-	5.0	3.8
1990	-	-		2.2	-	-	2.8	3.6
1991	-	-		2.3	-	-	3.0	3.3
1992	-	-		2.4	-	-	3.1	2.8
Subtotal	-	-		65.0	-	-	71.3	

* Excludes from PE 0604221N the following Project Elements:
P.E. - W1588 Update IV Avionics
P.E. - W1926 LRAACA

16. Program Funding Summary (Cont'd): (Current Estimate in Millions)

Fiscal Year	Qty	FY84 Base-Year Dollars: FLYAWAY Non-Rec	FY84 Base-Year Dollars: FLYAWAY Rec	FY84 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
Appropriation: Procurement								
1983	-	-	-	46.2	48.6	-	48.6	9.9
1984	5	-	146.1	274.7	74.3	48.6	291.1	8.0
1985	9	-	253.3	355.6	82.7	74.3	388.8	3.4
1986	9	-	260.6	319.0	74.2	82.7	360.3	2.8
1987	9	4.8	246.3	329.3	0.0	74.2	382.5	2.7
1988	0	-	0.0	2.4	0.0	0.0	2.9	3.7
1989	0	-	0.0	1.6	0.0	0.0	1.9	3.8
Subtotal	32	4.8	906.3	1328.8	279.8	279.8	1476.1	

Fiscal Year	Qty	FY84 Base-Year Dollars: FLYAWAY Non-Rec	FY84 Base-Year Dollars: FLYAWAY Rec	FY84 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
Appropriation: National Guard & Reserve								
1988	6	.4	175.6	176.0	-	-	211.7	3.7

Fiscal Year	Qty	FY84 Base-Year Dollars			Then-Year Dollars			Escl Rate
		FLYAWAY		Total	Advance Proc		Total	
		Non-Rec	Rec		Debit	Credit		%
Appropriation: Milcon								
1984	-	-	-	1.3	-	-	1.4	3.3
1985	-	-	-	1.4	-	-	1.4	3.4
1986	-	-	-	-	-	-	-	2.8
1987	-	-	-	2.5	-	-	2.9	2.7
1988	-	-	-	3.8	-	-	4.6	3.7
Subtotal	-	-	-	9.0	-	-	10.3	
Total	38	5.2	1081.9	1578.8	279.8	279.8	1769.4	

16. Program Funding Summary (Cont'd)

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1984	8.9	8.9	8.8
1985	24.9	24.9	22.7
1986	13.0	13.0	12.2
1987	5.7	5.6	4.8
1988	4.9	2.2	0.0
To Complete	13.9	N/A	N/A
Total	71.3	54.6	48.5
Appropriation: Procurement			
1983	48.6	48.6	48.3
1984	291.1	291.1	268.1
1985	388.8	388.7	355.4
1986	360.3	346.5	236.9
1987	382.5	186.3	71.1
1988	2.9	0.0	0.0
To Complete	1.9	N/A	N/A
Total	1476.1	1261.2	979.8
Appropriation: National Guard & Reserve			
1988	211.7	0.0	0.0
Appropriation: Milcon			
1984	1.4	1.4	1.4
1985	1.4	1.4	1.4
1986	0.0	0.0	0.0
1987	2.9	2.9	1.0
1988	4.6	0.0	0.0
To Complete	0.0	N/A	N/A
Total	10.3	5.7	3.8

17. Production Rate Data:

FISCAL YEAR	DEVELOPMENT ESTIMATE	PRODUCTION ESTIMATE	CURRENT ESTIMATE	MAXIMUM ECONOMIC
1984	-	5	5	24
1985	-	9	9	24
1986	-	9	9	24
1987	-	9	9	24
1988	-	9	6	24
1989	-	9	0	24
1990	-	9	0	24
1991	-	9	0	24
1992	-	12	0	24

B. Cost Variance -- Dollars in Millions

ITEM		Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max.)	Maximum
Prog. Acq. Cost	(BY)	3735.9	-2157.1	1578.8	N/A	N/A
	(TY)	5023.6	-3254.2	1769.4	N/A	N/A
PAUC	(BY)	46.699	- 5.152	41.547	N/A	N/A
	(TY)	62.795	-16.232	46.563	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	- 42	102	N/A	N/A
End Date (Mo/Yr)	9/94		3/91	N/A	N/A

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
PROCUREMENT	23/23

18. Operating and Support Costs: N/A

SAR-87-118

Selected Acquisition Report (RCS: DD-COMP(Q&A)823)
Program: I-S/A AMPE

As of Date: December 31, 1987

AF-16 I-S/A AMPE

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1. Designation/Nomenclature (Popular Name):

I-S/A AMPE/Inter-Service/Agency Automated Message Processing Exchange (I-S/A AMPE)

2. DOD Component: U. S. Air Force

3. Responsible Office and Telephone Number:

I-S/A AMPE Program Management Office
Headquarters Standard Systems Center
Air Force Communications Command
(AFCC) Gunter AFS AL 36114-6343

PD: Colonel James P. Hamilton
Assigned Nov 87
AUTOVON: 446-4337
Comm: (205)279-4337

4. Program Element/Procurement Line Items:

RDT&E: PE 33128F

O&M: PE 33128F
PE 33111A (Shared funding)
PE 33128N
PE 35123F (Shared funding)
PE 33128G
PE 33128S

[redacted]

SAF/PAS
88-0098-T

OASD(PA) DFOISR 88-T-0464

Procurement: APPN 3080

PE 33401F (Shared funding)	PE 33128F
PE 33401A (Shared funding)	PE 33111A
PE 33401N (Shared funding)	PE 37128N
PE 33401G (Shared funding)	PE 37128G
PE 33401S (Shared funding)	PE 37128S

MILCON: PE 33128F
PE 33111A (Shared funding)
PE 33128N
PE 33128G
PE 33128S

5. Related Programs: None

6. Mission and Description: Inter-Service/Agency Automated Message Processing Exchange (I-S/A AMPE) Program will provide a standard telecommunication system to replace the existing Services' and Agencies' systems, and meet new requirements as directed by Congress and the DOD. It will also provide a replacement for the AUTODIN Switching Centers (ASCs). The Defense Communications Agency manages the 15 operational ASCs, all of which will be replaced by I-S/A AMPE. In addition, the I-S/A AMPE will provide an interface for AUTODIN terminals to the Defense Communications System's (DCS) packet switching network, and will provide a consolidation of the DSSCS and GENSER services.

7. Program Highlights:

a. Significant Historical Developments -- The Defense Communications Agency (DCA) developed an approach called the Integrated AUTODIN Systems Architecture (IASA) that provides increased message processing standardization of the Defense Communications System (DCS) and the Services' and Agencies' AMPE systems. The I-S/A AMPE Program is an element of the IASA designed to replace the Services' and Agencies' AMPEs, functionally replace the AUTODIN Switching Centers (ASCs), and provide connection to the Defense Data Network (DDN). The I-S/A AMPE Program is a joint Service and Agency program with the Air Force as the Lead Military Department (LMD). The other Services and Agencies involved are Army, Navy, National Security Agency (NSA), Defense Intelligence Agency (DIA), Defense Communications Agency (DCA), and Defense Logistics Agency (DLA). The Air Force is responsible for funding the design of the system as well as Air Force production units. Army, Navy, NSA and DLA are responsible for funding their respective systems. DCA is responsible for the overall AUTODIN system architecture, of which I-S/A AMPE is a part. NSA and DIA provide security and policy guidance and certify and accredit the I-S/A AMPE system. USAF Program Management Directive (PMD) 3056(1) was signed on 10 Mar 83 directing the Air Force to implement the I-S/A AMPE Program. A Draft Request for Proposal (RFP) package was completed and released to industry for comment in Dec 83. The Program Office has considered industry comments for inclusion, as appropriate, in the RFP. A contract was awarded in Sep 84 to conduct Independent Verification and Validation (IV&V) of specified tasks in the areas of I-S/A AMPE contractor proposal evaluation, system design, specification development, testing, and implementation. Source selection for the I-S/A AMPE began in Oct 84.

Contractor proposals were received and the initial evaluation was completed. The Best and Final Offers (BAFOs) for the I-S/A AMPE contract were received from the offerors in May 85. The JRMB met on 20 Jun 85 and JRMB II approval was granted. The Source Selection Advisory Council was briefed on 9-11 Jul 85, and the Source Selection Authority was briefed on 18 Jul 85. The Secretary of Defense Decision Memorandum (SDDM) approving JRMB II was signed on 24 Jul 85. On 13 Aug 85, the I-S/A AMPE Design Period contract was awarded to TRW. The Source Selection Authority elected to award a single contract in lieu of using two prime contractors as originally planned. Briefings to the two unsuccessful offerors on the program were completed on 12 Sep 85. The Systems Requirements Review (SRR) was accomplished 7-11 Oct 85. The first modification to the contract was released 4 Nov 85. The System Specification was delivered in Nov and Dec 85. The Government rejected the initial submissions because the data item descriptions were not complied with by the contractor. The System Design Review (SDR) was completed May 86. This was completed later than originally scheduled (by four months), but had no impact on the overall program. The Program Office and TRW reached agreement on an initial functional baseline (i.e., System Specification/A-Specification) on 6 Nov 86. The first of three preliminary design reviews was completed on 18 Dec 86. The PMD was updated and reissued as PMD 3056(2), 8 December 86. TRW requested and was granted a 6 month slip in the program schedule. The slip in schedule is due to TRW's inability to meet system requirements in A and B1 specification.

b. Significant Developments Since Last Report -- The Inter-Service/Agency Automated Message Processing Exchange (I-S/A AMPE) Program was terminated. This is the last SAR.

c. Changes Since "As Of" Date -- None

8. Decision Coordinating Paper (DCP) Threshold Breaches: The following DCP threshold breaches have occurred since the 25 Feb 86 DCP Annex B:

	25 Feb 86 DCP Annex B	Current Estimate
Cost		
Procurement	311.5	1.9
Schedule		
JRMB III	Apr 89	Not Applicable
Operational		
System Initial Operational Capability	Oct 89	Not Applicable
Service and Agency AMPE Replacement	Oct 89 - Feb 94	Not Applicable
Replacement of ASCs Complete	Feb 94	Not Applicable
Interface to DDN	Jun 89	Not Applicable

9. Schedule: Not Applicable (Program Terminated)

10. Technical/Operational Characteristics:

	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
a. Technical --			
Performance Throughput	40-120 Line Blocks per second	N/A	Not Applicable
Readiness/Supportability (Hardware & Software Systems)			
(1) Reliability, Availability, and Maintainability (RAM) (%)	99.95	N/A	Not Applicable
(2) Logistics Support Base	CLS	N/A	Not Applicable
(3) Certification and Accreditation	A1	N/A	Not Applicable
b. Operational --			
Operational Availability (%)	99.95	N/A	Not Applicable
Manning			
(1) Operational Systems	3960	N/A	Not Applicable
(2) Systems Support Facility	73	N/A	Not Applicable

c. Change Explanations -- Program Terminated.

d. Current Change Explanations -- Program Terminated.

e. References --

Development Estimate: Decision Coordinating Paper (DCP) dated June 13, 1985.

Approved Program: FY89 President's Budget

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Development Estimate	Changes	Current Estimate 1/
a. Cost --			
O&M	285.7	-241.6	44.1
Development (RDT&E)	0.0	+73.3	73.3
Procurement	291.1	-289.3	1.8
Prime Mission Equip	(182.0)	(-182.0)	(0.0)
Govt Furnished Equip	(7.1)	(-7.1)	(0.0)
System/Project Mgt	(27.3)	(-27.3)	(0.0)
System T&E	(17.7)	(-15.9)	(1.8)
Total Flyaway	(234.1)	(-232.3)	(1.8)
Other System Cost	(57.0)	(-57.0)	(0.0)
Construction (MILCON)	114.4	-102.4	12.0
Total FY85 Base-Year $	691.2	-560.0	131.2
Escalation	138.3	-130.8	7.5
O&M	(25.0)	(-24.4)	(0.6)
Development (RDT&E)	(0.0)	(+4.9)	(4.9)
Procurement	(85.3)	(-85.2)	(0.1)
Construction (MILCON)	(28.0)	(-26.1)	(1.9)
Total Then-Year $	829.5	-690.8	138.7
b. Quantities --			
Development (RDT&E)	0	0	0
Procurement	94	-94	0
Total	94	-94	0
c. Unit Cost --			
Procurement:			
FY85 Base-Year $	3.097	Not Applicable	Not Applicable 1/
Then-Year $	4.004	Not Applicable	Not Applicable 1/
Program:			
FY85 Base-Year $	7.353	Not Applicable	Not Applicable 1/
Then-Year $	8.824	Not Applicable	Not Applicable 1/

1/Program terminated before any units were produced or delivered.

d. Approved Design to Cost Goal -- Not applicable; waived.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	138.7	555.2	138.7
(2) Quantity	0	93	0
(3) Unit Cost	Not Applicable	5.970	Not Applicable
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(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

No procurement quantities in the Current Year or Budget Year.

13. Cost Variance Analysis:

a. Summary - (Current (Then-Year) Dollars in Millions)

	O&M	RDT&E	PROC	MILCON	TOTAL
Development Estimate	310.7	—	376.4	142.4	829.5
Previous Changes:					
Economic	-1.5	+0.4	-11.7	-3.3	-16.1
Quantity	--	--	+24.4	--	+24.4
Schedule	+4.7	—	+13.9	+8.4	+27.0
Engineering	--	--	--	--	--
Estimating	-258.7	+91.0	-29.7	-0.2	-197.6
Other	--	--	--	--	--
Support	+0.6	--	+1.6	—	+2.2
Subtotal	-254.9	+91.4	-1.5	+4.9	-160.1
Current Changes:					
Economic	--	-0.6	+3.9	+0.8	+4.1
Quantity	--	--	-302.4	--	-302.4
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	-11.1	-12.6	—	-134.2	-157.9
Other	--	--	--	--	--
Support	--	--	-74.5	--	-74.5
Subtotal	-11.1	-13.2	-373.0	-133.4	-530.7
Total Changes	-266.0	+78.2	-374.5	-128.5	-690.8
Current Estimate	44.7	78.2	1.9	13.9	138.7

(FY 1985 Constant (Base-Year) Dollars in Millions)

	O&M	RDT&E	PROC	MILCON	TOTAL
Development Estimate	285.7	—	291.1	114.4	691.2
Previous Changes:					
Quantity	--	--	+17.7	--	+17.7
Schedule	+3.6	--	+7.0	+6.0	+16.6
Engineering	--	--	--	--	--
Estimating	-236.7	+84.1	-21.8	-2.5	-176.9
Other	--	--	--	--	--
Support	+0.5	--	+.8	--	+1.3
Subtotal	-232.6	+84.1	+3.7	+3.5	-141.3
Current Changes:					
Quantity	--	--	-235.2	--	-235.2
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	-9.0	-10.8	--	-105.9	-125.7
Other	--	--	--	--	--
Support	--	--	-57.8	--	-57.8
Subtotal	-9.0	-10.8	-293.0	-105.9	-418.7
Total Changes	-241.6	+73.3	-289.3	-102.4	-560.0
Current Estimate	44.1	73.3	1.8	12.0	131.2

b. Previous Change Explanations --

O&M

Economic: Revised economic escalation indices.
Schedule: Increase due to change from 32 to 44 month Design Period and six month schedule slippage by design contract.
Estimating: Decrease due to Source Selection Authority's decision to award a single contract in lieu of two contracts for the Design Period. In addition, there was a congressionally directed (FY86 Defense Appropriations Act) reprogramming of funds and corresponding requirements between Appropriations from O&M to RDT&E. Refinement of costs to reflect only acquisition activities. Cost aligned to approved program funding. No immediate impact on program.
Support: Refinement of facility modification costs based on site surveys.

RDT&E

Economic: Escalation increased due to shift from O&M to RDT&E. Revised economic escalation indices.
Estimating: Congressionally directed (FY86 Defense Appropriation Act) reprogramming of funds and corresponding requirements between Appropriations from O&M to RDT&E. Cost reflects Gramm-Rudman (FY86) cuts and across-the-board Air Force cuts. No immediate impact on program.

Procurement

Economic: Revised economic escalation indices.
Quantity: Additional reduction due to failure to approve program funding for scheduled I-S/A AMPE systems. Increase in procurement quantity to reflect OJCS Topology schedule.
Schedule: Increase due to revised schedule slipping procurement approximately one year. Rephasing of schedule based on Required Operational Dates (RODs) in lieu of Installation Dates. Rephasing of schedule due to slippage in design period contract.
Estimating: Overall reduction due to actual Design Phase Contract Award experience. Revised evaluation of costs based upon actual contractor experience. Alignment of approved program contract and to redefine costs between flyaway and non-flyaway and to adjust support funding due to unfunded systems.
Support: Revised evaluation of costs based upon actual contractor experience; redefine costs between flyaway and non-flyaway.

MILCON

Economic: Revised economic escalation indices.

Schedule: Rephasing of required construction due to slippage in design period contract.

Estimating: Decrease due to revised estimate of construction costs based on site surveys.

Cost aligned to approved program content significant delay in deployment of systems if additional funds are not provided. Adjustment of funding to cover MILCON requirements. Refinement of prior current estimate to reflect actual requirements.

c. Current Change Explanations --

	Base-Year	Then-Year
(1) O&M		
Reduced to zero because of program termination (Estimating)	-9.0	-11.1
(2) RDT&E		
Revised economic escalation indices (Economic)	0.0	-0.6
Early termination of program. (Estimating)	-10.8	-12.6
(3) Procurement		
Revised economic escalation indices (Economic)	0.0	3.9
Quantities reduced to zero because of program termination (Quantity)	-235.2	-302.4
Adjustment in support items because of program termination (Support)	-57.8	-74.5
(4) MILCON		
Revised economic escalation indices (Economic)	0.0	0.8
Adjustment construction requirement because of program termination (Estimating)	-105.9	-134.2

d. References --

Development Estimate: Decision Coordinating Paper (DCP) dated June 13, 1985.

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars) Not applicable since program was terminated before any units were produced or delivered.

15. Contract Information: (Then-Year Dollars in Millions)

a. O&M and RDT&E --

Software Design Effort:	Initial Contract Price Target	Ceiling	Qty
TRW, Inc., Torrance, CA F01630-85-D-0003, FPIF/FFP Award: August 13, 1985 Definitized: August 13, 1985	$83.2	$104.2	0

Current Contract Price Target	Ceiling	Qty	Estimate Price At Completion Contractor	Program Manager
$87.0	$108.9	0	$153.6M	$165.0M

Explanation of Change: The contractor and program manager's estimates-at-completion increased significantly from the previous report due to the major re-baselining effort conducted during FY87 by TRW and AT&T.

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-12.3M	-5.6M
Cumulative Variances to Date (12/31/87)	-0.7M	-3.2
Net Change	-13.0M	-2.4M

The decrease in the cumulative cost and schedule variances are also due to the re-baselining effort conducted by TRW and AT&T during FY88.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 100% (Program Terminated)

(2) Percent Program Cost Appropriated: 100% (Program Terminated)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY83-88)	Budget Year (FY89)	Balance FYDP	To Complete Beyond FYDP	Total
O&M	44.7	0.0	0.0	0.0	44.7
RDT&E	78.2	0.0	0.0	0.0	78.2
Procurement	1.9	0.0	0.0	0.0	1.9
MILCON	13.9	0.0	0.0	0.0	13.9
Total	138.7	0.0	0.0	0.0	138.7

FY88 is last year for appropriations.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary — Total Program

Fiscal Year	Qty	FY85 Base-Year Dollars: Flyaway Nonrec	FY85 Base-Year Dollars: Flyaway Rec	FY85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: O&M								
1983				0.4			0.4	4.9
1984				1.6			1.6	3.8
1985				41.2			41.7	3.6
1986				0.0			0.0	N/A
1987				0.0			0.0	N/A
1988				0.9			1.0	3.7
Subtotal				44.1			44.7	
Appropriation: RDT&E								
1983				0.0			0.0	N/A
1984				0.0			0.0	N/A
1985				0.0			0.0	N/A
1986				23.5			24.5	2.8
1987				48.6			52.4	2.7
1988				1.2			1.3	3.7
Subtotal				73.3			78.2	
Appropriation: Procurement								
1986	0	1.6		1.6			1.7	2.8
1987	0	0.0		0.0			0.0	N/A
1988	0	0.0		0.2			0.2	3.7
Subtotal	0	1.6	0.0	1.8			1.9	
Appropriation: MILCON								
1988				12.0			13.9	3.7
Subtotal				12.0			13.9	
Total	0		0.0	131.2			138.7	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- Air Force

Fiscal Year	Qty	FY85 Base-Year Dollars: Flyaway Nonrec	FY85 Base-Year Dollars: Flyaway Rec	FY85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: O&M								
1983				0.4			0.4	4.9
1984				1.6			1.6	3.8
1985				41.2			41.7	3.4
1986				0.0			0.0	N/A
1987				0.0			0.0	N/A
1988				0.8			0.9	3.7
Subtotal				44.0			44.6	
Appropriation: RDT&E								
1983				0.0			0.0	N/A
1984				0.0			0.0	N/A
1985				0.0			0.0	N/A
1986				23.5			24.5	2.8
1987				48.6			52.4	2.7
1988				1.2			1.3	3.7
Subtotal				73.3			78.2	
Appropriation: Procurement								
1986	0	1.6	0.0	1.6			1.7	2.8
1987	0	0.0	0.0	0.0			0.0	N/A
1988	0	0.0	0.0	0.0			0.0	N/A
Subtotal	0	1.6	0.0	1.6			1.7	
Appropriation: MILCON								
1988	0			10.9			12.6	3.7
Subtotal	0		0.0	10.9			12.6	
Total	0		0.0	130.8			137.1	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- Army

Fiscal Year	Qty	FY85 Base-Year Dollars: Flyaway Nonrec	FY85 Base-Year Dollars: Flyaway Rec	FY85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: O&M								
1983				0.0			0.0	N/A
1984				0.0			0.0	N/A
1985				0.0			0.0	N/A
1986				0.0			0.0	N/A
1987				0.0			0.0	N/A
Subtotal				0.0			0.0	
Appropriation: Procurement								
1986	0			0.0			0.0	N/A
1987	0			0.0			0.0	N/A
1988	0			0.0			0.0	N/A
Subtotal	0			0.0			0.0	
Appropriation: MILCON								
1988				0.4			0.5	3.7
Subtotal				0.4			0.5	
Total	0			0.4			0.5	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- Navy

Fiscal Year	Qty	FY85 Base-Year Dollars: Flyaway Nonrec	FY85 Base-Year Dollars: Flyaway Rec	FY85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: O&M								
1983				0.0			0.0	N/A
1984				0.0			0.0	N/A
1985				0.0			0.0	N/A
1986				0.0			0.0	N/A
1987				0.0			0.0	N/A
1988				0.0			0.0	N/A
Subtotal				0.0			0.0	
Appropriation: Procurement								
1986	0			0.0			0.0	N/A
1987	0			0.0			0.0	N/A
1988	0			0.2			0.2	3.7
Subtotal	0			0.2			0.2	
Appropriation: MILCON								
1988				0.0			0.0	N/A
Subtotal				0.0			0.0	
Total	0			0.2			0.2	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- DLA

Fiscal Year	Qty	FY85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: O&M								
1983				0.0			0.0	N/A
1984				0.0			0.0	N/A
1985				0.0			0.0	N/A
1986				0.0			0.0	N/A
1987				0.0			0.0	N/A
1988				0.1			0.1	3.7
Subtotal				0.1			0.1	
Appropriation: Procurement								
1986				0.0			0.0	N/A
1987				0.0			0.0	N/A
1988				0.0			0.0	N/A
Subtotal				0.0			0.0	
Appropriation: MILCON								
1988				0.0			0.0	N/A
Subtotal				0.0			0.0	
Total				0.1			0.1	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- NSA

Fiscal Year	Qty	FY85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: O&M								
1983				0.0			0.0	N/A
1984				0.0			0.0	N/A
1985				0.0			0.0	N/A
1986				0.0			0.0	N/A
1987				0.0			0.0	N/A
1988				0.0			0.0	N/A
Subtotal				0.0			0.0	
Appropriation: Procurement								
1986	0			0.0			0.0	N/A
1987	0			0.0			0.0	N/A
1988	0			0.0			0.0	N/A
Subtotal	0			0.0			0.0	
Appropriation: MILCON								
1988				0.7			0.8	3.7
Subtotal				0.7			0.8	
Total	0			0.7			0.8	

16. Program Funding Summary (Cont'd):

d. Obligations and Expenditures —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated1/	Expended1/
Appropriation: O&M			
1983	0.4	0.4	0.4
1984	1.6	1.6	1.6
1985	41.7	41.7	41.7
1988	1.0	0.0	0.0
To Complete	0.0	N/A	N/A
Total	44.7	43.7	43.7
Appropriation: RDT&E			
1986	24.5	24.5	11.4
1987	52.4	47.5	2.3
1988	1.3	0.2	0.2
To Complete	0.0	N/A	N/A
Total	78.2	72.2	13.8
Appropriation: Procurement			
1986	1.7	0.2	0.2
1987	0.0	0.0	0.0
1988	0.2	0.0	0.0
To Complete	0.0	N/A	N/A
Total	1.9	0.2	0.2
Appropriation: MILCON			
1988	13.9	0.0	0.0
To Complete	0.0	N/A	N/A
Total	13.9	0.0	0.0

17. Production Rate Data: Not applicable since program was terminated before any units were produced or delivered.

18. Operating and Support Costs: Not Applicable.

1/Reflects Program Office records as of 18 February 88.

(3) ~~CONFIDENTIAL~~ SAR-87-004

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

N-13 E-2C PROGRAM: E-2C

AS OF DATE: December 31, 1987

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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

PM: CAPT H.E. Seligson
Assigned: June 15, 1984
AUTOVON 222-3251, (202)692-3251

4. (U) Program Elements:

RDT&E: PE 0204152N
PROCUREMENT: APPN 1506 ICN 0195 PE 24152N, 24156N
MILCON: PE 24611N

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OASD(PA) DFOISR 88-T-0956

5. (U) Related Programs: C-2A Greyhound
Improved Engine (PE 64252N)

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 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 radar and ALR-73 Passive Detection Systems which allow E-2C to detect emitters/targets even during periods of radar silence. E-2C replaces E-1B and E-2B Airborne Early Warning (AEW) aircraft.

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. E-2C satisfies the mission needs.

b. Significant Developments Since Last Report -- OPTEVFOR evaluation report of OT-IIA 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. Recommends release of long lead funding and non-recurring APN funding.

DT-IID/OT-IIB series testing for UDP Group I APS-139 was completed on 21 Dec 87 with the following results:

1. UDP GP I is potentially operationally effective
2. UDP GP I is potentially operationally suitable
3. UDP GP I is recommended for continued limited production

c. Changes Since "As Of" Date -- None

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no DCP threshold breaches.

9. (U) Schedule:

a. Milestone:

	Production Estimate/ Approved Programs	Current Estimate
Project Initiated (Letter Contract)	Jun 1968/Jun 1968	Jun 1968
Definitized Contract Executed (R&D)	May 1969/Sep 1970 CH-1	Sep 1970
Production Contract Award	Oct 1970/Sep 1971 CH-1	Sep 1971
Navy Preliminary Evaluation I (Commenced)	Jan 1972/Feb 1972 CH-1	Feb 1972
First Flight of Production Airplane	May 1972/Sep 1972 CH-1	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	CH-1	Jan 1973
Board of Inspection and Survey (Commenced)	Feb 1973/Apr 1973	CH-1	Apr 1973
Fleet Introduction	Apr 1973/May 1973	CH-1	May 1973
Board of Inspection and Survey (Completed)	Mar 1973/Nov 1973	CH-1	Nov 1973
Initial Operational Capability	Nov 1973/Feb 1974	CH-1	Feb 1974
Navy Support Date	Nov 1974/Dec 1975	CH-1	Dec 1975
First Production AN/APS-125 ARPS	Dec 1976/Nov 1976	CH-1	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	CH-1	Jun 1983
High Speed Processor (Prod. Delivery)	Apr 1987/Apr 1987		Apr 1987
APS-139 Radar (Prod. Delivery)	Feb 1988/Feb 1988		Apr 1988 CH-2

b. Previous Change Explanations -- None

c. Current Change Explanations
CH-1 DAE Baseline dated 17 Feb 1988
CH-2 Production Slip

d. (U) References --

Production Estimate: DCP No. 26 Rev I dated 24 June 1971, subject "Development Concept Paper Carrier Based, Airborne Early Warning/Command and Control System (E-2C)" NDCP W0463 dated 28 September 1984, subject "Navy Decision Coordinating Paper for Carrier Based Early Warning Command and Control System (E-2C)"

Approved Program: FY 1988/1989 Amended Biennial Presidential Budget DAE Baseline dated 17 Feb 1988

10. (U) Technical/Operational Characteristics:

a. (U) Technical	Production Estimate/ Approved Programs		Demonstrated Performance	Current Estimate
Take off weight	51,535/51,878	CH-1	51,878	51,878
Length/Span	56'4"-80'7"/57'6"-80'7"	CH-1	57'6"-80'7"	57'6"-80'7"
Engine Number/Type	2-T56-A-8A/2-T56-A-425	CH-1	2-T56-A-425	2-T56-A-425
Crew	5/5 5	CH-1	5	5
b. (U) Operational				
(U) Speed (KIAS)				
(1) Max Speed @ 13,500' (KIAS)	315/315		N.A.	315

10. (U) Technical/Operational Characteristics (Cont'd):

	(2) Cruise Speed @ 24,450'	270/270	N.A.	270
(U)	Time on Station @ 200 NM (Hrs)	4.0/4.0	3.5	4.0
(U)	Service Ceiling (Ft)	28,100/28,100	N.A.	28,100
(U)	Radar Detection Range (AN/APS-120)			

(b)(1)

(U)	Passive Detection System			

(b)(1)

(U)	(2) azimuth	360 deg/360 deg	360 deg	360 deg
(U)	Radar detection range (AN/APS-138/9 with TRAC-A antenna)			

(b)(1)

(U)	Systems Accuracy (CEP to Target at 200 NM range) (NM)	1.5/1.5	1.5	1.5

Note: All detection parameters based on 50% probability of detection point.

c. Previous Changes Explanations -- None

d. Current Changes Explanations
CH-1 DAE Baseline dated 17 Feb 1988

10. (U) Technical/Operational Characteristics (Cont'd):

e. 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 28 September 1984, subject "Navy Decision Coordinating Paper for Carrier Based Early Warning Command and Control System (E-2C)"

Approved Program: FY 1988/1989 Amended Biennial Presidential Budget DAE Baseline dated 17 Feb 1988

	Production Estimate	Changes	Current Estimate
a. Cost —			
Development (RDT&E)	$ 655.7	$ + 79.3	$ 735.0
Procurement	4739.2	+784.1	5523.3
Airframe & Changes	(2967.3)	(+582.9)	(3550.2)
Engine & Accessories	(142.0)	(+ 72.1)	(214.1)
Electronics	(110.0)	(+ 14.7)	(124.7)
Armament & Other GFE	(13.7)	(+ 0.3)	(14.0)
Total Flyaway	(3233.0)	(+670.0)	(3903.0)
Other Wpn Sys Cost	(1183.4)	(+121.1)	(1304.5)
Initial Spares	(322.8)	(- 7.0)	(315.8)
Construction (MILCON)	3.1	- 0.7	2.4
Total FY 85 Base-Year $	5398.0	+862.7	6260.7
Escalation	523.5	+ 40.1	563.6
Development (RDT&E)	(50.3)	(+ 21.7)	(72.0)
Procurement	(473.1)	(+ 18.5)	(491.6)
Construction (MILCON)	(0.1)	(- 0.1)	0.0
Total Then-Year $	$ 5921.5	$ +902.8	$ 6824.3
b. Quantities —			
Development (RDT&E)	2	-	2
Procurement	125	+ 16	141
Total	127	+ 16	143
c. Unit Cost —			
Procurement:			
FY 85 Base-Year $	$ 37.9	$ + 1.3	$ 39.2
Then-Year $	41.7	+ 1.0	42.7
Program:			
FY 85 Base-Year $	42.5	+ 1.3	43.8
Then-Year $	$ 46.6	$ + 1.1	$ 47.7

11. (U) Program Acquisition Cost (Cont'd) (Current Estimated in Millions of Dollars)

d. Approved Design to Cost Goal -- Not applicable

e. Foreign Military Sales -- Sales to date are 4 for Israel for a total of $157.8M; 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 $364.5M.

f. Nuclear Costs -- None

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then Year) Dollars in Millions)

	Current Year		Budget Year
	SAR Current Estimate Dec 1987	UCR Baseline Estimate Dec 1986	UCR Baseline Estimate Dec 1987
a. Program Acquisition --			
(1) Cost	6824.3	6825.9	6824.3
(2) Quantity	143	143	143
(3) Unit Cost	47.7	47.7	47.7
	FY 1988 Appropriation Act		
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	394.7	394.7	354.9
Less CY Adv Proc	30.0	30.0	30.9
Plus PY Adv Proc	21.4	21.4	30.0
Net Total	386.1	386.1	354.0
(2) Quantity	6	6	6
(3) Unit Cost	64.350	64.350	59.000

13. (U) Cost Variance Analysis:

a. Summary — (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Production Estimate	706.0	5212.3	3.2	5921.5
Previous Changes:				
Economic	- 8.6	-121.7		-130.3
Quantity	—	+622.7	—	+622.7
Schedule	—	—	—	—
Engineering	+ 24.6	—	—	+ 24.6
Estimating	+ 99.3	+185.9	—	+285.2
Other	—	—	—	—
Support	—	+103.0	-.8	+102.2
Subtotal	+115.3	+789.9	-.8	+904.4
Current Changes:				
Economic	+ 3.9	+ 21.1	—	+ 25.0
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	+ 14.8	—	+ 14.8
Estimating	- 18.2	- 50.7	—	- 68.9
Other	—	—	—	—
Support	—	+ 27.5	—	+ 27.5
Subtotal	- 14.3	+ 12.7	—	- 1.6
Total Changes	+ 101.0	+802.6	-.8	+902.8
Current Estimate	807.0	6014.9	2.4	6824.3

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:				
Economic	—	—	—	—
Quantity	—	+534.3	—	+ 534.3
Schedule	—	—	—	—
Engineering	+ 49.8	—	—	+ 49.8
Estimating	+ 46.1	+171.2	—	+ 217.3
Other	—	—	—	—
Support	—	+ 98.3	- 0.7	+ 97.6
Subtotal	+ 95.9	+803.8	- 0.7	+ 899.0
Current Changes:				
Economic	—	—	—	—
Quantity		—	—	—
Schedule	—	—	—	—
Engineering	—	+ 11.9	—	+ 11.9
Estimating	- 16.6	- 42.0	—	- 58.6
Other	—	—	—	—
Support	—	+ 10.4	—	+ 10.4
Subtotal	- 16.6	- 19.7	—	- 36.3
Total Changes	+ 79.3	+784.1	- 0.7	+ 862.7
Current Estimate	735.0	5523.3	2.4	6260.7

b. Previous Change Explanations — Change due to quantity, engineering, estimating and support costs.

c. Current Change Explanations —

	(Dollars in Millions) Base Year	Then Year
1. RDT&E		
Estimating	-16.6	- 18.2
Current (Economics) Change due to different indices from last year.		+ 3.9

13. (U) Cost Variance Analysis (Cont'd):
(FY 1985 Constant Dollars (Base Year) in Millions)

	(Dollars in Millions) Base Year	Then Year
2. Procurement		
Revised escalation (Economic)	N/A	+21.1
Revised estimate of support costs (Support)	+ 10.4	+ 27.5
Repricing of A/C and GFE requirements (Estimating)	- 42.0	- 50.7
Engineering changes due to new ECP's	+ 11.9	+ 14.8
3. MILCON	—	—

d. 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 28 September 1984, subject "Navy Decision Coordinating Paper for Carrier Based Early Warning Command and Control System (E-2C)"

Approved Program: FY 1988/1989 Amended Biennial Presidential Budget DAE Baseline dated 17 Feb 1988

14. (U) Program Acquisition Unit Cost (PAUC) History:

a. Initial SAR Estimate to Current Baseline Estimate

(1) Same as Current Baseline Estimate

b. Current Baseline Estimate to Current Estimate —

PAUC (PdE)	Changes (Then Year Dollars in Millions)								PAUC (CE)
	ECON	QTY	SCH	ENG	EST	SUP	OTHER	TOTAL	
46.6	-.7	-.9	—	+.3	+1.5	+.9	—	+1.1	47.7

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. Procurement --

Airframe	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corporation N00019-85-C-0094 FFP 30 June 1986	$307.0	N/A	6

Current Contract Price Target	Ceiling	Qty	Estimate Price At Completion Contractor	Program Manager
$313.2	N/A	6	$313.2	$313.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	-0-	-0-
Cumulative Variances to Date	-0-	-0-
Net Change	-0-	-0-

Airframe	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corporation N00019-86-C-0096 FFP 31 July 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-

15. (U) Contract Information (Cont'd):

b. RDT&E —

Radar	Initial Contract Price Target	Ceiling	Qty
Grumman Aerospace Corporation N00019-86-C-0356 FPIS 09 Jan 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-

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status —

(1) Percent Program Completed: 84.0% (21 yrs/25 yrs)

(2) Percent Program Cost Appropriated: 70.2% ($4787.6/$6824.3)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY82-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93)	Total
RDT&E	452.6	23.1	331.3	-	807.0
Procurement	4332.6	354.9	1327.4	-	6014.9
MILCON	2.4	-	-	-	2.4
Total	4787.6	378.0	1658.7	-	6824.3

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary --

Fiscal Year	Qty	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation: RDT&E								
1970	2	--	--	161.0	--	--	161.0	5.5
1972	--	--	--	30.8	--	--	30.8	4.6
1973	--	--	--	15.9	--	--	15.9	4.4
1974	--	--	--	0.1	--	--	0.1	8.0
1975	--	--	--	0.0	--	--	0.0	10.9
1976	--	--	--	0.0	--	--	0.0	6.6
197T	--	--	--	0.0	--	--	0.0	2.9
1977	--	--	--	0.0	--	--	0.0	2.6
1978	--	--	--	0.0	--	--	0.0	6.8
1979	--	--	--	5.5	--	--	5.5	8.4
1980	--	--	--	11.1	--	--	11.1	10.6
1981	--	--	--	19.0	--	--	19.0	10.6
1982	--	--	--	17.7	--	--	17.7	7.6
1983	--	--	--	40.5	--	--	40.5	4.9
1984	--	--	--	40.6	--	--	40.6	3.8
1985	--	--	--	33.9	--	--	34.4	3.4
1986	--	--	--	21.2	--	--	22.1	2.8
1987	--	--	--	30.5	--	--	32.8	2.7
1988	--	--	--	18.9	--	--	21.1	3.7
1989	--	--	--	19.9	--	--	23.1	3.8
1990	--	--	--	83.1	--	--	99.5	3.6
1991	--	--	--	88.9	--	--	109.7	3.3
1992	--	--	--	96.4	--	--	122.1	2.8
TOTAL	2	--	--	735.0	--	--	807.0	

16. (U) Program Funding Summary (Cont'd): (Current Estimated in Millions of Dollars)

c. Annual Summary —

Fiscal Year	Qty	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
				Appropriation: Procurement				
1970	11	—	—	48.8	43.7	—	48.8	3.9
1972	9	—	190.7	275.0	16.5	43.7	275.0	3.8
1973	—	—	104.7	157.6	18.2	16.5	157.6	4.2
1974	8	—	127.3	161.4	1.5	18.2	161.4	5.8
1975	6	—	102.5	129.2	7.7	1.5	129.2	8.8
1976	6	1.0	100.1	160.9	8.4	7.7	160.9	6.6
197T	1	—	16.8	23.0	6.9	3.7	23.0	3.6
1977	6	—	107.9	156.5	10.6	11.6	156.5	3.8
1978	6	—	132.4	193.7	10.6	10.6	193.7	6.8
1979	6	9.4	140.6	207.3	16.3	10.6	207.3	8.7
1980	6	—	159.6	199.2	17.6	16.3	199.2	11.8
1981	6	21.6	152.0	235.3	20.1	17.6	235.3	11.6
1982	6	1.2	192.7	254.5	21.2	20.1	254.5	14.3
1983	6	0.0	187.3	291.6	24.7	21.2	291.6	9.0
1984	6	0.0	195.4	319.6	25.4	24.7	319.6	8.0
1985	6	30.1	186.7	312.2	28.2	25.4	328.8	3.4
1986	6	26.8	183.9	311.6	26.9	28.2	338.3	2.8
1987	10	22.3	342.8	406.9	21.4	26.9	457.2	2.7
1988	6	28.2	230.3	339.1	30.0	21.4	394.7	3.7
1989	6	—	221.8	294.8	30.9	30.0	354.9	3.8
1990	6	19.0	230.0	358.0	32.5	30.9	443.5	3.6
1991	6	—	225.3	342.0	33.3	32.5	434.8	3.3
1992	6	—	212.6	345.1	—	33.3	449.1	2.8
TOTAL	141	159.6	3743.4	5523.3	452.6	452.6	6014.9	
				Appropriation: MILCON				
85 & Prior	—	—	—	2.4	—	—	2.4	—
TOTAL				2.4			2.4	

59.60 rad

16. (U) Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
		Appropriation: RDT&E	
1983 & Prior	301.6	301.6	301.6
1984	40.6	40.5	42.3
1985	34.4	33.7	33.7
1986	22.1	22.0	19.6
1987	32.8	32.9	17.6
1988	21.1	5.9	0.1
To Complete	354.4	N/A	N/A
TOTAL	807.0	436.6	414.9
		Appropriation: Procurement	
1983 & Prior	2494.0	2494.0	2494.0
1984	319.6	319.6	287.4
1985	328.8	325.9	275.4
1986	338.3	335.6	254.9
1987	457.2	421.2	145.0
1988	394.7	12.8	0.0
To Complete	1682.3	N/A	N/A
TOTAL	6014.9	3909.1	3456.7
		Appropriation: MILCON	
1982 & Prior	2.4	2.4	2.4
1983	--	--	--
1984	--	--	--
1985	--	--	--
1986	--	--	--
1987	--	--	--
To Complete	--	N/A	N/A
TOTAL	2.4	2.4	2.4

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. Tooling presently at Grumman allows for production of six E-2C's, eight C-2A's, and four FMS customers.

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Economic	Maximum Estimate
1987	N/A	10	10	18
1988	N/A	6	6	18
1989	N/A	6	6	18
1990	N/A	6	6	18
1991	N/A	6	6	18
1992	N/A	6	6	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	+ 862.7	6260.7	--	6260.7
	(TY $)	5921.5	+ 902.8	6824.3	--	6824.3
PAUC	(BY $)	42.5	+ 1.3	43.8	--	43.8
	(TY $)	46.6	+ 1.1	47.7	--	47.7

c. 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)	6/86	N/A	6/86	N/A	6/86
Duration (in Months)	98	N/A	98	N/A	98
End Date (Mo/Yr)	8/94	N/A	8/94	N/A	8/94

d. Deliveries (Plan/Actual) --

	To Date
RDT&E	2/2
Procurement	99/99

18. (U) Operating and Support Costs: N/A

(2)

SAR-87-111

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)

PROGRAM: BATTLESHIP REACTIVATION

N-7 BATT REACT

AS OF DATE: December 31, 1987

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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-313B1)
Naval Sea Systems Command
Washington, DC 20362-5101

PM: CAPT Dennis Doyle
Assigned: Oct 15, 1985
(202)692-0554 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-1873

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 -- The USS MISSOURI completed her PSA in May 1987.

c. Changes Since "As Of" Date -- None

8. Decision Coordinating Paper (DCP) Threshold Breaches: N/A

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(Ch-1)

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.

c. Current Change Explanations: Ch-1 - The estimated delivery date of WISCONSIN changed from Aug 88 to Oct 88 due to increased scope in boiler repairs.

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 1988/89 Amended Biennial Budget

10. Technical/Operational Characteristics:

a. Technical	Prod Estimate/ Appr Program*	Demonstrated Performance	Current Estimate
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-15 MOD-4	MK-15 MOD-4
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**

NOTES

* 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.

d. Current Change Explanations -- None

10. Technical/Operational Characteristics (Cont'd):

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 1988/89 Amended Biennial Budget

11. Program Acquisition Cost: (In Millions of Dollars)

	Production Estimate (FY81-88)	Changes	Current Estimate (FY81-89)
a. Cost —			
Development	19.4	+2.1	21.5
Procurement	1,457.3	+73.5	1,530.8
Basic Ship	(696.4)	(+173.2)	(869.6)
GFE	(532.2)	(-10.3)	(521.9)
Other	(148.4)	(-130.3)	(18.1)
Subtotal Procurement	(1,377.0)	(+32.6)	(1,409.6)
Outfitting/Post Delivery	(80.3)	(+29.5)	(109.8)
Battle Spares	--	(+11.4)	(11.4)
Construction	--	--	--
Total FY82 Base-Year $	1,476.7	+75.6	1,552.3
Escalation	399.9	-188.9	211.0
Development	(1.9)	(-.2)	(1.7)
Procurement	(398.0)	(-188.7)	(209.3)
Construction	--	--	--
Total Then-Year $	1,876.6	-113.3	1,763.3
b. Quantities —			
Development	-	-	-
Procurement	4	-	4
Total	4	-	4
c. Unit Cost —			
Procurement:			
FY82 Base-Year $	364.325	+18.375	382.700
Then-Year $	463.825	-28.800	435.025
Program:			
FY82 Base-Year $	369.175	+18.900	388.075
Then-Year $	469.150	-28.325	440.825

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

			Current Year		Budget Year
			Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a.	Program Acquisition				
	(1) Cost		1,763.3	1,789.4	1,763.3
	(2) Quantity		4	4	4
	(3) Unit Cost		440.825	447.350	440.825
b.	Current Procurement		(FY 1988)	(FY 1988)	(FY 1989)
	(1) Cost		26.9	26.9	2.2
	Less CY Adv Proc	-	-	-	-
	Plus PY Adv Proc	+	-	-	-
	Less OF/PD	-	26.9	26.9	2.2
	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	-193.1	-	-193.6
Quantity	-	-	-	-
Schedule	+4.3	+127.9	-	+132.2
Engineering	-	-	-	-
Estimating	-1.9	-23.9	-	-25.8
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+1.9	-89.1	-	-87.2
Current Changes:				
Economic	-	-4.4	-	-4.4
Quantity	-	-	-	-
Schedule	-	+5.2	-	+5.2
Engineering	-	-	-	-
Estimating	-	-40.5	-	-40.5
Other	-	-	-	-
Support	-	+13.6	-	+13.6
Subtotal	-	-26.1	-	-26.1
Total Changes	+1.9	-115.2	-	-113.3
Current Estimate	23.2	1,740.1	-	1,763.3

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	+97.7	-	+101.2
Engineering	-	-	-	-
Estimating	-1.4	-5.3	-	-6.7
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+2.1	+92.4	-	+94.5
Current Changes:				
Quantity	-	-	-	-
Schedule	-	+4.3	-	+4.3
Engineering	-	-	-	-
Estimating	-	-34.6	-	-34.6
Other	-	-	-	-
Support	-	+11.4	-	+11.4
Subtotal	-	-18.9	-	-18.9
Total Changes	+2.1	+73.5	-	+75.6
Current Estimate	21.5	1,530.8	-	1,552.3

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
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

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	-	-4.4
Schedule: Reflects the later planned delivery of WISCONSIN (BB-64)	+4.3	+5.2
Estimating: Decrease reflects Congressional reduction on the USS MISSOURI (BB-63) (17.2M Then YR $) and refined estimates	-34.6	-40.5
Support: Reflects procurement of selected equipments as Battle Spares	+11.4	+13.6

d. References --

Production Estimate: CNM Memo Ser 00/0547 of 8 Jun 1981, COMNAVSEASYSCOM, "Reactivation of NEW JERSEY (BB62)"

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	-49.500	-	+34.350	-	-16.575	+3.400	-	-28.325	440.825

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- N/A

b. Procurement --

WISCONSIN:

	Initial Contract Price		
Litton Systems Inc., Ingalls Shipbuilding Div. N00024-86-C-2043, FPPI, Award: July 1986*	Target	Ceiling	Qty
	210.3	N/A**	1

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Mgr
235.5	N/A**	1	263.0	264.5

* 1.0M planning contract awarded in June 1986
** Contract is firm fixed price, therefore Ceiling Price is not applicable.

15. Contract Information (Cont'd)

	Cost Var	Schedule Var
Previous Cumulative Variances	-	-
Cumulative Variances To Date	-	-
Net Change	-	-

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: 89% (8 of 9 years)
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 99.9% ($1,761.1/$1,763.3)
(Funds Appropriated To Date in Millions/Total Program Funding in Millions)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY81-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-93)	Balance To Complete Beyond FYDP (FY94)	Total
RDT&E	23.2	-	-	-	23.2
Procurement	1,737.9	2.2	-	-	1,740.1
Total	1,761.1	2.2	-	-	1,763.3

c. Annual Summary --

Fiscal Year	Qty	FY 82 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1981				3.2			3.1	10.61
1982				3.8			3.9	7.60
1983				5.3			5.7	4.90
1984				2.9			3.2	3.80
1985				4.3			4.9	3.40
1986				2.0			2.4	2.80
Subtotal				21.5			23.2	

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary —

Fiscal Year	Qty	FY 82 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement-SCN								
1981			83.2	83.2	88.1		88.1	9.60
1982	1		294.0	301.0	93.6	88.1	328.4	7.50
1983	1		270.6	304.8	37.9	85.9	338.2	3.80
1984	1		393.3	399.6	7.1		453.6	3.60
1985				11.2	13.0		13.0	2.10
1986	1		368.5	401.0	25.3		480.6	2.8
1987				7.3	9.1		9.1	2.7
1988				21.0	26.9		26.9	3.70
1989				1.7	2.2		2.2	3.80
1990								3.60
Subtotal	4		1,409.6	1,530.8	303.2	174.0	1,740.1	

d. Obligations and Expenditures —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1981	3.1	3.1	3.0
1982	3.9	3.7	3.5
1983	5.7	5.6	5.4
1984	3.2	3.2	3.1
1985	4.9	4.9	4.0
1986	2.4	2.1	2.1
To Complete	-	N/A	N/A
Total	23.2	22.6	21.1
Appropriation: Procurement-SCN			
1981	88.1	88.1	86.7
1982	328.4	328.3	318.8
1983	338.2	336.6	324.4
1984	453.6	443.8	429.7
1985	13.0	13.0	13.0
1986	480.6	377.6	235.5
1987	9.1	9.1	4.6
To Complete	29.1	0.0	0.0
Total	1,740.1	1,596.5	1,412.7

17. Production Rate Data: N/A

18. Operating and Support Costs: N/A

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)

PROGRAM: FORWARD AREA AIR DEFENSE SYSTEM (FAADS)
FORWARD AREA AIR DEFENSE COMMAND, CONTROL, AND INTELLIGENCE (FAAD C2I)

87-028

A-9 FAADS C²I

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name): Forward Area Air Defense System (FAADS) Forward Area Air Defense Command, Control, and Intelligence (FAAD C2I).

2. DOD Component: Department of the Army.

3. Responsible Office and Telephone Number:

Project Manager
Air Defense Command Interoperability Systems
Project Office
Redstone Arsenal, AL 35898-5600

COL Kenneth N. Brown
ASSIGNED: September 3, 1985
AUTOVON: 742-3442
COMMERCIAL: (205) 895-3442

4. Program Elements/Procurement Line Items:

RDT&E:
- PE 63740 Project 464 (Aerial Sensor)
- PE 63740 Project 593 (FAAD C2) -- *Sunk*
- PE 63706 Project 243 (Positive Hostile ID) (Shared Funding) -- *Sunk*
- PE 64741 Project 126 (FAAD C2 Ground Sensor)
- PE 64741 Project 421 (Aerial Sensor)
- PE 64709 Project 355 (Positive Hostile ID) (Shared Funding)
- PE 64709 Project 530 (Coop IFF) (Shared Funding)

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AS AMENDED

No SECURITY Objection
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07 MAR 1988

OASD(PA) DFOISR 88-T-0774

4. Program Elements/Procurement Line Items (Cont'd):

PROCUREMENT: APPN 2035 SSN AD5050 (FAAD C2/GND)

MILCON: NA

5. Related Programs: Combined Arms, Line of Sight-Forward-Heavy, Line of Sight-Rear, and Non-Line of Sight

6. Mission and Description: The Army has worked with the Office of the Secretary of Defense (OSD) to develop an effective and affordable program to fill the void in the forward area. In January 1986, OSD approved in principle an integrated program to meet the growing air threat to the forward area of the battlefield. The FAADS program integrates weapons, sensors, and command, control and intelligence (C2I) architecture to counter the entire spectrum of the air threat to the forward area through the 90's. The FAADS concept is designed to provide total coverage in the division area and permits the enemy no preferred attack option. The acquisition strategy relies heavily on non-developmental items (NDI) and preplanned product improvements (P3I) to rapidly overcome our current air defense deficiencies and keep pace with the advancing threat. A Cost and Operational Effectiveness Analysis (COEA) is being conducted to assure the optimum mix of weapon characteristics.

The FAADS concept consists of weapons delivery elements tied together by a C2I network which also integrates FAADS into the Army Command and Control System (ACCS) architecture. The C2I initiative incorporates a family of sensors and identification equipment (ground and aerial, active and passive) with improved data processing and distribution capability. The mission will be accomplished through digital processing of target information, improved dissemination of air threat warning and weapon control orders, and the introduction of essential equipment at all echelons to provide data processing and display capabilities with emphasis on the needs of the fire units.

The components of FAADS are not new to air defense. Planning for C2I along with requirements for combined arms initiatives and improved air defense weapons has existed for several years. The FAADS program, using a systems approach, will integrate these relatively independent systems together to defeat the future enemy threat in the forward area. The components will work together to maximize total force effectiveness.

7. Program Highlights:

a. Significant Historical Developments - - SHORAD C2 program was presented to the Army Systems Acquisition Review Council (ASARC) (MDRII) 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:

(1) Full scale development (Build I - Air Defense Operations) of the FAAD C2I system software.

(2) A ground sensor NDI acquisition strategy to procure four test articles in FY 88 to support other FAAD developmental and operational testing, and 13 low rate initial production (LRIP) units in FY 88 and FY 89 to be used for operational test and evaluation, production verification, and initial training.

Aerial sensor decisions will be requested upon completion of the ongoing systems definition phase. Much of the data associated with the balance of the FAADS program remains to be determined (TBD).

The FAADS to include the FAAD C2I component is expected to satisfy mission requirements. Program funding and quantities reflect the FY88/89 President's budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.

b. Changes since "As Of" Date - - None.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There are no threshold breaches of the Decision Coordinating Paper (DCP) dated July 15, 1986.

9. Schedule:

a. Milestones

	Development Estimate/ Approved Program	Current Estimate
(1) C2 Architecture and Ground Based Sensor		
ASARC/JRMB (FSD C2 Build 1 & LRIP Sensor)	Aug 1986/Aug 1986	Aug 1986
FSD C2 Build 1 Contract Award	Sep 1986/Sep 1986	Sep 1986
FSD C2 Build 2 Contract Award	Jun 1988/Jun 1988	Jan 1989 (Ch 1)
LRIP Sensor Contract Award	Jun 1988/Jun 1988	Jan 1990 (Ch 1)
Start System Test/Demo Build 1	Jun 1988/Jun 1989	Oct 1990 (Ch 1)
Complete System Test/Demo Build 1	Jun 1990/Jun 1990	Apr 1991 (Ch 1)
Start System TT/IOTE	Sep 1990/Sep 1990	Jan 1992 (Ch 1)
Complete System TT/IOTE	Jun 1991/Jun 1991	Oct 1992 (Ch 1)
First Unit Equipped (FUE)	Jun 1991/Jun 1991	Jan 1993 (Ch 1)

	Planning Estimate/ Approved Program	Current Estimate
(2) - - - Aerial Sensor		
Start Advanced Development	TBD/Dec 1987	Dec 1987
Complete Advanced Development	TBD/Dec 1990	Dec 1990
(3) - - - NCTR/PHID* Milestone identification separate in compartmented program	TBD/TBD	TBD
(4) - - - ID Friend or Foe (MKXV)	TBD/TBD	TBD

b. Previous Change Explanations - - N/A

c. Current Change Explanations - - (Ch 1) Schedule slip due to delay in availability of government furnished equipment (GFE) and budget reduction.

d. References - -

Development/Planning Estimate: FY 1988-89 President's Budget; DCP dated July 15,1986.
Approved Program: FY 1988-89 Amended President's Budget Submission

* NCTR/PHID - Non Cooperative Target Recognition/Positive Hostile Identification

10. Technical/Operational Characteristics:

a. Technical - -

(1) FAAD C2I - C2 Architecture and Ground Based Sensor

	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
RAM - - FAAD C2			
Sensor MTBOMF	TBD	(b)(1)	
Generator MTBOMF	TBD		
ABMOC or AME or C2 subsystems MTBOMF	TBD		
System Requirements Ao	TBD		
Manpower Threshold	TBD		
MTTR (subsystem)	TBD		
(sensor)	TBD		

(2) FAAD C2I - Aerial Sensor

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
Aerial Sensor	TBD	TBD	TBD
PHID/NCTR	TBD	TBD	TBD
ID Friend or Foe (MKXV)	TBD	TBD	TBD

b. Operational - -

	Development Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(1) FAAD C2I/Ground Based Sensors			
ABMOC/C2 Node, 90% of the time, will be capable of:			
Target Correlation reports true position	within 1 km/within 1 km	TBD	within 1 km
Target Information to fire unit after report entry	within 12 sec /within 12 sec	TBD	within 12 sec
Selection and simultaneous display of air track, ground situation, weapons status and special points of interest	90% / 90%	TBD	90%
(2) FAAD C2I subsystems, 90% of the time will be capable of:			
Air Battle Management Order (ABMO) dissemination to fire unit of:			
Air Defense Warning	within 90 sec / within 90 sec	TBD	within 90 sec
Weapons Control	within 90 sec / within 90 sec	TBD	within 90 sec
State of Alert	within 90 sec / within 90 sec	TBD	within 90 sec
Manual Acknowledgement of ABMO from time of receipt	within 90 sec / within 90 sec	TBD	within 90 sec
(3) FAAD C2I Ground Based Sensor w/ FAAD C2I subsystem will be capable of march order and emplacement 85% of the time	within 30 min / within 30 min	TBD	within 30 min

10. Technical/Operational Characteristics (cont'd):

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(4) Aerial Sensor	TBD	TBD	TBD
(5) Positive Hostile ID	TBD	TBD	TBD
(6) ID Friend or FOE (MKXV)	TBD	TBD	TBD

c. Previous Change Explanations - - None

d. Current Change Explanations - - None

e. References - -

FAAD C2I/ Ground Based Sensors:

Development Estimate: Draft ROC, October 27, 1986 and draft DCP July 15, 1986
Approved Program: Draft ROC, October 27, 1986, and draft DCP, July 15, 1986

PHID/IFF/Aerial Sensors:

Planning Estimate/Approved Program: TBD

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

FAAD C2

a. Cost	Development Estimate	Changes	Current Estimate
Development (RDT&E)	$ 506.1	$ -2.1	$ 504.0
Procurement	783.4	0.0	783.4
Construction (MILCON)	0.0	0.0	0.0
Total FY 87 Base Year $	1289.5	-2.1	1287.4
Escalation	172.6	+41.7	214.3
Development (RDT&E)	(30.3)	(+8.4)	(38.7)
Procurement	(142.3)	(+33.3)	(175.6)
Construction (MILCON)	0.0	0.0	0.0
Total Then Year $	$ 1462.1	$ +39.6	$ 1501.7

1) b. Quantities - -

1) Quantities for FAAD C2I Systems vary in size based on specific mission requirements (i.e. Heavy Division, Light Division, Airborne Division, Air Assault Division, Armored Cavalry Regiment, Corps FAAD Battalion and Training Base). The size variation is relative to the number of components within the system and therefore causes a considerable difference in cost. The quantities procured in each fiscal year consists of 2 or more different size systems. Therefore, a unit of measure is not defined for the FAAD C2I Program.

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars) (cont'd)

1) c. Unit Cost - - N/A

	Development Estimate	Changes	Current Estimate
Procurement:			
FY 87 Base Year $			
Then Year $			
Program:			
FY 87 Base Year $			
Then Year $			

2) d. Approved Design to Cost Goal - - N/A

e. Foreign Military Sales - - None

f. Nuclear Costs - - None

---

3) PHID/IFF/Aerial Sensors

a. Cost - -	Planning Estimate/ Approved Program	Changes	Development Estimate/ Current Estimate
Development (RDT&E):	$ 227.3	-3.3	$ 224.0
Procurement	TBD	-	TBD
Construction (MILCON)	TBD	-	TBD
Total FY87 Base Year $	$ 227.3	-3.3	$ 224.0
Escalation	$ 18.1	14.8	$ 32.9
Development (RDT&E):	$ (18.1)	+14.8	$ (32.9)
Procurement	TBD	-	TBD
Construction (MILCON)	TBD	-	TBD
Total (then Year $)	$ 245.4	11.5	$ 256.9
b. Quantities - -	TBD	TBD	TBD

c. Unit Cost - - TBD

d. Approved Design to Cost Goal - - N/A

e. Foreign Military Sales - - N/A

f. Nuclear Costs - - N/A

1) FAAD C2I Systems vary in size based on specified mission requirements. The size variation is relative to the number of compoments within the system and therefore causes a considerable difference in cost. Software costs cannot be allocated to specific system components. Therefore, a unit of measure is not defined for the FAAD C2I Program.

2) Program is primarily off-the-shelf NDI. See DCP, July 15, 1986.

3) C2 and PHID/IFF/Aerial Sensors costs are separately identified.

12. Program Acquisition/Current Procurement Unit Cost Summary:

FAAD C2	Current Year		Budget Year
	SAR Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition			
(1) Cost	1501.7	1462.1	1501.7
(2) Quantity			
(3) Unit Cost	N/A	N/A	N/A

b. Current Procurement - - N/A

PHID/IFF/Aerial Sensors

NOTE: In accordance with Title 10, U. S. Code 2433, unit cost reporting shall not apply to reports that are limited to development only.

13. Cost Variance Analysis:

FAAD C2

a. Summary - (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	536.4	925.7	1462.1
Previous Changes	-	-	-
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Other	-	-	-
Support	-	-	-
Subtotal	-	-	-
Current Changes	-	-	-
Economic	+7.0	+33.3	+40.3
Quantity	-	-	-
Schedule	-2.2	-	-2.2
Engineering	-	-	-
Estimating	+1.5	-	+1.5
Other	-	-	-
Support	-	-	-
Subtotal	+6.3	+33.3	+39.6
Total Changes	+6.3	+33.3	+39.6
Current Estimate	542.7	959.0	1501.7

13. Cost Variance Analysis (cont'd):

FAAD C2

(FY87 Constant Dollars in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	506.1	783.4	1289.5
Previous Changes	-	-	-
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Other	-	-	-
Support	-	-	-
Subtotal	-	-	-
Current Changes	-	-	-
Economic	-	-	-
Quantity	-	-	-
Schedule	-2.1	-	-2.1
Engineering	-	-	-
Estimating	-	-	-
Other	-	-	-
Support	-	-	-
Subtotal	-2.1	0.0	-2.1
Total Changes	-2.1	0.0	-2.1
Current Estimate	504.0	783.4	1287.4

PHID//IFF/Aerial Sensor

a. Summary (Current (Then-Year) Dollars in Millions) - -

	RDT&E	PROC	TOTAL
Planning Estimate	245.4	TBD	245.4
Previous Changes	-	-	-
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Support	-	-	-
Subtotal	-	-	-
Current Changes	-	-	-
Economic	+8.0	-	+8.0
Quantity	-	-	-
Schedule	-13.9	-	-13.9
Engineering	-	-	-
Estimating	+17.4	-	+17.4
Support	-	-	-
Subtotal	+11.5	-	+11.5
Total Changes	+11.5	-	+11.5
Development Estimate	256.9	TBD	256.9

PHID//IFF/Aerial Sensor (cont'd)

(FY87 Constant Dollars in Millions)

	RDT&E	PROC	TOTAL
Planning Estimate	227.3	TBD	227.3
Previous Changes	-	-	-
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Support	-	-	-
Subtotal	-	-	-
Current Changes	-	-	-
Economic		-	
Quantity	-	-	-
Schedule	-13.5	-	-13.5
Engineering	-	-	-
Estimating	+10.2	-	+10.2
Support	-	-	-
Subtotal	-3.3	-	-3.3
Total Changes	-3.3	-	-3.3
Current Estimate	224.0	TBD	224.0

Total FAAD C2I

a. Summary (Current (Then-Year)Dollars in Millions)

	RDT&E	PROC	TOTAL
Dev/~~Planning~~ Estimate	781.8	925.7	1707.5
Previous Changes	-	-	-
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Support	-	-	-
Subtotal	-	-	-
Current Changes	-	-	-
Economic	+15.0	+33.3	+48.3
Quantity	-	-	-
Schedule	-16.1	-	-16.1
Engineering	-	-	-
Estimating	+18.9	-	+18.9
Support	-	-	-
Subtotal	+17.8	+33.3	+51.1
Total Changes	+17.8	+33.3	+51.1
~~Dev/~~Current Estimate	799.6	959.0	1758.6

Total FAADC2I

(FY87 Constant Dollars in Millions)

	RDT&E	PROC	TOTAL
Development Estimate	733.4	783.4	1516.8
Previous Changes	-	-	-
Economic	-	-	-
Quantity	-	-	-
Schedule	-	-	-
Engineering	-	-	-
Estimating	-	-	-
Support	-	-	-
Subtotal	-	-	-
Current Changes	-	-	-
Economic	-	-	-
Quantity	-	-	-
Schedule	-15.6	-	-15.6
Engineering	-	-	-
Estimating	+10.2	-	+10.2
Support	-	-	-
Subtotal	-5.4	-	-5.4
Total Changes	-5.4	-	-5.4
Current Estimate	728.0	783.4	1511.4

b. Previous Change Explanations - - N/A

c. Current Change Explanations - -

(Dollars in Millions)

RDT&E	Base Year	Then Year
Revised escalation indices (Economic)	-	+15.0
Revised estimate (Estimating)	+10.2	+13.9
Schedule adjustment (Schedule)	-15.6	-16.1

PROCUREMENT		
Revised escalation incides (Economic)	0.0	+33.3

d. References - - FAAD C2

Development Estimate: SDDM, August 14, 1986; FY 88-89 President's Budget
Current Estimate: FY 89 Amended President's Budget Submission

- - PHID/IFF/Aerial Sensors:

Planning Estimate: FY 88-89 President's Budget
Current Estimate: FY 89 Amended President's Budget Submission

14. Program Acquisition Unit Cost (PAUC) History (Millions of Then-Year Dollars):

Current Baseline Estimate to Current Estimate - -

PAUC (Plan Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
TBD	-	-	-	-	-	-	-	-	TBD

15. Contract Information (Then-Year Dollars in Millions):

a. RDT&E - - FAAD C2I / Ground

	Target	Ceiling	Quantity
TRW Defense Systems Group DAAHO1-86-C-A065, CPIF Award: 29 September 1986 Definitized: 29 September 1986 FAAD C2/Ground:	$ 58.1	N/A	N/A

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Quantity	Contractor	Program Manager
$ 82.0	N/A	N/A	$ 82.0	$ 85.3

Previous Cumulative Variances [1]	Cost Variance	Schedule Variance
+23.9	-4.2	-0.4

1). Uses December 1987 CPR data. Variance based on restructured program resulting from late availability of Government Furnished Equipment/Government Furnished Information (GFE/GFI)

16. Program Funding Summary (Current Estimate in Millions of Dollars):

a. Program Status - - FAAD C2 / Ground Based Sensor

(1) Percent Program Completed: 60% (9/15)

(2) Percent Program Cost Appropriated: 14.9% ($224.5/$1,501.7)

- - PHID/IFF/Aerial Sensors

(1) Percent Program Completed: 43% (3/7)

(2) Percent Program Cost Appropriated: 12.5% ($32.0/$256.9)

16. Program Funding Summary (Current Estimate in Millions of Dollars) (cont'd):

b. Appropriation Summary - -

(Then-Year Dollars in Millions)

C2I/Ground Based Sensor	Current & Prior Yrs (FY 80-88)	Budget Year (FY89)	FYDP (FY 90-94)	To Complete	Total
RDT&E	224.5	97.1	221.1	---	542.7
Procurement	---	---	959.0	---	959.0
Total	224.5	97.1	1180.1	---	1501.7
PHID/IFF/Aerial Sensor					
RDT&E	31.9	26.0	199.0	TBD	256.9
Procurement	TBD	TBD	TBD	TBD	TBD
Total	31.9	26.0	199.0	TBD	256.9
Total FAADC2I					
RDT&E	256.4	123.1	420.0	TBD	799.6
Procurement	TBD	TBD	959.0	TBD	959.0
Total	256.4	123.1	1379.1	TBD	1758.6

c. Annual Summary - -

FISCAL YEAR	QTY	FY 87 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESC RATE (%)
		FLYAWAY		TOTAL	ADVANCE PROC		TOTAL	
		NON-REC	REC		DEBIT	CREDIT		
FAAD C2								
Appropriation: RDT&E								
1980				4.0			3.0	5.9
1981				12.3			10.0	6.1
1982				15.2			13.2	7.6
1983				1.1			1.0	4.9
1984				33.2			31.2	3.8
1985				18.7			18.1	3.4
1986				20.2			20.1	2.8
1987				36.6			37.6	2.7
1988				84.8			90.3	3.7
1989				88.1			97.1	3.8
1990				88.1			100.4	3.6
1991				59.3			69.6	3.3
1992				42.4			51.1	-
SUBTOTAL	TBD			504.0			542.7	-

16. Program Funding Summary (Current Estimate in Millions of Dollars) (cont'd):

c. Annual Summary - - (cont'd)

FISCAL YEAR	QTY	FY 87 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESC RATE (%)
		FLYAWAY		TOTAL	ADVANCE PROC		TOTAL	
		NON-REC	REC		DEBIT	CREDIT		
FAAD C2				**Appropriation: Procurement**				
1987				-			-	-
1988				-			-	-
1989				-			-	-
1990				188.5			221.9	3.6
1991				241.2			291.2	3.3
1992				135.2			167.2	2.8
1993				128.3			162.2	2.3
1994				90.2			116.5	2.3
SUBTOTAL	TBD			783.4			959.0	-
TOTAL				1287.4			1501.7	-
PHID/IFF/Aerial Sensors				**Appropriation: RDT&E**				
1986				10.5			10.1	N/A
1987	TBD			4.8			4.9	2.7
1988	TBD			15.9			16.9	3.7
1989	TBD			23.6			26.0	3.8
1990	TBD			63.8			72.7	3.6
1991	TBD			19.6			23.0	3.3
1992	TBD			85.8			103.3	2.8
TO COMP	TBD			TBD			TBD	-
TOTAL	TBD			224.0			256.9	-

Program funding and quantities reflect the FY88/89 President's budget, except as adjusted for FY88 Congressional directive and FY89 amended budget decisions.

16. Program Funding Summary (Current Estimate in Millions of Dollars) (cont'd):

c. Annual Summary - - (cont'd)

FISCAL YEAR	QTY	FY 87 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESC RATE (%)
		FLYAWAY		TOTAL	ADVANCE PROC		TOTAL	
		NON-REC	REC		DEBIT	CREDIT		
TOTAL FAAD C2I				Appropriation: RDT&E				
1980				4.0			3.0	5.9
1981				12.3			10.0	6.1
1982				15.2			13.2	7.6
1983				1.1			1.0	4.9
1984				33.2			31.2	3.8
1985				18.7			18.1	3.4
1986				30.7			30.2	2.8
1987				41.4			42.5	2.7
1988				100.7			107.2	3.7
1989				111.7			123.1	3.8
1990				151.9			173.1	3.6
1991				78.9			92.6	3.3
1992				128.2			154.4	2.8
SUBTOTAL				728.0			799.6	
TOTAL FAAD C2I				Appropriation: Procurement				
1986 & Prior				-			-	-
1987	-			-			-	-
1988	-			-			-	-
1989	-			-			-	-
1990	-			188.5			221.9	3.6
1991	-			241.2			291.2	3.3
1992	-			135.2			167.2	2.8
1993	-			128.3			162.2	2.3
1994	-			90.2			116.7	2.3
TO COMP	-			783.4			959.0	-
TOTAL	-			1287.4			1501.7	-

16. Program Funding Summary (Current Estimate in Millions of Dollars) (cont'd):

d. Obligations and Expenditures - -

FISCAL YEAR	THEN-YEAR DOLLARS (Current Estimate in Millions)		
	Total	Obligated	Expended
FAAD C2			
Appropriation: RDT&E			
1980	3.0	2.9	2.9
1981	10.0	9.9	9.7
1982	13.2	13.1	12.8
1983	1.0	1.0	1.0
1984	31.2	31.2	30.7
1985	18.1	15.5	15.5
1986	20.1	19.6	19.3
1987	37.6	37.6	26.7
To Complete	408.5	N/A	N/A
Total	542.7	130.8	118.6
PHID/IFF/Aerial Sensors			
Appropriation: RDT&E			
1987 & Prior	15.0	8.3	5.0
1988	16.9	4.6	2.4
To Complete	225.0	N/A	N/A
Total	256.9	12.9	7.4

17. Production Rate Data: TBD

18. Operating and Support Costs: N/A

SAR-87-106

UNCLASSIFIED

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

RDT&E-ONLY SAR

CLEARED
FOR OPEN PUBLICATION
MAR 24 1988

PROGRAM: JOINT TACTICAL MISSILE DEFENSE (ATM)

AS OF DATE: December 31, 1987

A-5 ATM

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No SECURITY Objection
TO PUBLIC RELEASE
2 MAR 1988

1. Designation and Nomenclature (Popular Name): Anti-Tactical Missile (ATM), Joint Tactical Missile Defense (JTMD), Tactical Missile Defense (TMD)

2. DoD Component: Department of the Army

3. Responsible Office and Telephone Number:

Joint Tactical Missile Defense
Project Office
Redstone Arsenal, AL 35898-5750

COL James M. Chatfield
ASSIGNED: AUGUST 3, 1987
AUTOVON: 742-3230
COMMERCIAL: (205) 895-3330

4. Program Elements/Procurement Line Items:

RDT&E: PE 63302, Project D099 (Shared Funding)

5. Related Programs: JTMD Counterforce, JTMD Passive Countermeasures, JTMD Command and Control, Army Tactical Missile System (ATACMS), PATRIOT ATM upgrade, HAWK cruise missile improvement and ATM submunition.

6. Mission and Description: JTMD is an umbrella concept under which technologies to support active defense, counterforce, passive countermeasures, and command and control systems against Warsaw Pact tactical missile threat will be developed and demonstrated. Although this concept applies to theater-level JTMD operations in support of the operational and tactical level of war, it requires the exploitation of national systems and capabilities to support theater efforts. This concept considers only the use of nonnuclear munitions in JTMD to counter the Soviet missile threat. However, the concept could be adapted for use of nuclear or dual-capable systems to counter the threat. JTMD systems must

OASD(PA) DFOISR 88-T-0784

be capable of being integrated with existing and planned NATO counterair and fire support operations. The objective of JTMD operations is to protect maneuver forces and high value fixed assets from enemy missiles employed in support of the enemy air and ground operations. These operations include missions and capabilities of all allied forces.

On January 28, 1987, the Deputy Secretary of Defense Memorandum provided the following guidance for the Anti-Tactical Missile program:

- A Tactical Missile Defense be developed to neutralize the emerging Warsaw Pact Tactical Missile threat to the NATO Central Region and within other potential areas of conflict.

- Tactical Missile Defense is a high priority program.

- Operational concept elements include active defense, counterforce, passive countermeasures, and command and control.

- Tactical Missile Defense is a joint service effort with Army as the lead service.

- The program should pursue cooperative effort with allies.

- Tactical Missile Defense is a two phase program with the near term phase addressing the conventional Short Range Ballistic Missile (SRBM) threat and the longer term phase addressing the advanced Tactical Ballistic Missile (TBM) threat.

- Both phases should build on existing systems, leverage off emerging advanced technology and compatible with growth to full theater defense.

The JTMD Active Defense Program is to attack enemy missiles in flight. The program is to build on existing systems through emerging advanced technology. This program does not replace other defense programs.

Counterforce as it relates to JTMD is the ability to strike enemy tactical missile launch and operating positions well beyond the forward line of troops (FLOT). This capability is anticipated with the introduction of ATACMS in conjunction with other long range assets.

JTMD Command and Control (C^2) efforts will integrate existing and planned C^2 systems to transmit target acquisition and tracking data in near-real-time. These systems must also be hardened so that they can operate in stressing environments.

Passive defense measures which include hardening, mobility, dispersal, camouflage, concealment and deception are inherent responsibilities and concerns of all tactical forces. The continuation of emphasis in these areas will contribute to reducing the effectiveness of the tactical missile threat. Improvement in these passive measures as well as signature reduction and reconstitution will be the focus of the passive measures element of JTMD.

7. Program Highlights:

a. 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 August 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).

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 defense programs, when deployed as modifications to the PATRIOT System, establish the baseline for the development of systems to counter the TBM threat.

A Milestone I DAB Decision Review is planned for the 3rd QTR FY88. Appropriate documentation and cost estimates for the JTMD Active Defense Missile will be developed to support such a decision. Appropriate SAR updates will be submitted subsequent to the Milestone I decision.

Milestone I Decision Reviews for counterforce, C^2 and passive countermeasures elements of JTMD are currently planned for the FY90 time frame. As the programs for each of these elements are defined, appropriate SAR updates will be submitted.

b. Significant Development Since Last Report: This is an initial SAR. The JTMD Active Defense program is expected to satisfy mission requirements. Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.

c. Changes Since "As of" Date: None, this is an initial SAR.

8. Decision Coordinating Paper (DCP) Threshold Breaches: A system concept paper (SCP) will be prepared for the Milestone I decision review currently scheduled for the third quarter of FY88.

9. Schedule (Active Defense Only):

	Planning Estimate/ Approved Program	Current Estimate
a. Milestones -		
Milestone I Decision	3rd Qtr FY88/3rd Qtr FY88	3rd Qtr FY88
Milestone II Decision	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. Previous Change Explanations -- N/A - Initial SAR.

c. Current Change Explanations -- N/A - Initial SAR.

d. References --

Planning Estimate: FY89 President's Amended Budget.
Approved Program: FY89 President's Amended Budget.

10. Technical/Operational Characteristics (Active Defense Only):

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. Technical --	TBD/TBD	TBD	TBD
b. Operational --	TBD/TBD	TBD	TBD

c. Previous Change Explanations -- N/A - Initial SAR

d. Current Change Explanations -- N/A - Initial SAR

e. References --

Planning Estimate: FY89 President's Amended Budget.
Approved Program: FY89 President's Amended Budget.

11. Program Acquisition Cost (Active Defense Only) (Current Estimate in Millions of Dollars):

	Planning Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)			
Active Defense System	264.2	-	264.2
Total FY88 Base Year $	264.2		264.2
Escalation	10.8	-	10.8
Development (RDT&E)	(10.8)	-	(10.8)
Total Then-Year $	275.0		275.0
b. Quantities -			
Development (RDT&E)	TBD	-	TBD

c. Unit Cost - TBD

d. Approved Design to Cost Goal - TBD

e. Foreign Military Sales - None planned at this time.

f. Nuclear Costs - None

12. Program Acquisition/Current Procurement Unit Cost Summary Active Defense Only (Current 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. Cost Variance Analysis (Active Defense Only):

a. 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	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Total Changes	--	--	--	--
Current Estimate	275.0	--	--	275.0

(FY 88 Constant [Base Year] Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
PLANNING ESTIMATE	264.2	--	--	264.2
Previous Changes	--	--	--	--
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--

13. Cost Variance Analysis (Active Defense Only) (cont'd):

(FY 88 Constant [Base Year] Dollars in Millions) (cont'd)

	RDT&E	PROC	MILCON	TOTAL
Current Changes	--	--	--	--
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Total Changes	--	--	--	--
Current Estimate	264.2	--	--	264.2

b. Previous Change Explanations -- N/A - Initial SAR.

c. Current Change Explanations -- N/A - Initial SAR.

d. References --

Planning Estimate: FY89 President's Amended Budget.

14. Program Acquisition Unit Cost (PAUC) History (Millions of Then-Year Dollars): N/A

15. Contract Information (Then-Year Dollars in Millions): No major contracts have been awarded for Active Defense development.

16. Program Funding Summary (Current Estimate in Millions of Dollars):

a. Program Status --

(1) Percent Program Completed: TBD [1]

(2) Percent Program Cost Appropriated: TBD [1]

1) JTMD is in the conceptional phase with the program definition continuing to be developed.

JTMD, December 31,1987

16. Program Funding Summary (Current Estimate in Millions of Dollars) (cont'd):

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY 88)	Budget Year (FY 89) 1/	FYDP (FY 90-93) 1/	Beyond FYDP (FY 94)	Total
RDT&E	117.2	12.8	145.0	0.0	275.0

c. Annual Summary -- (Active Defense Only) Program funding and quantities reflect the FY88/89 President's Budget, except as adjusted for FY88 congressional direction and FY89 amended budget decisions.

Fiscal Year 2/	Qty	FY 88 Base-Year Dollars			Then-Year Dollars			Escl Rate %
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
Appropriation : RDT&E								
1983	-	-	-	11.7	-	-	10.0	4.9
1984	-	-	-	19.1	-	-	17.1	3.8
1985	-	-	-	31.4	-	-	29.2	3.4
1986	-	-	-	58.7	-	-	56.3	2.8
1987	-	-	-	4.4	-	-	4.3	2.7
1988	TBD	TBD	TBD	0.3	-	-	0.3	3.7
1989	TBD	TBD	TBD	12.1	-	-	12.8	3.8
1990	TBD	TBD	TBD	25.7	-	-	28.2	3.6
1991	TBD	TBD	TBD	23.4	-	-	26.5	3.3
1992	TBD	TBD	TBD	51.5	-	-	59.7	2.8
1993	TBD	TBD	TBD	25.9	-	-	30.6	2.3
To Comp 3/	TBD	TBD	TBD	TBD	-	-	TBD	-
Total	TBD	TBD	TBD	264.2	-	-	275.0	-

1/ Requirements for FY89 and beyond will be finalized at the Milestone I decision in 3rd Qtr FY88.

2/ FY 86 and prior funding contains funds for PAC I and PAC II ($64M), HAWK ($7M), ATM ($21M), and Classified Programs ($20M). FY 87 and out will fund the JTMD program.

3/ JTMD does not have a validated baseline cost estimate.

16. Program Funding Summary (Current Estimate in Millions of Dollars) (cont'd):

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1983	10.0	10.0	10.0
1984	17.1	17.1	16.9
1985	29.2	29.2	28.7
1986	56.3	56.3	54.9
1987	4.3	4.2	2.0
To Comp	158.1	N/A	N/A
Total	275.0	116.9	112.5

17. Production Rate Data: -- N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- N/A

b. Costs -- N/A

SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A) 823)

PROGRAM: FORWARD AREA AIR DEFENSE SYSTEM (FAADS)
LINE OF SIGHT-FORWARD-HEAVY (LOS-F-H)

A-10 FAADS LOS-F-H

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name): Forward Area Air Defense System (FAADS) Line of Sight-Forward-Heavy (LOS-F-H)

2. DoD Component: Department of the Army

3. Responsible Office and Telephone Number:

Project Manager
Line of Sight-Forward-Heavy
Redstone Arsenal, AL 35898-5750

COL John M. Gamino
ASSIGNED: December 15, 1986
AUTOVON: 742-4449
COMMERCIAL: (205) 895-4449

4. Program Elements/Procurement Line Items:

RDT&E PE 63757A Project 463 (LOS-F-H)
PE 23801A Project 683 (LOS-F-H)

PROCUREMENT: APPN 2032 SSN H01600 (LOS-F-H)

MILCON: N/A

[redacted]

OASD(PA) DFOISR 88-0934

5. Related Programs:

Line of Sight-Rear; Non-Line of Sight; and Forward Area Air Defense Command, Control, and Intelligence.

6. Mission and Description:

The Army has worked with the Office of the Secretary of Defense (OSD) to develop an effective and affordable program to fill the void in the forward area. 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 FAADS program integrates weapons, sensors, and command, control and intelligence (C^2I) architecture to counter the entire spectrum of the air threat to the forward area through the 1990's. The FAADS concept is designed to provide total coverage in the division area and permits the enemy no preferred attack option. The acquisition strategy relies heavily on non-developmental items (NDI) and preplanned product improvements to rapidly overcome our current air defense deficiencies and keep pace with advancing threat. An initial Cost and Operational Effectiveness Analysis was conducted during FY87 to determine the mixes of technologies for FAADS.

The FAADS concept consists of weapons delivery elements tied together by a C^2I network which also integrates FAADS into the Army command and control system. The C^2I initiative incorporates a family of sensors and identification equipment (ground and aerial, active and passive) with improved data processing and distribution capability.

The LOS-F-H component is conceived of as an NDI air defense system designed to provide direct fire coverage for maneuver elements. A Request for Proposal (RFP) was released to industry in March 1987, and the Air Defense Anti-Tank System was selected on November 30, 1987.

The components of FAADS are not new to air defense. Planning for C^2I, along with requirements for combined arms initiatives and improved air defense weapons, has existed for several years. The FAADS program, using a systems approach, will integrate these relatively independent systems together to defeat the future enemy threat in the forward area. The components will work together to maximize total force effectiveness.

7. Program Highlights:

a. 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 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. The LOS-F-H system is expected to satisfy mission requirements.

b. Changes Since As Of Date -- Contract award of Research, Development, Test and Evaluation (RDT&E) options occurred February 11 1988. Program funding and quantities reflect the FY88/89 President's Budget except as adjusted for FY88 Congressional Direction and FY89 Amended Budget Decisions.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There is no DCP for the LOS-F-H system.

9. Schedule:

	Planning Estimate/ Approved Program	Current Estimate
a. Milestones --		
LOS-F-H		
Release RFPs	TBD/2Q87	2Q87 (CH-1)
Competitive Test Start	TBD/4Q87	4Q87 (CH-2)
Contract Award	1Q88/2Q88	2Q88 (CH-3)
Operational Test	TBD/TBD	TBD
First Unit Equipped	TBD/TBD	TBD

b. Previous Change Explanations -- N/A

c. Current Change Explanations --

(CH-1) The RFPs were released March 16, 1987 (vs TBD).

(CH-2) Competitive Test started July 10, 1987 (vs TBD).

(CH-3) Program funding not released by Congress. Contract award was rescheduled from December 1987 to February 1988.

d. References --

Planning Estimate: FY88-89 President's Budget

Approved Program: FY89 Amended President's Budget Submission

10. Technical/Operational Characteristics:

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. Technical --	TBD	TBD	TBD
b. Operational --	TBD	TBD	TBD

c. Previous Change Explanations -- N/A

d. Current Change Explanations -- N/A

e. References --

Planning Estimate: TBD

Approved Program: TBD

Current Estimate: TBD

11. Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Planning Estimate	Changes	Current Estimate
a. Cost --			
Development (RDT&E)			
FAAD System	95.6	+105.0	200.6
Procurement	1358.0	-176.9	1181.1
FAADS Weapon System		--	
Initial Spares		--	
Total Flyaway	TBD	--	TBD
Other Wpn Sys Cost	TBD	--	TBD
Construction (MILCON)	0	0	0
Total FY87 Base Year $	1453.6	- 71.9	1381.7
Escalation	239.7	+ 4.5	244.2
Development (RDT&E)	(3.2)	(+ 8.7)	(11.9)
Procurement	(236.5)	(- 4.2)	(232.3)
Construction (MILCON)	0		0
Total Then-Year $	$1693.3	- 67.4	1625.9
b. Quantities (Fire Units/Missiles)[1/]			
Development (RDT&E)	TBD	--	4/32
Procurement	TBD	--	110/4097
Total	TBD	--	114/4129

1/ Total Program quantities remain to be determined.

11. Program Acquisition Cost (Cont'd): (Current Estimate in Millions of Dollars)

c. Unit Cost (Fire Units)

Procurement:			
FY87 Base-Year $	TBD	--	10.7
Then-Year $	TBD	--	12.8
Program:			
FY87 Base-Year $	TBD	--	12.1
Then-Year $	TBD	--	14.3

d. Approved Design to Cost Goal -- N/A

e. Foreign Military Sales -- None

f. Nuclear Costs -- None

12. Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	1625.9	1625.9	$1625.9
(2) Quantity	114	114	114
(3) Unit Cost (Fire Units)	14.3	14.3	14.3
b. Current Procurement --	(FY88)	(FY88)	(FY89)
(1) Cost	33.5	33.5	108.8
Less CY Adv Proc	33.5	33.5	23.8
Plus PY Adv Proc	0.0	0.0	33.5
Net Total	0.0	0.0	118.5
(2) Quantity (Missiles)	N/A	N/A	60
(3) Unit Cost (Missiles)	N/A	N/A	1.98

13. Cost Variance Analysis:

a. Summary (Current (Then-Year) Dollars in Millions) --

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	98.8	1594.5	TBD	1693.3
Previous Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+113.7	-181.1	--	- 67.4
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+113.7	-181.1	--	- 67.4
Total Changes	+113.7	-181.1	--	- 67.4
Current Estimate	212.5	1413.4	TBD	1625.9

(FY87 Constant Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	95.6	1358.0	TBD	1453.6
Previous Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes:				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+105.0	-176.9	--	-71.9
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+105.0	-176.9	--	-71.9
Total Changes	+105.0	-176.9	--	-71.9
Current Estimate	200.6	1181.1	TBD	1381.7

13. Cost Variance Analysis (Cont'd):

b. Previous Change Explanations -- N/A -- Initial SAR

c . Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Reprogramming of funds (Estimating)		
- FY88/89 Procurement Funds to RDT&E Funds (Congressional Action)	+109.8	+118.3
- For FY87 FAAD Integration Effort	+ 3.7	+ 3.8
- For FY86 Support of Part I Candidate Evaluation, for FY86 inflation adjustments and for FY87 AMC swap of funds	- 8.5	- 8.4
(2) Procurement		
Reprogramming of Funds (Estimating)		
- Revised Program Assumption due to reduction of FY89 funding	- 67.1	- 62.8
- Reprogramming of Funds to RDT&E Funds from Procurement Funds (Congressional Action)	-109.8	-118.3

d. References --

Planning Estimate: FY88-89 President's Budget

Current Estimate: FY89 Amended President's Budget Submission

14. Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

Current Baseline Estimate to Current Estimate

PAUC *	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
14.3	--	--	--	--	--	--	--	--	14.3

*First SAR reporting quantities

15. Contract Information: (Then-Year Dollars in Millions) N/A

No contracts have been awarded as of December 31, 1987.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status --

(1) Percent Program Completed: 42.9% (3/7)

(2) Percent Program Cost Appropriated: 11.6% ($189.3/$1625.9)

b. Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY86/87&88)	Budget Year (FY89)	FYDP (FY90-92)	Beyond FYDP (FY93)	Total
RDT&E	$ 155.8	$ 49.7	$ 7.0	TBD	$ 212.5
Procurement	$ 33.5	$ 108.8	$ 1271.1	TBD	$ 1413.4
MILCON	0.0	0.0	0.0	-	
Total	$ 189.3	$ 158.5	$ 1278.1	TBD	$ 1625.9

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary -- FAADS LOS-F-H

Fiscal Year	Qty[1]	FY 87 Base-Year Dollars			Then-Year Dollars[2]			Escl Rate
		Flyaway			Advance		Proc	
		Nonrec	Rec	Total	Debit	Credit	Total	(%)
Appropriation: RDT&E								
1986				33.4			33.2	N/A
1987				23.0			23.6	2.7
1988	4/32			93.1			99.0	3.7
1989	TBD			45.1			49.7	3.8
1990	TBD			2.6			3.0	3.6
1991	TBD			1.7			2.0	3.3
1992	TBD			1.7			2.0	2.8
1993	TBD			TBD			TBD	--
To Compl	TBD			TBD			TBD	--
Subtotal	TBD			200.6			212.5	--
Appropriation: Procurement								
1988				30.3			33.5	3.7
1989	5/60			95.2			108.8	3.8
1990	20/1313			361.8			425.2	3.6
1991	38/1329			350.0			421.8	3.3
1992	47/1395			343.8			424.1	2.8
1993	TBD			TBD			TBD	
To Compl	TBD			TBD			TBD	
Subtotal	TBD			1181.1			1413.4	--
Total	TBD			1381.7			1625.9	--

1/ Quantities shown are fire units/missiles.

2/ Program Funding reflects the FY88/89 President's Budget except as adjusted for FY88 Congressional Direction and FY89 Amended Budget Decisions.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1986	33.2	33.2	21.0
1987	23.6	22.3	3.4
1988	99.0	0	0
To Complete	56.7	0	0
Total	212.5	55.5	24.4

17. Production Rate Data: N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- TBD

b. Costs -- TBD

SAR-87-041

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
PROGRAM: FIXED DISTRIBUTED SYSTEM (FDS)

N-18 FDS

AS OF DATE: December 31, 1987

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AS AMENDED

APR 11 1988

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
FDS Project Director
Space and Naval Warfare Systems Command
Washington, D.C. 20363-5100

CAPT R. C. Witter, USN
Assigned: January 23, 1986
Dr. K. E. Hawker
AV 222-1120;
COMM (202) 692-1120

4. (U) Program Elements/Procurement Line Items:

RDT&E,N: PE 0603784N 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.e).

[redacted]

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[redacted]

OASD(PA) DPOISR 88-T-0919

(b)(1)

(b)(1)

7. (U) Program Highlights (Cont'd):

(b)(1)

c. (U) Change Since "As Of Date" -- None.

8. (U) Navy Decision Coordinating Paper (NDCP) Threshold Breaches: NDCP was approved May 13, 1986.

9. (U) Schedule:

(b)(1)

	Planning Estimate/ Approved Program	Current Estimate

9. (U) Schedule (Cont'd):

(b)(1)

d. (U) References --

Planning Estimate: NDCP dated May 13, 1986 and TEMP No. 1009 dated May 13, 1986.

Approved Program: FY88/89 Amended Biennial Budget.

10. (U) Technical/Operational Characteristics:

a. (U) Technical--

	Plan Estimate/ Approved Program	Demonstrated Performance	Current Estimate

(b)(1)

c. (U) Previous Change Explanations -- N/A

d. (U) Current Change Explanations -- N/A

e. (U) References--

Planning Estimate: NDCP dated 13 May 1986 and TEMP No. 1009 FDS dated 13 May 1986.

Approved Program: Same as Planning Estimate.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Planning Estimate	Changes	Current Estimate
a. (U) Cost			
Development (RDT&E,N)	674.7	-	674.7*
Procurement (OPN)	TBD	N/A	TBD
Construction (MILCON)	TBD	N/A	TBD
Total FY86 Base-Year $	TBD	N/A	TBD
Escalation	102.3	-.7	101.3
Development (RDT&E,N)	(102.3)	(-.7)	(101.3)
Procurement (OPN)	N/A	N/A	N/A
Construction (MILCON)	N/A	N/A	N/A
Total Then-Year $	TBD	-	TBD
b. (U) Quantities			
Development (RDT&E,N)	1	N/A	1
Procurement (OPN)	TBD	N/A	TBD
Total	1	N/A	1
c. (U) Unit Cost			
Procurement:			
FY86 Base-Year $	TBD	N/A	TBD
Then-Year $	TBD	N/A	TBD
Program:			
FY86 Base-Year $	TBD	N/A	TBD
Then-Year $	TBD	N/A	TBD

*Note: See paragraph 9.c.

d. (U) Approved Design to Cost Goal -- N/A

e. (U) Foreign Military Sales -- None

f. (U) NuclearCosts--N/A

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	-3.8	-	-	-3.8
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-3.8	-	-	-3.8
Current Changes:				
Economic	+3.1	-	-	+3.1
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	+3.4	-	-	+3.4
Other	-	-	-	-
Support	-	-	-	-
Subtotal	+6.5	-	-	+6.5
Total Changes	+2.7	-	-	+2.7
Current Estimate	779.7	0	0	779.7*

*Note: See paragraph 9.c.

13. (U) Cost Variance Analysis (Cont'd):

a. (U) (FY86 Contract (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	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	674.7	0	0	674.7

13. (U) Cost Variance Analysis (Cont'd)

b. (U) Previous Change Explanations --

RDT&E	(Dollars in Millions) FY86 Base-Year	Then-Year
Economic: Revised escalation rate.	N/A	-3.8

c. (U) Current Change Explanations --

Economic: Revised escalation rate.	N/A	+3.1
Estimating:	N/A	+3.4

Budget reductions ($11.4M in FY88, $7.1M in FY89) cause program increase due to funding shift from FY88/89 to FY93.

d. (U) References --

Approved Program: FY88/89 Amended Biennial Budget.

14. (U) Program Acquisition Unit Cost (PAUC) History: N/A (RDT&E,N program only.)

15. (U) Contract Information: (Then-Year Dollars in Millions)

All contracts below $40 million dollars threshold.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. (U) Program Status -- N/A

b. (U) Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY84-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Beyond FYDP (FY93)	Total
RDT&E,N	151.3	104.9	473.0	50.5	779.7*

*Note: See paragraph 9.c.

16. (U) Program Funding Summary (Cont'd):

c. (U) Annual Summary --

Fiscal Year	Qty	FY86 Base-Year Dollars			Then-Year Dollars			Escal Rate %
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E,N								
1984		14.6		14.6			14.0	3.8
1985		16.1		16.1			15.9	3.4
1986		23.1		23.1			23.5	2.8
1987		31.8		31.8			33.3	2.7
1988		59.5		59.5			64.6	3.7
1989		93.1		93.1			104.9	3.8
1990		168.0		168.0			195.7	3.6
1991		127.9		127.9			153.5	3.3
1992		100.5		100.5			123.8	2.8
1993		40.1		40.1			50.5	2.3
Subtotal		674.7		674.7			779.7*	

*Note: See paragraph 9.c.

16. (U) Program Funding Summary (Cont'd):

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E,N			
1984	14.0	14.0	14.0
1985	15.9	15.9	15.9
1986	23.5	23.5	19.2
1987	33.3	33.2	28.1
1988	64.6	58.3	.3
1989-1992	577.9	N/A	N/A
1993	50.5	N/A	N/A
Total	779.7*	144.9	77.5

*Note: See paragraph 9.c.

17. (U) Production Rate Data: N/A

18. (U) Operating and Support (O&S) Costs: N/A

SAR-87-123

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SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
SENSE AND DESTROY ARMOR (SADARM)
(RDTE-ONLY)

A-22 SADARM AS OF DATE: December 31, 1987

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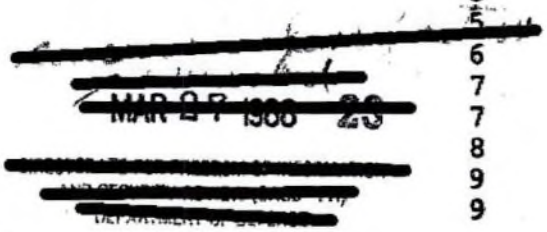

1. (U) Designation/Nomenclature (Popular Name): Sense and Destroy Armor (SADARM)

   Projectile, 155mm, XM898
   Rocket, Multiple Launch Rocket System, XM29

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: 464802D369
   464802D644 (Shared Funding)

   Procurement: TBD

5. (U) Related Programs: None

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6. (U) Mission and Description: The Sense and Destroy Armor (SADARM) Program will provide enhanced counterbattery capability for the 155mm and the Multiple Launch Rocket System (MLRS). The Field Artillery requires a fire and forget, all weather, day or night, capability to provide support against threat targets. This development responds to the primary fire support deficiency of insufficient lethality identified by the Fire Support Mission Area Analysis. The SADARM design will be optimized to defeat counterfire target sets, which include both firing and nonfiring threat indirect fire systems. It will supply supplementary fire for close support, interdiction, and suppression of enemy air defense. SADARM is a force multiplier reducing the Artillery's dependence on firing a high volume of conventional munitions, such as the M483 and the MLRS DPICM. SADARM is a shoot-to-kill submunition. Upon expulsion each submunition is de-spun and a drag device controls the velocity and spin during descent. During this time the submunition processes information on potential targets, scanning the ground in a decreasing spiral pattern. When the sensor acquires the target, the lethal mechanism fires an explosively formed penetrator down into the target. If no target is acquired, the submunition self-destructs just before ground impact. This program will not replace any other system.

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. Demonstration and Validation (D&V) of an 8 Inch SADARM was initiated in September 1980 with the approval of an "Letter of Agreement for Sense and Destroy Armor (SADARM) Artillery Munition." Contracts with Honeywell Defense Systems Division and Aerojet Electro Systems were placed in September 1980 for a competitive D&V Program. During FY84 a congressional decision was made to terminate the 8 Inch program, based on data (later found to be erroneous) indicating SADARM was not cost effective. The remaining activities on the program were completed in April 1985 with all-up live firings by Honeywell and final reports. In September 1983 two contracts were awarded on a competitive basis to Aerojet and AVCO for technology demonstration of a smaller diameter SADARM submunition. Due to congressional funding restrictions these efforts were terminated. As an outgrowth of much deliberation during the second half of FY84, a SADARM Program, capable of a variety of applications, was approved by the Army in April 1986. On 24 September 1986, two competitive contracts for the development of the SADARM submunition were awarded to Aerojet and Honeywell. On 30 November 1987 an Army System Acquisition Review Council was convened and recommended a SADARM program fielded in two systems, MLRS and 155mm Howitzer. A Defense Acquisition Board (DAB) is scheduled for 10 March 1988. The SADARM is expected to satisfy mission requirements.

b. (U) Significant Developments Since Last Report: None. This is the initial SAR.

c. (U) Changes Since "As of" Date: The scheduled DAB was held 10 March 1988. Preliminary indications are that two-size submunitions will continue to be developed; a 5.8" size diameter for 155mm and a 6.9" for the MLRS. In addition, there will be a continued study of the 8-Inch system.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches:

There are no threshold breaches at this time. A formal Acquisition Decision Memorandum has not been published.

9. (U) Schedule:

a. (U) Milestones:

	Planning Estimate/ Approved Program	Current Estimate
Generic SADARM Submunition Development Approved by AMC	Nov 84/Nov 84	Nov 84
Congressional Direction for FSD and Production Plan	Dec 85/Dec 85	Dec 85
DA Approval - MLRS/155mm SADARM ROC	Mar 86/Mar 86	Mar 86
DA Approval - 48 Month Acquisition Plan	Apr 86/Apr 86	Apr 86
DA IPR for Submunition FSD	Sep 86/Sep 86	Sep 86
Competitive Submunition FSD Contract Awards	Sep 86/Sep 86	Sep 86
Congressional Restructure to 60 Month Acquisition Plan	Nov 86/Nov 86	Nov 86
OSD Addition of 8 Inch FSD Program	Nov 86/Nov 86	Nov 86
MLRS Initial Integration Contract Award	Dec 86/Dec 86	Dec 86
Milestone II ASARC	Nov 87/Nov 87	Nov 87
Milestone II DAB	Mar 88/Mar 88	Mar 88
Projectile IOTE (Start)	TBD/TBD	TBD
TC LP - MLRS	TBD/TBD	TBD
TC - Projectiles	TBD/TBD	TBD
Milestone III ASARC	TBD/TBD	TBD
Milestone III DAB	TBD/TBD	TBD
Submunition and Projectile FSP Award	TBD/TBD	TBD
MLRS LRIP Contract Award	TBD/TBD	TBD
TC - MLRS	TBD/TBD	TBD
MDR	TBD/TBD	TBD
MLRS FSP Contract Award	TBD/TBD	TBD
FUE - Projectile	TBD/TBD	TBD
FUE - MLRS	TBD/TBD	TBD

b. (U) Previous Change Explanations: None. This is the initial SAR.

c. (U) Current Change Explanations: None.

d. (U) References:

Planning Estimate: Draft DCP, 10 December 1987
FY89 Amended President's Budget

Approved Program: FY89 Amended President's Budget

10. (U) Technical/Operational Characteristics:

	Planning Est/ Approved Program	Demonstrated Performance	Current Estimate
a. ~~(U)~~ Technical			
155mm SADARM Projectile Weight	103.5 lbs/103.5 lbs	TBD	103.5 lbs
MLRS SADARM Warhead Weight	107 kg/107 kg	TBD	107 kg
155mm SADARM Projectile Length*	31.5 in/31.5 in	TBD	31.5 in
MLRS SADARM Warhead Length	2003.6mm/2003.6mm	TBD	2003.6mm
MLRS Rocket Carrier Reliability	(b)(1)		
155mm Carrier Reliability			
Submunition Reliability (MLRS)			
Submunition Reliability (Cannon)			
b. ~~(U)~~ Operational			
MLRS E_k (SPH) (1 Rocket)			
155mm E_k (SPH) (1 Volley)			
MLRS Max Range (km)			
155mm Max Range (M109 Series)(km)			
155mm Max Range (M198 Series)(km)			
Submunition P_k (Average)			
Submunition Perforation (RHA)(mm)			
Storage Life (All SADARM munitions) (years)	10/10	TBD	10

* not including fuze

c. (U) Previous Change Explanations: None. This is the initial SAR.

d. (U) Current Change Explanations: None.

e. (U) References:

Planning Estimate: FY89 Amended President's Budget
Draft DCP dated 10 December 1987

Approved Program: FY89 Amended President's Budget

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars):

	Planning Estimate	Changes	Current Estimate
a. (U) Cost			
Development (RDTE)	623.5		623.5
Procurement - Total	TBD		TBD
Flyaway	(-)		
Other Weapon Costs	(-)		
Initial Spares	(-)		
Total FY88 Constant $	623.5		623.5
Escalation	45.1		45.1
Development (RDTE)			
Total Then-Year $	668.6		668.6
b. (U) Quantities			
Development			
Submunitions	5530		5530
MLRS Rockets	208		208
155mm Projectiles	1990		1990

c. (U) Unit Cost: Not applicable.

d. (U) Approved Design to Cost: Not applicable.

e. (U) Foreign Military Sales: Not applicable.

f. (U) Nuclear Costs: Not applicable.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Then-Year Dollars in Millions)

In accordance with Title 10 U.S. Codes 2433, unit cost reporting shall not apply to reports that are limited to the development (RDTE) program.

13. (U) Cost Variance Analysis:

a. (U) Summary — (Current (Then-Year) Dollars in Millions)

	RDTE	TOTAL
Planning Estimate	668.6	668.6
Previous Changes:		
Economic		
Quantity		
Schedule		
Engineering		
Estimating		
Other		
Support		
Subtotal	-	-
Current Changes:		
Economic		
Quantity		
Schedule		
Engineering		
Estimating		
Other		
Support		
Subtotal	-	-
Total Changes	-	-
Current Estimate	668.6	668.6

(FY 1988 Constant (Base-Year) Dollars in Millions)

	RDTE	TOTAL
Planning Estimate	623.5	623.5
Previous Changes:		
Quantity		
Schedule		
Engineering		
Estimating		
Other		
Support		
Subtotal	-	-
Current Changes:		
Quantity		
Schedule		
Engineering		
Estimating		
Other		
Support		
Subtotal	-	-
Total Changes	-	-
Current Estimate	623.5	623.5

13. (U) Cost Variance Analysis (Cont'd):

b. (U) Previous Change Explanations: None. This is the initial SAR.

c. (U) Current Change Explanations: None.

d. (U) References: FY89 Amended President's Budget.

14. (U) Program Acquisition Unit Cost (PAUC) History:
(Millions of Then-Year dollars)

Not applicable.

15. (U) Contract Information: (Then-Year Dollars Millions)

a. (U) RDTE

Honeywell, Inc.
Contract# DAAA21-86-C-0308
Award: Sept 86
Contract Type: CPIF

Initial[1] 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
N/A	159.9

Aerojet ElectroSystems
Contract# DAAA21-86-C-0309
Award: Sept 86
Contract Type: CPIF

Initial[1] 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
N/A	159.9

b. (U) Procurement - Not applicable.

c. (U) MILCON - Not applicable.

NOTES:
1. (U) Initial target established before Congressional direction to lengthen Full Scale Development to at least 60 months. Modifications to existing Honeywell and Aerojet contracts to lengthen the FSD period and to reflect development of a single-size submunition will increase the Initial Target of

15. (U) Contract Information (Cont'd):

both contracts by an unspecified amount. Contractor estimates for the lengthened FSD program for a single-size submunition are not yet available.

16. (U) Program Funding Summary:

a. (U) Program Status

(1) (U) Percent Program Complete: (Years Funds Appropriated/Total Program Years). 33% (3/9).

(2) (U) Percent Program Cost Appropriated: (Funds Appropriated To Date in Millions/Total Program Funding in Millions). 31.5% (210.4/668.6).

b. (U) Appropriation Summary

Appropriation	Current & Prior Yrs (FY86-88)	Budget Year (FY89)	Balance FYDP (FY90-94)	To Complete Beyond FYDP (FY95-)	Total
RDTE	210.4	127.9	330.3	0	668.6
Total	210.4	127.9	330.3	0	668.6

c. (U) Annual Summary

APPROPRIATION: RDTE

FISCAL YEAR	QTY	FY88 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESC. RATE %
		FLYAWAY			ADVANCE PROC			
		NONREC	REC	TOTAL	DEBIT	CREDIT	TOTAL	
FY86				37.3			35.8	2.8
FY87				72.8			72.1	2.7
FY88				99.9			102.5	3.7
FY89				120.3			127.9	3.8
FY90				129.4			142.2	3.6
FY91				93.8			106.1	3.3
FY92				45.9			53.2	2.8
FY93				19.5			23.1	2.3
FY94				4.7			5.7	2.3
TOTAL				623.5			668.6	

16. (U) Program Funding Summary (Cont'd):

d. (U) Obligations and Expenditures
(Then Year Dollars (Current Estimate in Millions))

Fiscal Year	Total	Obligated	Expended
1986	35.8	31.9	31.8
1987	72.1	71.8	30.5
1988	102.5	10.9	.3
1989	127.9		
To Complete	330.3		
Total	668.6	114.6	62.6

17. (U) Production Rate Data: Not applicable.

18. (U) Operating and Support Costs: Not applicable.

(4)

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SAR-87-006

This Page is Unclassified

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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, 1987

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1. (U) Designation/Nomenclature (Popular Name): AN/BSY-2 Submarine Combat System (AN/BSY-2 SCS) and Standalone Wide Aperture Array (SWAA) 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 James R. Wilson, USN
Assigned: December 29, 1985
Area Code 202/746-0056
AUTOVON 286-0056

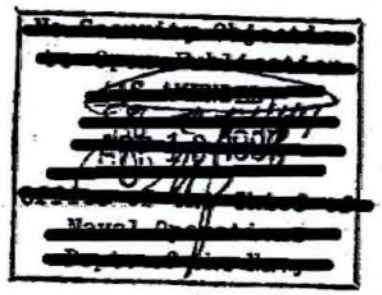
AS AMENDED

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 84731N

O&M,N:
BA8 PE 78017N, LINE ITEM P2PU



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OASD(PA) DPOISR 88-T-2977

5. (U) Related Programs:

PE0604562N-S0236 - 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 to facilitate the decision process.

7. (U) Program Highlights:

a. The original program SUBACS was initiated in 1981, with Concept Definition in March 1982. In June 1982 the program was structured into three phases. Full Scale Development began in December 1983. Technological problems caused restructuring of the program, and in June 1985 the program split into two discreet segments: AN/BSY-1 and the FY89 Submarine Combat System (subsequently renamed AN/BSY-2). Development of the AN/BSY-2 Submarine Combat System began in early 1986 with the award of fixed-price System Design Definition (SDD) contracts to the Missile and Surface Radar Division of RCA (subsequently acquired by General Electric Company) and Federal Systems Division of IBM. Program Milestone I approval was granted in October 1986.

b. Significant highlights subsequent to the last Selected Acquisition Report dated 31 December 1986 include: Issuance of a Request for Proposals on 18 February 1987; proposals received from both SDD contractors on 6 July 1987; A Sustaining Engineering contract awarded to General Electric Company on 11 December 1987.

c. Since 31 December 1987, the Program Baseline Document was approved on 9 February 1988. The Defense Acquisition Board (DAB) Milestone II met on 11 February 1988 and the Acquisition Defense Memorandum (ADM) was signed on 9 March 1988. The option for FSD was exercised on 30 March 1988.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches:

(U) There are no breaches.

9. (U) Schedule:

	INITIAL PLAN	CURRENT ESTIMATE
a. (U) Milestones		
(U) System Design Definition Contract Award		
RCA Corporation	Jan 86	Jan 86
IBM Corporation	Mar 86	Mar 86
(U) Milestone I (JRMB)	Jun 86	Jun 86
(U) Milestone II (DAB)	Nov 87	Feb 88
(U) FSD Contract Award	Jan 88	Feb 88
(U) Authorization for Limited Production (DAB)	1st Q FY90	1st Q FY90
(U) Authorization for Limited Production (DAB)	1st Q FY92	1st Q FY92
(U) Material Support Date (AN/BQG-5)	Nov 92	Nov 92
(U) AN/BQG-5 TECHEVAL	Aug 93	Aug 93
(U) Material Support Date (AN/BSY-2)	Nov 93	Nov 93
(U) Authorizatoin for Limited Production (DAB)	1st Q FY94	1st Q FY94
(U) AN/BQG-5 OPEVAL	Mar 94	Mar 94
(U) Initial Operational Capability (AN/BQG-5)	Apr 94	Apr 94
(U) AN/BSY-2 TECHEVAL	Dec 94	Dec 94
(U) Complete TECHEVAL (DT II D)	Dec 94	Dec 94
(U) AN/BSY-2 OPEVAL	Jun 95	Jun 95
(U) Complete OPEVAL (OT II B)	Jun 95	Jun 95

9. (U) Schedule: (Cont'd)

	INITIAL PLAN	CURRENT ESTIMATE
a. (U) Milestones		
(U) Initial Operational Capability (AN/BSY-2)	Jul 95	Jul 95
(U) Complete OPEVAL (OT II B)	Jun 95	Jun 95
(U) Authorization for Full Production (Milestone III)	1st Q FY96	1st Q FY96
(U) Navy Support Data AN/BSY-2	Jul 96	Jul 96

b. (U) Previous Change Explanation: NONE.

c. (U) Current Change Explanation:

(Ch-1) The Defense Acquisition Board Milestone II was delayed three months to complete source selection prior to the Milestone II decision.

(Ch-2) The FSD option delayed one month to allow DOD Milestone II decision.

(Ch-3) The Critical Design Review reflects General Electric's recent Milestone planning.

d. (U) References:

(U) Planning Estimate: SDDM dated October 9, 1986, subject "Fiscal Year 1989 Submarine Combat System Milestone I Decision Memorandum" (U)

(U) Approved Program:

a. FY88/89 Amended Biennial Budget

b. AN/BSY-2 Submarine Combat System Test and Evaluation Master Plan No. 908-5, Rev. 1, dated 15 June 1987, approved by OSD 17 December 1987

c. 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 USD(A) as the development baseline.

10. ~~(S)~~ Technical/Operational Characteristics:

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes
a. ~~(S)~~ Technical Characteristics:					
(b)(1)					

10. Technical/Operational Characteristics: (Cont'd)

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes
(b)(1)					

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10. (C) Technical/Operational Characteristics: (Cont'd)

(b)(1)

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes

10. (U) Technical/Operational Characteristics: (Cont'd)

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes
(b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes
(b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes
(b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes
(b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes
b)(1)					

10. (U) Technical/Operational Characteristics: (Cont'd)

(b)(1)

	Planning Estimate	Approved Program*	Demonstrated Performance	Current Estimate*	Notes

10. (U) Technical/Operational Characteristics (Cont'd)

(U) The following notes are based on environmental and threat parameters provided in the following:

Reference A: The Attack Submarine Effectiveness Analysis Input Parameters Data Book, Volume B.

Reference B: Naval Intelligence Support Center (NISC) Soviet Threat Assessment Report (STAR), Submarine Systems, Volume 1, NISC Ltr S/N 21/S2118 dtd 8 Apr 86 updated with NISC Ltr S/N 21/S2166 dtd 9 Sep 86.

(b)(1)

(U) Notes for Technical/Operational Characteristics (Cont'd)

(b)(1)

9. (U) The FOM is based on tracker acquisition.

(b)(1)

11. (U) The threshold is calculated using classification LOFAR gram.

12. (U) Tested at sea using a 10% modulated high signal level source.

(b)(1)

14. (U) The array wander contribution to is dominant over all other mechanisms over all arrival paths except severe mountainous bottoms.

(b)(1)

16. (U) Ranging accuracies are a function of SVP and bottom slope. The stated threshold represents averaged results over several scenarios.

(b)(1)

(U) Notes for Technical/Operational Characteristics (Cont'd)

(b)(1)

20. (U) The actual system capacity is for 2000 tracks. This system requirement will be verified by design review. The threshold of 500 tracks will be demonstrated during land-based testing.

21. (U) Mean Time Between Failure (MTBF) is the sum of critical, major, and minor failures as defined in MIL-STD-721C. Interim assessments of MTBF will be estimated through the use of computer modeling for the September 1991 and September 1993 Program Reviews. Thresholds for these reviews are 14 hours and 23 hours, respectively. See MTBCF note for failure definitions.

22. (U) Mission Time Between Critical Failures (MTBCF) defines the system mission reliability. MTBCF is equal to Mission Time divided by the total number of critical and major failures which occur during a series of specified missions. Critical, major and minor failures are defined as follows.

a. (U) A critical failure prevents the ship from performing its mission.

b. (U) A major failure causes the ship to lose some operationaly capability and degrade mission accomplishment.

c. (U) A minor failure affects performance but can be worked around to avoid mission impact.

(U) The full-up and self-protect configurations are defined in the FY89 Submarine Combat System Top-Level Requirements (TLR).

(b)(1)

23. (U) An interim assessment of MTTR will be made prior to the September 1993 Program Review. The threshold for the interim review is 28 minutes.

24. (U) Fault localization shall be capable of being on-line with system operation without further degradation of system capabilities. Maximum fault group sizes are defined as follows:

a. (U) Non-memory faults

8 - Format D or 5x5 modules
16 - Format B modules
4 - New LRU's

(U) Notes for Technical/Operational Characteristics (Cont'd)

b. (U) Memory faults

2 - New LRU's
4 - Retained LRU's

c. (U) 85% of all non-memory faults on new equipment will be localized to one LRU. 90% of all memory faults on new equipment will be localized to one LRU.

25. (U) MTBE is defined in terms of Cold starts (down loading, and initialization of software programs and data without restoration of historical data) and warm starts (down loading and initialization of software programs and data including restoration of historical data). Historical data includes all data except that lost during the interval between the error and the completion of the recovery action. Mode remembered on checkpoint data is also included in the historical data.

26. (U) The Tiger simulation model (Version 8) will be used to provide predictions of RMA parameters. Inputs to the computer model will include system functional requirements; most realistic, predicted and historical hardware failure rates, hardware restoration time, software error rates, software restoration time; planned logistic and repairs policies; and anticipated level of training. As technical and operation test results become available actual system data will be entered in the model.

27. (U) COMOPTEVFOR will observe FOM determination during developmental testing and comment on whether the system satisfies the FOM thresholds. The system characteristics used operationally by the fleet to predict detection ranges will be used during OT to calculate in-situ FOMs and associated detection ranges against the target. Sonar detection effectiveness will be evaluated by comparing actual performance with the ranges derived from in-situ measurements and calculation of FOMs. In addition, sonar performance will be related to the capability of the test platform to accomplish its ASW mission through the resolution of Critical Operational Effectiveness Issues.

(b)(1)

29. (U) Full-up and Self-protect are defined in the FY 89 Submarine Combat System Top-Level Requirements (TLR).

30. (U) MTBCF is equal to total mission operating time divided by the total number of critical and major failures which occur during a series of specified missions. Failures are defined as follows:

Critical. Prevents the ship from performing its mission.

Major. Causes the ship to lose some operational capability and degrades mission accomplishment. If detected before the mission, it would probably be mission aborting.

(U) Notes for Technical/Operational Characteristics (Cont'd)

Minor. Affects performance but can be worked around to avoid mission impact.

31. (U) MTBE is defined in terms of Cold Starts (downloading and initialization of software programs without restoration of historical data) and Warm Starts (downloading and initialization of software programs with restoration of historical data).

32. (U) Based on the SSN 21 90-day mission scenario provided in the TLR.

$$A_o = \frac{\text{Uptime}}{\text{Uptime + Downtime}}$$

33. (U) The threshold represents averaged results over several scenarios. Actual values are dependent upon signal to noise ratio, SVP, scenario geometry, bottom slope and state of training. At least two own-ship legs are required. Solution accuracies required are Range $\pm$955 yds, Bearing $\pm$2.7°, course $\pm$10°, and speed $\pm$2 kts. Measurement of the threshold begins with tracker initialization and ends when the required solution accuracy is achieved.

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) There was no changes previous to this SAR.

d. (U) Current 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.

e. (U) References:

Planning Estimate:

a. The Attack Submarine Effectiveness Analysis Input Parameters Data Book, Volume B of 17 August 1984.

b. 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.

f. (U) Approved Program:

A. FY88/89 Amended Biennial Budget

B. AN/BSY-2 Submarine Combat System Test and Evaluation Master Plan No. 908-5, Rev. 1, dated 15 June 1987, approved by OSD 17 December 1987.

C. 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 USD(A) as the development baseline.

D. Naval Intelligence Support Center (NISC) Soviet Threat Assessment Report (STAR), Submarine Systems, Volume 1, NISC ltr s/n 21/S2118 dtd 8 April 1986 updated with NISC ltr s/n 21/S2166 dtd 9 Sep 86.

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars)

AS OF DATE: DECEMBER 31, 1987
BASE YEAR: FY1986

	Planning Estimate	Changes	Current Estimate
a. Cost			
Development (RDT&E)	$ 1566.2	-19.1	$ 1547.1
Procurement			
Support System Costs (including LBES, Trainers, Trainer Unique Equipment, MS/RFs, IMAs, I&C Spares and MAMs)	956.5	-118.3	838.2
	(956.5)	(-118.3)	(838.2)
Construction (MILCON)	-	-	-
Total FY86 Base Year $	2522.7	-137.4	2385.3
Escalation	467.2	+1.5	468.7
Development (RDT&E)	(211.5)	(+4.3)	(215.8)
Procurement	(255.7)	(-2.8)	(252.9)
Construction (MILCON)	-		-
Total Then Year $	2989.9	-135.9	2854.0
b. Quantities			
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. Unit Cost			
Procurement:			
FY86 Base Year $	N/A	N/A	N/A
Then Year $	N/A	N/A	N/A

11. (U) Program Acquisition Cost: (Current Estimate in Millions of Dollars) (Cont'd)

	Planning Estimate	Changes	Current Estimate
Program:			
FY86 Base Year $	N/A	N/A	N/A
Then Year $	N/A	N/A	N/A

d. Approved Design to Cost Goal: N/A; Design to Cost Goals are established at Milestone II.

e. Foreign Military Sales: None

f. Nuclear Costs: None

12. (U) Program Acquisition/Current Procurement Unit Cost Summary: (Current (Then Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition			
(1) Cost	2854.0	2989.9	2854.0
Quantity	N/A	N/A	N/A
Unit Cost	N/A	N/A	N/A
b. Current Procurement			
(1) Cost	N/A	N/A	N/A
Less CY Adv Proc	N/A	N/A	N/A
Plus PY Adv Proc	N/A	N/A	N/A
Net Total	N/A	N/A	N/A
(2) Quantity	N/A	N/A	N/A
(3) Unit Cost	N/A	N/A	N/A

N/A: Not Applicable. Procurement units for new construction ships are included in the SSN 21 and SSN 688 SARs.

13. (U) Cost Variance Analysis:

a. Summary -- (Current (Then Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate	1777.7	1212.2	-	2989.9
Previous Changes:				
Economic	-	-		-
Quantity	-	-		-
Schedule	-	-		-
Engineering	-	-		-
Estimating	-	-		-
Other	-	-		-
Support	-	-		-
Subtotal	-	-		-
Current Changes:				
Economic	+8.1	+23.8		+31.9
Quantity	-	-		-
Schedule	-	-		-
Engineering	-	-		-
Estimating	-22.9	-144.9		-167.8
Other	-	-		-
Support	-	-		-
Subtotal	-14.8	-121.1		-135.9
Total Changes	-14.8	-121.1		-135.9
Current Estimate	1762.9	1091.1	-	2854.0

(FY 1986 Constant Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Estimate	1566.2	956.5	-	2522.7
Previous Changes:				
Economic	-	-		-
Quantity	-	-		-
Schedule	-	-		-
Engineering	-	-		-
Estimating	-	-		-
Other	-	-		-
Support	-	-		-
Subtotal	-	-		
Current Changes:				
Economic	-	-		-
Quantity	-	-		-
Schedule	-	-		-
Engineering	-	-		-
Estimating	-19.1	-118.3		-137.4
Other	-	-		-
Support	-	-		-
Subtotal	-19.1	-118.3		-137.4
Total Changes	-19.1	-118.3		-137.4
Current Estimate	1547.1	838.2	-	2385.3

13. (U) Cost Variance Analysis: (Cont'd)

b. Previous Change Explanations: Not Applicable - second SAR.

c. Current Change Explanations:

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
o Revised Jan 88 economic escalation rates. (Economic)	-	+8.1
o Variance due to reduced requirement for lab support (4.7M) in FY88, deleted payback requirement for prior year reprogramming (19.8M) in FY88, and reduction in requirement for Team Trainer development in FY89 (9.8M). (Estimating)	-19.1	-22.9
(2) Procurement		
o Revised Jan 88 economic escalation rates. (Economic)	-	+23.8
o Reduction in quantity of Team Trainers from five to four and Weapons Launch System Operator Trainers from six to zero. (Estimating)	-118.3	-144.9

d. References:

Planning Estimate: SDDM, dated 9 October 1986, subject "Fiscal Year 1989 Submarine Combat System" Milestone I Decision Memorandum

14. (U) Program Acquisition Unit Cost (PAUC) History:*

a. Initial SAR Estimate to Current Baseline Estimate: N/A

b. Current Baseline Estimate to Current Estimate: N/A

* 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)

There are no contracts which exceed $40 million.

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status:

(1) Percent Program Completed:* 21.4% (3 yrs/14 yrs)
(2) Percent Program Cost Appropriated: 15.1% (431.0/2854.0)

16. (U) Program Funding Summary: (Cont'd)

b. Appropriation Summary:

(Then-Year Dollars in Millions)

Appropriation	Current and Prior Yrs (FY81-88)	Budget Year (FY89)	Balance To Complete FYDP (FY90-93)	Balance To Complete Beyond FYDP (FY94-99)	Total
RDT&E	431.0	294.2	978.3	59.4	1762.9
Procurement	-	-	719.7	371.4	1091.1
MILCON	-	-	-	-	-
Total	431.0	294.2	1698.0	430.8	2854.0

* 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	FY86 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
				Appropriation: RDT&E				
1981		19.8		19.8			15.2	-
1982		28.6		28.6			23.7	7.6
1983		27.1		27.1			24.1	4.9
1984		23.7		23.7			22.4	3.8
1985		26.8		26.8			26.5	3.4
1986		37.5		37.5			38.2	2.8
1987		89.8		89.8			94.1	2.7
1988		171.9		171.9			186.8	3.7
1989		261.1		261.1			294.2	3.8
1990		288.6		288.6			336.2	3.6
1991		277.2		277.2			332.8	3.3
1992		171.7		171.7			211.5	2.8
1993		77.6		77.6			97.8	2.3
1994		27.2		27.2			35.0	2.3
1995		18.5		18.5			24.4	2.3
Subtotal		1547.1		1547.1			1762.9	-

Fiscal Year	Qty	FY86 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
				Appropriation: OPN*				
1990			108.8	108.8			131.2	3.6
1991			173.4	173.4			214.5	3.3
1992			60.4	60.4			76.5	2.8
1993			229.7	229.7			297.5	2.3
1994			38.8	38.8			51.3	2.3
1995			33.8	33.8			45.8	2.3
1996			88.4	88.4			122.5	2.3
1997			16.4	16.4			23.3	2.3
1998			87.3	87.3			126.7	2.3
1999			1.2	1.2			1.8	2.3
Subtotal			838.2	838.2			1091.1	-
Total		1547.1	838.2	2385.3			2854.0	-

16. (U) Program Funding Summary: (Current Estimate in Millions of Dollars) (Cont'd)

c. Annual Summary: (Cont'd)

Fiscal Year	Qty	FY86 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: SCN for SSN 21								
1988		-	-	-	-	18.2	18.2	3.7
1989	1	18.4	142.8	176.2	18.2	-	188.2	3.8
1990		-	-	-	-	26.3	26.3	3.6
1991	2	17.8	264.4	303.8	26.3	40.5	390.0	3.3
1992	2	2.6	262.0	285.7	40.5	59.6	380.8	2.8
1993	3	2.4	374.7	408.0	59.6	57.5	526.3	2.3
Subtotal		41.2	1043.9	1173.7	144.6	202.1	1529.8	

Fiscal Year	Qty	FY86 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Sailaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: SCN for SSN 688*								
1988		-	-	-	-	40.3	40.3	3.7
1989	2	6.1	64.0	73.0	40.3	39.1	84.3	3.8
1990	2	1.1	64.3	67.4	39.1	36.5	78.7	3.6
1991	2	-	59.9	60.5	36.5	19.6	57.9	3.3
1992	1	-	31.7	32.2	19.6	19.4	40.6	2.8
1993	1		30.7	31.1	19.4	19.2	40.1	2.3
Subtotal		7.2	250.6	264.2	154.9	174.1	341.9	

d. Obligations and Expenditures:

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1981	15.2	15.2	15.2
1982	23.7	23.7	23.7
1983	24.1	24.1	24.1
1984	22.4	22.4	22.4
1985	26.5	26.5	26.3
1986	38.2	38.2	34.6
1987	94.1	93.5	68.7
1988	186.8	32.3	5.7
To Complete	2423.0	-	-
Total	2854.0	275.9	220.7

* These are non-add quantities and funding is included in the host platform SARs (SSN 21 and SSN 688).

17. (U) Production Rate Data:

a. Annual Production Rate: Not Applicable.

b. Cost Variance: Not Applicable.

c. Schedule Variance: Not Applicable.

d. Planned Deliveries:

	To Date
RDT&E	0/0
Procurement	0/0

18. (U) Operating and Support Costs: Not Applicable; Program is not yet in Full Scale Development.

19. (U) Cost-Quantity Information. Not Applicable. Production systems for new construction ships are procured under SCN appropriation and are reported in the SSN 21 and SSN 688 SARs.

SAR-87-100

[redacted]

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)
(U) PROGRAM: AGM-136A

AF-31 TACIT RAINBOW AS OF DATE: December 31, 1987

(U) INDEX

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SAF/PAS

88-0116

1. (U) Designation/Nomenclature (Popular Name): AGM-136A/Tacit Rainbow

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:

RDT&E: PE 27316F, 27316N
PROCUREMENT: PE 27316F, 27316N, APPN 3020/3010
MILCON: PE 27316F
O&M: PE 27316F

5. (U) Related Programs: Seek Spinner

[redacted]

[redacted]

OASD(PA) DFOISR 88-F-0942

[redacted]

6. (U) Mission and Description:

(U) The Tacit Rainbow (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 Air Force F-16 and EF-111 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 Ventura Division (NCVD) 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 contract was awarded to NCVD in October 1981 with a period of performance through July 1984. Cost, schedule and technical problems led to a Tri-Service Assistant Secretaries of the Air Force, Army and Navy directed six month intensive risk closure period from July 1985-January 1986. After correction of the technical problems, the System Program Office (SPO) was given direction from the Assistant Secretaries (AF, USA and USN) in March 1986 to proceed with the completion of FSD and to cap the existing Cost Plus Incentive Fee contract. FSD go-ahead was in June 1986. Preliminary Design Review and Critical Design Review for the redesigned missile system were conducted in July and October 1986, respectively. Upon completion of airworthiness and environmental testing, Tacit Rainbow entered Contractor Development Flight Test to be followed by the Development Test & Evaluation/Initial Operational Test & Evaluation.

b. (U) Developments Since Last Report - Three AGM-136A jettison flights off the B-52G were successfully completed. In addition, 4 captive flights and 1 free flight were conducted off the Navy A-6E. The free flight test resulted in a failure. Contractor flight testing should resume in the Feb/Mar 1988 time frame followed by Government-conducted Development Test and Evaluation/ Initial Operational Test and Evaluation. All vehicle structural testing along with Phase I airworthiness testing were completed. The new direction, PMD 1093(4) - 27316F, dated 21 July 87, significantly changed previous effort by requiring second sourcing of missile procurement and integration of the Tacit Rainbow onto the Air Force F-16 and EF-111. The mission planning area was redirected to meet changing user requirements.

(U) FY90 and beyond have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

(U) The AGM-136A system is expected to satisfy the mission requirement.

c. (U) Changes Since "As Of" Date - None

8. (U) Decision Coordinating Paper Threshold Breaches: AGM-136A does not have a DCP.

9. [redacted] Schedule:

a. [redacted] Milestones	Dev. Estimate/ Approved Program	Current Estimate
(U) DAB IIIA	Jun 88/ Dec 88 (CH-3)	Jun 89 (CH-1)
(U) Complete full scale development	Sep 88/ Dec 88 (CH-3)	Jun 89 (CH-2)
(U) First Production Delivery	Aug 89/ May 90(CH-3)	Jul 90 (CH-1)
(b)(1)		
(U) DT&E/IOT&E Complete	- / Jun 89(CH-3)	Jun 89 (CH-3)

b. (U) Previous Change Explanations: Initial SAR submission.

c. [redacted] Current Change Explanations:

(b)(1)

(U) (CH-2) Completion of FSD is changed from Sep 88 to Jun 89 to reflect a slip in DT&E and IOT&E as a result of test problems during contractor development testing.

(U) (CH-3) Reflects USD(A) baseline approval.

d. (U) References:

Development Estimate: FY88/89 President's Budget

Approved Program: FY88/89 President's Budget; PMD 1093(4)-27316F, dated 21 Jul 1987; USD(A) Memo, 9 Feb 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical	Dev Estimate/ Approved Program	Demonstrated Performance	Current Estimate
(U) Reliability			
(b)(1)			

c. (U) Previous Change Explanations: Initial SAR submission.

d. (U) Current Change Explanations:

(b)(1)

(U) (CH-2) Range that was provided in the 30 Jun 87 SAR was in error. Endurance is being substituted as a more accurate representation of the operational requirement.

(U) (CH-3) To reflect USD(A) baseline approval, 9 Feb 1988.

1/ (U) After pre-launch, includes all aspects from carriage through to warhead function.

2/ (U) Defined as passing go/no-go checks and accepting preflight mission programming.

(b)(1)

AGM-136A, December 31, 1987

10. (U) Technical/Operational Characteristics (Cont'd):

e. (U) References:

Development Estimate: FY88/89 President's Budget

Approved Program: FY88/89 President's Budget; PMD 1093(4)-27316F, dated 21 Jul 1987; USD(A) Memo, 9 Feb 1988.

11. (U) Program Acquisition Cost:*
(Current Estimate in Millions of Dollars)

a. (U) Cost --	Development Estimate	Changes	Current Estimate
Development (RDT&E)	125.7	+ 4.7	131.4
Procurement	2653.7	+ 19.9	2673.6
Total Flyaway	(2289.7)	(+ 47.8)	(2337.5)
Peculiar Support	(147.0)	(- 16.3)	(130.7)
Other Weapon System Cost	(151.6)	(- 8.2)	(143.4)
Initial Spares	(65.4)	(- 3.4)	(62.0)
Construction (MILCON)	6.1	+ 1.0	7.1
Total Base Year FY85 $	2786.5	+ 25.6	2812.1
Escalation	867.5	+ 45.5	913.0
Development (RDT&E)	(17.8)	(+ 0.5)	(18.3)
Procurement	(848.5)	(+ 44.8)	(893.3)
Construction (MILCON)	(1.2)	(+ 0.2)	(1.4)
Total Then Year $	3654.0	+ 71.1	3725.1

b. (U) Quantities--

(b)(1)

d. (U) Approved Design to Cost Goal - None.

e. (U) Foreign Military Sales -- None

f. (U) Nuclear Costs -- None

* Costs reflect single source program for FY90 and beyond while FY88/89 reflect dual source program causing FY90 and out phasing anomalies.

12. [redacted] Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est. Dec 87 SAR	UCR Baseline Jun 87 SAR	UCR Baseline Dec 87 SAR
a. [redacted] Program Acquisition --			
(1) (U) Cost	$3725.1	$3654.0	$3725.1
(b)(1)			
b. [redacted] Current Procurement --	(FY 88)	(FY88)*	(FY 89)
(1) (U) Cost	59.7	59.7	186.9
Less CY Adv Proc	0	0	0
Plus PY Adv Proc	0	0	0
Net Total	59.7	59.7	186.9
(b)(1)			

* Adjusted to reflect FY88 Appropriation Act in accordance with Congressional change to SAR law.

13. (U) Cost Variance Analysis:

a. (U) Summary -- (Current (Then Year) Dollars in Millions)

TY$

	RDT & E	PROC*	MILC	TOTAL
Development Estimate	144.5	3502.2	7.3	3654.0
Previous Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current 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
Total Changes	+5.2	+64.7	+1.2	+71.1
Current Estimate	149.7	3566.9	8.5	3725.1

*Includes 3010 and 3020 appropriations

13. (U) Cost Variance Analysis (Cont'd):

a. (U) Summary -- (FY85 Constant (Base Year) Dollars in Millions)

	RDT & E	PROC*	MILC	TOTAL
Development Estimate	126.7	2653.7	6.1	2786.5
Previous Changes				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	-	-	-	-
Estimating	-	-	-	-
Other	-	-	-	-
Support	-	-	-	-
Subtotal	-	-	-	-
Current Changes				
Economic	-	-	-	-
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
Total Changes	+4.7	+19.9	+1.0	+25.6
Current Estimate	131.4	2673.6	7.1	2812.1

*Includes 3010 and 3020 appropriations

b. (U) Previous Change Explanations: Initial SAR submission.

13. (U) Cost Variance Analysis (Cont'd):

c. (U) Current Change Explanations:

	(Dollars in Millions) Base-Year	Then-Year
(1) (U) RDT&E		
Revised economic escalation indices (Economic)	-	-0.4
Adjustment for current year escalation (Estimating)	+0.4	+0.4
Increased IOT&E requirement (Estimating)	+4.3	+5.2
(2) (U) PROCUREMENT		
Revised economic escalation indices (Economic)	-	+27.3
Adjustment for current year escalation (Estimating)	-0.1	-0.1
Adjustment for FY 90 and beyond escalation (Estimating)	-12.7	-17.0
Adjustment for FY 90 and beyond escalation (Support)	-0.9	-1.1
One year delay in procurement due to direction for second sourcing and problems with contractor development testing	-	+27.8
Delay in flyaway procurement (Schedule)	-	(+16.1)
Delay in support procurement (Support)	-	(+9.8)
Delay in launcher procurement (Support)	-	(+1.9)
Fixed expense savings due to schedule compression (Schedule)	-	-26.9
Refinement of estimates for peculiar support items (Support)	-27.6	-33.5
Refinement of spares estimates (Support)	-3.7	-4.0
Refinement of launcher nonrecurring estimate (Support)	+4.3	+7.0
Refinement of 3020 nonrecurring estimate due to increased facilitization costs for prime contractor and costs for directed second sourcing (Estimating)	+57.2	+67.8
Refinement of 3020 recurring air vehicle estimate (Estimating)	+3.4	+17.4
(3) (U) MILCON		
Revised estimate for storage facility upgrade (Estimating)	+1.0	+1.2

13. (U) Cost Variance Analysis (Cont'd):

d. (U) References:

Development Estimate: FY 88/89 President's Budget

14. [redacted] Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. [redacted] Initial SAR Estimate to Current Baseline Estimate --

PAUC (Initial SAR Dev Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
(b)(1)									

15. (U) Contract Information:* (Then-Year Dollars in Millions)

a. (U) RDT&E --

1. Contractor: Northrop Ventura Division
Contract Type: CPIF
Contract Title: AGM 136A Full Scale Engineering Development
Contract Number: F33657-81-C-2123
Contractor's Estimated Price at Completion: N/A
Actual Cost of Work Performed (ACWP) to date: N/A
Variances: N/A

2. Contractor: Boeing Military Aircraft Company
Contract Type: FPIF
Contract Title: B-52 Integration Full Scale Engineering Development
Contract Number: F33657-85-C-2097
Contractor's Estimated Price at Completion: N/A
Actual Cost of Work Performed (ACWP) to Date: N/A
Variances: N/A

b. (U) Procurement -

1. Contractor: Northrop Ventura Division
Contract Type: FPIF
Contract Title: AGM-136A Nonrecurring Production
Contract Number: F33657-87-C-0166
Contractor's Estimated Price at Completion: N/A
Actual Cost of Work Performed (ACWP) to date: N/A
Variances: N/A

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: 10.0% (1 yr/10 yrs)

(2) (U) Percent Program Cost Appropriated: 4.0% ($149.4/$3725.1)

b. (U) Appropriation Summary --

(Then-Year Dollars in Millions)

Appropriation	Current Year (FY88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93-97)	Total
RDT&E	89.7	45.1	14.9	0	149.7
Procurement	59.7	186.9	1194.5	2125.8	3566.9
MILCON	0	5.6	2.9	0	8.5
Total	149.4	237.6	1212.3	2125.8	3725.1

*Program funding summary reflects single source program for FY90 and beyond. FY88/89 reflects dual source program causing FY90 and out phasing anomalies.

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16. Program Funding Summary--COMBINED (Cont'd):

c. *Annual Summary --

Fiscal Year	Qty	FY 85 Base-Year Dollars: Flyaway Nonrec	Flyaway Rec	Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate (%)
Appropriation: RDT&E (3600)								
1988	-	-	-	80.2	-	-	89.7	3.7
1989	-	-	-	38.9	-	-	45.1	3.8
1990	-	-	-	10.9	-	-	13.1	3.6
1991	-	-	-	0.7	-	-	0.9	3.3
1992	-	-	-	0.7	-	-	0.9	2.8
Subtot	(b)(1)	-	-	131.4	-	-	149.7	
Appropriation: Missile Procurement								
1988	-	47.2	-	47.2	-	-	55.1	3.7
1989	(b)(1)	3.2	123.5	134.3	-	-	162.0	3.8
1990		28.2	174.1	227.3	-	-	282.1	3.6
1991		1.6	265.5	291.3	-	-	370.8	3.3
1992		4.7	353.4	386.8	-	-	504.0	2.8
1993		-	318.1	355.4	-	-	473.8	2.3
1994		-	307.6	347.5	-	-	473.7	2.3
1995		-	302.1	344.0	-	-	479.9	2.3
1996		-	253.5	295.8	-	-	422.1	2.3
1997		-	154.8	189.2	-	-	276.3	2.3
Subtot		84.9	2252.6	2618.8	-	-	3499.8	

16. [redacted] Program Funding Summary--COMBINED (Cont'd):

c. [redacted] *Annual Summary --

Fiscal Year	Qty	FY 85 Base-Year Dollars: Flyaway Nonrec	FY 85 Base-Year Dollars: Flyaway Rec	FY 85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: Aircraft Procurement								
1988	-	-	-	4.0	-	-	4.6	3.7
1989	-	-	-	20.7	-	-	24.9	3.8
1990	-	-	-	18.0	-	-	22.3	3.6
1991	-	-	-	12.0	-	-	15.2	3.3
1992	-	-	-	0.1	-	-	0.1	2.8
Subtot	-	-	-	54.8	-	-	67.1	
(b)(1)								

Fiscal Year	Qty	FY 85 Base-Year Dollars: Flyaway Nonrec	FY 85 Base-Year Dollars: Flyaway Rec	FY 85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: MILCON (3300)								
1989	-	-	-	4.7	-	-	5.6	3.8
1990	-	-	-	2.4	-	-	2.9	3.6
Subtot	-	-	-	7.1	-	-	8.5	
Total***	(b)(1)	84.9	2252.6	2812.1	-	-	3725.1	

***Quantity does not include (b)(1) (3010 APPN); Funding level includes 3010 funding.

[redacted]

16. [redacted] Program Funding Summary--USAF only (Cont'd):

c. [redacted] *Annual Summary --

Fiscal Year	Qty	FY 85 Base-Year Dollars: Flyaway: Nonrec	FY 85 Base-Year Dollars: Flyaway: Rec	FY 85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc: Debit	Then-Year Dollars: Advance Proc: Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: RDT&E								
1988	-	-	-	70.8	-	-	79.2	3.7
1989	-	-	-	33.9	-	-	39.3	3.8
1990	-	-	-	7.6	-	-	9.1	3.6
1991	-	-	-	0.7	-	-	0.9	3.3
1992	-	-	-	0.7	-	-	0.9	2.8
Subtot	(b)(1) [redacted]	-	-	113.7	-	-	129.4	
Appropriation: Missile Procurement								
1988	[redacted]	47.2	-	47.2	-	-	55.1	3.7
1989	(b)(1) [redacted]	-	59.4	59.7	-	-	72.0	3.8
1990		25.9	77.4	120.5	-	-	149.6	3.6
1991		-	97.6	113.1	-	-	144.0	3.3
1992		-	162.8	179.6	-	-	234.0	2.8
1993		-	159.5	178.2	-	-	237.5	2.3
1994		-	153.0	173.1	-	-	235.9	2.3
1995		-	150.3	171.3	-	-	239.0	2.3
1996		-	92.9	108.4	-	-	154.7	2.3
Subtot		73.1	952.9	1151.1	-	-	1521.8	

91-92 378.0
- 15.3
393.3

67.1
[illegible]

AGM-136A, December 31, 1987

16. [redacted] Program Funding Summary--USAF only (Cont'd):

c. [redacted] *Annual Summary --

Fiscal Year	Qty	FY 85 Base-Year Dollars: Flyaway Nonrec	FY 85 Base-Year Dollars: Flyaway Rec	FY 85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: Aircraft Procurement**								
1988	-	-	-	4.0	-	-	4.6	3.7
1989	-	-	-	20.7	-	-	24.9	3.8
1990	-	-	-	18.0	-	-	22.3	3.6
1991	-	-	-	12.0	-	-	15.2	3.3
1992	-	-	-	0.1	-	-	0.1	2.8
Subtot	-	-	-	54.8	-	-	67.1	
Appropriation: MILCON								
1989	-	-	-	4.7	-	-	5.6	3.8
1990	-	-	-	2.4	-	-	2.9	3.6
Subtot	-	-	-	7.1	-	-	8.5	
Total	[redacted] (b)(1)	73.1	952.9	1326.7	-	-	1726.8	

**Launchers for B-52 Carriage

16. [redacted] Program Funding Summary--USN Only (Cont'd):

c. [redacted] *Annual Summary --

Fiscal Year	Qty	FY 85 Base-Year Dollars: Flyaway Nonrec	FY 85 Base-Year Dollars: Flyaway Rec	FY 85 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate (%)
Appropriation: RDT&E								
1988	-	-	-	9.4	-	-	10.5	3.7
1989	-	-	-	5.0	-	-	5.8	3.8
1990	-	-	-	3.3	-	-	4.0	3.6
Subtot	-	-	-	17.7	-	-	20.3	
Appropriation: Missile Procurement								
1989	[redacted]	3.2	64.1	74.6	-	-	90.0	3.8
1990		2.3	96.7	106.8	-	-	132.5	3.6
1991		1.6	167.9	178.2	-	-	226.8	3.3
1992		4.7	190.6	207.2	-	-	270.0	2.8
1993		-	158.6	177.2	-	-	236.3	2.3
1994		-	154.6	174.4	-	-	237.8	2.3
1995		-	151.8	172.7	-	-	240.9	2.3
1996		-	160.6	187.4	-	-	267.4	2.3
1997		-	154.8	189.2	-	-	276.3	2.3
Subtot		11.8	1299.7	1467.7	-	-	1978.0	
Total		11.8	1299.7	1485.4	-	-	1998.3	

(b)(1)

*FY90 and beyond have not been completely adjusted to reflect the impact of FY88 congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

16. (U) Program Funding Summary--USAF Only (Cont'd)

d. (U) Obligations and Expenditures * -

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1988	79.2	5.5	0.3
To Complete	50.2	-	-
Total	129.4	5.5	0.3
Appropriation: Missile Procurement			
1988	55.1	0	0
To Complete	1466.7	-	-
Total	1521.8	0	0
Appropriation: Aircraft Procurement			
1988	4.6	0	0
To Complete	62.5	-	-
Total	67.1	0	0

*As of 31 January 1988 program status by organization

16. (U) Program Funding Summary--USN Only (Cont'd)

d. (U) Obligations and Expenditures -

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
	Appropriation: RDT&E		
1988	10.5	0	0
To Complete:	9.8	-	-
Total	20.3	0	0

17. (U) Production Rate Data:

a. (U) *Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1988	(b)(1)	N/A	(b)(1)	N/A
1989		"		"
1990		"		"
1991		"		"
1992		"		"
1993		"		"
1994		"		"
1995		"		"
1996		"		"
1997		"		"

*This reflects the annual buy single source program for FY90 and beyond.

17. [redacted] Production Rate Data: (Cont'd)

b. [redacted] Cost Variance -- Dollars in Millions

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less Max	Maximum Economic
Prog Acq Cost (BY$)	N/A	N/A	2812.1	N/A	N/A
(TY$)	N/A	N/A	3725.1	N/A	N/A
PAUC (BY$)	N/A	N/A	(b)(1)	N/A	N/A
(TY$)	N/A	N/A		N/A	N/A

c. [redacted] 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	(b)(1)	N/A	N/A
Duration (in Mos)	N/A	N/A		N/A	N/A
End Date (Mo/Yr)	N/A	N/A		N/A	N/A

d. (U) Deliveries including spares (Plan/Actual) --

	To Date
RDT&E	23/2
Procurement	0/0

18. [redacted] Operating and Support Costs:

a. [redacted] Assumptions and Groundrules --

The support concept for Tacit Rainbow is as follows. The missile system is designed for dormant long-term storage and one-time use. The missile system is designed for a pre-launch reliability of (b)(1) and a mission reliability of (b)(1) A two level maintenance concept will be implemented. Organizational level maintenance will be limited to periodic inspections, go/no-go testing, and preparation for launch. All missile repairs will be done at depot level. Because of the low level of maintenance effort envisioned, contractor logistics support is planned for the depot. The missile is designed to be placed in inventory with no impact to current manning ceilings. Operations and support costs address initial and replenishment spares, and costs for depot repair. There is no known antecedent for Tacit Rainbow.

18. [redacted] 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	Avg Annual Cost Per Total Fleet
Personnel	.005	N/A
O&S Consumables	.020	N/A
Direct Depot Maintenance	.369	N/A
Sustaining Investment	.143	N/A
Other Direct Costs	.232	N/A
Indirect Costs	N/A	N/A
Total	.769	N/A

SAR-87-113

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FINAL SAR

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823) (U)
PROGRAM: High Frequency Anti-Jam (HFAJ) System

N-21 HFAJ

AS OF DATE: December 31, 1987

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1. (U) Designation and Nomenclature (Popular Name): High Frequency Anti-Jam (HFAJ) System

2. (U) DoD Component: U.S. Navy

3. (U) Responsible Office and Telephone Number:
PMW-155 CAPT G. L. Smith
Space and Naval Warfare Systems Command Assigned: 1 October 1987
Washington D.C. 20363-5100 AV 222-9740; COMM (202) 692-9740

APR 11 1988 AS AMENDED

4. (U) Program Elements/Procurement Line Items:

RDT&E:	PE 64232N (Shared Funding)	LI 51069500/51175300
Procurement:	PE 24163N (Shared Funding)	LI 33301100
	PE 24660Y (Shared Funding)	LI 33266000
O&MN:	PE 24660Y (Shared Funding)	LI 21163008
	PE 78012Y (Shared Funding)	LI 21112065
	PE 84771Y (Shared Funding)	LI 21069504
MILCON:	TBD	

No Security Objection to Open Publication (AS AMENDED) 88 LT 1338 Office of the Chief of Naval Operations Dept. of the Navy

5. (U) Related Programs: Submarine Integrated Antenna System (SIAS) Program PE 64502N

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OASD(PA) DFOISR 88-T-0904

6. (U) Mission and Description: The HFAJ program is a unified development program to develop and acquire High Frequency (HF) Anti-Jam (AJ) communications systems to meet tactical Battle Group and tactical support needs. It will provide AJ protection of tactical Battle Group HF links for Battle Group operations and Battle Force Information Management. In addition to its anti-jam capability, this system will provide improved system automation and efficiency over existing systems. The anti-jam system, to be acquired for the next generation HF communications system, is expected to employ broadband frequency agile transmission and reception, AJ modulation/demodulation, and an RF distribution/antenna subsystem. For the submarine and aircraft, a newly developed antenna system compatible with the AJ modes of operation will be used. The HFAJ system will be developed, packaged, and integrated to provide a non-AJ and anti-jam HF system for surface ships, aircraft, communications stations ashore, and submarines. The system will provide AJ protection for 2-way tactical support links between P-3 aircraft and Anti-Submarine Warfare Operations Centers (ASWOC). This program will develop equipment which will replace non-AJ RF equipment and some non-AJ modems on those platforms but not baseband equipment. The planned program will replace the HF suite only on selected platforms.

7. (U) Program Highlights:

a. (U) Significant Historical Developments -- In the first quarter FY 86, a decision was made to combine the Link Eleven Improvement (LEI) system development with the development of the High Frequency Anti-Jam (HFAJ) system to ensure compatibility and avoid redundant design effort. A Defense Acquisition Board Milestone decision was issued on 24 June 1987 to proceed with the FSED design phase. The Acquisition Decision Memorandum (ADM) was signed on 9 October 1987, and contract award occurred on 9 October 1987. The Amended Fiscal Year 1989 Biennial Budget eliminated all HFAJ funding for fiscal years 1989 and beyond, thus effectively cancelling the program. Fiscal Year 1988 funds will be used to complete the remainder of the Phase I design. This SAR will be the final submission.

b. (U) Significant Developments Since Last Report -- This is the Final SAR.

c. (U) Changes Since "As Of" Date -- See items 7.a. and 7.b. above.

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no ADM (dated 9 October 1987) threshold breaches.

9. (C) Schedule:

a. (C) Milestones —

	Development Estimate/ Approved Program	Current Estimate
Milestone IIA	Jun 87	Jun 87
FSED Contract Award	Oct 87	Oct 87
Preliminary Design Review	Jun 88	Jun 88
Critical Design Review	Nov 88	Nov 88
Milestone IIB	Feb 89	N/A
FSED Hardware Delivery	Oct 91	N/A
Commence Install & Checkout	Feb 92	N/A
(b)(1)		
Dev Testing Completed	Aug 93	N/A
Milestone IIIA	Jun 94	N/A
OPEVAL Complete	Dec 94	N/A
Milestone IIIB	Jun 95	N/A
Commence Prod Deliveries	Sep 96	N/A

b. (U) Previous Change Explanations -- N/A

c. (U) Current Change Explanations -- Program funding has been cancelled.

d. (U) References -- Amended Fiscal Year 1989 Biennial Budget.

Development Estimate: HFAJ Program Acquisition Decision Memorandum (ADM) dated 9 October 1987.

Approved Program: Program cancelled. Fiscal Year 1988 funds will be used to complete the remainder of the Phase I design.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --

	Dev Estimate/ Appr Program	Demonstrated Performance	Current1/ Estimate
(b)(1)			
(U) Data Rates (Bits per Second)			
Link 11	2250		2250
Secure Voice	2400		2400
Teletypewriter	75-2400		75-2400
(b)(1)			
(U) Reliability (per channel)			
Surface Ship/Sub/Shore (MTBF hours)	500		500
Aircraft (MFHBF hours)	250		250

c. (U) Previous Change Explanations -- N/A

d. (U) Current Change Explanations -- N/A

e. (U) References --

Development Estimate: HFAJ Program Acquisition Decision Memorandum (ADM) dated 9 October 1987.

Approved Program: Program cancelled.

1/ (U) Design criteria only.

11. (U) Program Acquisition Cost (Current Estimate in Millions of Dollars)

	Development Estimate	Changes	Current Estimate
a. (U) Cost --			
Development	316.7	-206.5	110.2
Procurement	3045.7	-3045.7	0.0
Flyaway	2342.2	-2342.2	0.0
Other Wpn Sys Cost	31.5	-31.5	0.0
Initial Spares	181.0	-181.3	0.0
Install (O&MN)	490.7	-490.7	0.0
Construction (MILCON)	4.4	-4.4	0.0
Total FY 87 Base-Year $	3366.8	-3256.6	110.2
Escalation	1173.5	-1173.9	-0.4
Development	23.9	-24.3	-0.4
Procurement (OPN/O&MN)	1147.8	-1147.8	0.0
Construction (MILCON)	1.8	-1.8	0.0
Total Then-Year $	4540.3	-4430.5	109.8
b. (U) Quantities (Channels)[1/] --			
Development	38	-38	0
Procurement (OPN)	2441	-2441	0
Total	2479	-2479	0
c. (U) Unit Cost --			
Procurement:			
FY 87 Base-Year $	1.248	-1.248	0.000
Then-Year $	1.718	-1.718	0.000
Program:			
FY 87 Base-Year $	1.358	-1.358	0.000
Then-Year $	1.832	-1.832	0.000

d. (U) Approved Design to Cost Goal -- N/A

e. (U) Foreign Military Sales -- None

f. (U) Nuclear Costs -- None

1/ (U) Channels reflect the number of specific conventional and anti-jam circuits aboard the platforms affected by this acquisition.

12. (U) Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Sep 87 SAR	UCR Baseline Dec 87 SAR
a. (U) Program Acquisition --			
(1) Cost	109.8	4540.3	109.8
(2) Quantity (Channels)	0	2479	0
(3) Unit Cost	0	1.832	0
b. (U) Current Procurement	N/A		
(1) Cost			
(2) Quantity (Channels)			
(3) Unit Cost			

13. (U) Cost Variance Analysis: N/A -- Final Submission[1/]

a. (U) Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	340.6	4193.5	6.2	4540.3
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	340.6	4193.5	6.2	4540.3
Current Changes:				
Economic				
Quantity	-230.8	-4193.5	-6.2	-4430.5
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	-230.8	-4193.5	-6.2	-4430.5
Total Changes	-230.8	-4193.5	-6.2	-4430.5
Current Estimate	109.8	0	0	109.8

13. (U) Cost Variance Analysis (Con't):[1/]
(FY 1987 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	316.7	3045.7	4.4	3366.8
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	316.7	3045.7	4.4	3366.8
Current Changes:				
Quantity	-206.5	-3045.7	-4.4	-3256.6
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	-206.5	-3045.7	-4.4	-3256.6
Total Changes	-206.5	-3045.7	-4.4	-3256.6
Current Estimate	110.2	0	0	110.2

b. (U) Previous Change Explanation -- N/A

c. (U) Current Change Explanations --

RDT&E - Quantity: Program funding has been cancelled

PROC - Quantity: Program funding has been cancelled

MILCON - Quantity: Program funding has been cancelled

d. (U) References -- Amended Fiscal Year 1989 Biennial Budget

Development Estimate: HFAJ Program ADM of 9 October 1987.

14. (U) Program Acquisition Unit Cost (PAUC) History: (Millions of Then-Year Dollars)

a. (U) Development Estimate to Current Estimate --

PAUC (Dev Est)	Changes								PAUC (Cur Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.832	--	-1.832	--	--	--	--	--	--	0

b. Current Baseline Estimate to Current Estimate -- N/A

15. (U) Contract Information: (Then-Year Dollars in Millions)

a. (U) RDT&E --

Design Phase	Initial Contract Price Target	Ceiling	Qty
Rockwell/Marconi Joint Venture Team Richardson, TX N00039-87-C-0282, FFP Award: 9 October 1987 Definitized: 9 October 1987	42.5	N/A	0 1/

Current Contract Price Target	Ceiling	Qty	Estimated Price at Completion Contractor	Program Manager
42.5	N/A	0 1/	42.5 2/	42.5 2/

	Cost Variance	Schedule
Previous Cumulative Variances	N/A	N/A
Cumulative Variances to Date	0	0
Net Change	0	0

1/ Current contract is for Phase I design.

2/ Priced Not-to-Exceed option of $169 Million is included in the contract. Total contract value is not to exceed $211.5 Million.

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) Percent Program Completed: 23.3% (6.3 yrs/ 27 yrs) 3/

(2) Percent Program Cost Appropriated: 2.4 % ($109.8/ $ 4540.3) 3/
Note: Advanced development completed FY86 (FY82-86). Full scale development commenced 10/87.

b. (U) Appropriation Summary --

Appropriation	Current & Prior Yrs FY82-88	Budget Year FY89	Balance to Complete FYDP FY90 -92	Beyond FYDP FY93-08	TOTAL
RDT&E	109.8	0.0	0.0	0.0	109.8
Procurement	0.0	0.0	0.0	0.0	0.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	109.8	0.0	0.0	0.0	109.8

3/ (U) Program cancelled.

16. (U) Program Funding Summary (Con't): (Current Estimate in Millions of Dollars)

c. (U) Annual Summary --

Fiscal Year	Qty	FY 87 Base-Year Dollars			Then-Year Dollars			Escal Rate
		Flyaway			Advance Proc		Total	
		Nonrec	Rec	Total	Debit	Credit		%
Appropriation: RDT&E								
1982				5.6			4.8	7.38
1983				5.1			4.6	4.90
1984				11.9			11.1	3.80
1985				22.9			22.0	3.40
1986				10.0			9.9	2.80
1987				13.6			13.9	2.70
1988				41.1			43.5	3.70
Subtotal				110.2			109.8	
TOTAL				110.2			109.8	

d. (U) Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E			
1988 & Prior	109.8	98.4	56.7
To Complete	N/A	N/A	N/A
Total	109.8	98.4	56.7

17. (U) Production Rate Data:

a. (U) Annual Production Rates -- 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 $)	N/A	N/A	0	0	N/A
	(TY $)	N/A	N/A	0	0	N/A
PAUC	(BY $)	N/A	N/A	0	0	N/A
	(TY $)	N/A	N/A	0	0	N/A

c. (U) Schedule Variance --

Item	Production Estimate	Variance (CE less PdE)	Current Estimate	Variance (CE less MAX)	Maximum Economic
Start Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A
Duration (in Months)	N/A	N/A	N/A	N/A	N/A
End Date (Mo/Yr)	N/A	N/A	N/A	N/A	N/A

d. (U) Deliveries (Plan/Actual) --

	To Date
RDT&E	0/0
Procurement	0/0

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules -- N/A

SAR-87-048

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SELECTED ACQUISITION REPORT (RCS: DD-COMP (Q&A)823)

PROGRAM: LSD 41 CLASS (CARGO VARIANT)

N-26 LSD-41 CARGO VARIANT AS OF DATE: December 31, 1987

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AS AMENDED APR 11 1988

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

PM: E. E. Shoults
Assigned: April 29, 1985
AUTOVON: 222-8511
COMM: (202) 692-8511

4. (U) Program Elements:

RDT&E: PE0603564N, PE0604567N (shared funding)
PROCUREMENT: 24411N, APPN 1611, ICN 5105

5. (U) Related Programs: LCAC, LSD 41

No Security Objection to Open Publication AS AMENDED
88 CP 45
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~~Review for DECLASSIFICATION on: OADR~~

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OASD(PA) DFOISR 88-F-4705

6. (U) Mission and Description: To conduct sustained combat operations; to project naval power ashore by transporting landing force elements, cargo, Landing Craft (LCAC) and Assault Amphibians to the objective area and by launching preloaded assault craft and amphibians, to support amphibious assault; and to operate in the amphibious warfare environment.

The LSD 41 (CV) is a variant of the LSD 41 Class and takes advantage of the considerable experience gained during design, construction, and initial fleet operation of the LSD 41 Class. The ship will differ from the LSD 41 Class in its larger capacities to lift vehicles and cargo with a reduction in size of the well deck to accommodate two LCAC instead of four. The LSD 41 (CV) will retain the capability to operate conventional and air-cushion landing craft and to launch and recover helicopters. The LSD 41 (CV) will use the same diesel propulsion plant as the LSD 41 Class.

7. (U) Program Highlights:

a. (U) Significant Historical Developments-- The Tentative Operational Requirement (TOR), promulgated on 27 November 1983, provided guidance to examine the feasibility of three alternative designs for a LSD 41 Class follow ship. The SCIB, on 11 May 1984, approved Alternative IIB design, a minimum change from the LSD 41 Class design. Alternative IIB was further modified to incorporate OPNAV requested cost reductions. Based on these modifications the SCIB on 3 January 1985 approved the LSD 41 (CV) configuration. In August 1985 the SCIB rejected a proposed RO/RO alternative because of incompatibility with the survivability and cargo off-load requirements of the assault echelon. The LSD 41 (CV) TLR was approved 2 July 1986 and the Acquisition Plan was approved 29 August 1986.

b. (U) Significant Developments Since Last Report -- The request for Proposal was issued to industry on 21 October 1987. This proposal is for detail design and construction of one LSD 41 Cargo Variant with options for 4 additional ships.

The LSD 41 Cargo Variant has no requirement for Operational or Development Test and Evaluation as all systems have been demonstrated on the LSD 41 Class.

Milestone II approval was given at the 10 December 1987 NPDM, Chaired by ASN(S&L), dependent on Congressional approval of the manpower documents. The Navy Decision Coordinating Pager (NDCP) was signed on 10 December 1987. This SAR is rebaselined from a Planning Estimate to a Development Estimate and reflects both estimates. The LSD 41 (CV) Program is expected to meet its mission requirements.

c. (U) Changes Since "as of" Date -- None

8. (U) Decision Coordinating Paper (DCP) Threshold Breaches: There are currently no NDCP (dated December 1987) threshold breaches.

9. (U) Schedule:

a. (U) Milestone --	Planning Estimate/Approved Program	Current/DE Estimate
(U) Milestone I (SCIB)	May 84/May 84	May 84
(U) Milestone II (NPDM)	Dec 87/Dec 87	Dec 87
(U) Milestone III	Jul 89	Jul 89
(U) Contract Award	May 88	May 88
(U) Delivery	Oct 93	Oct 93

(b)(1) [redacted]

b. (U) Previous Change Explanations -- None

c. (U) Current Change Explanation -- None

d. (U) References --

Planning Estimate: Milestone I, SCIB decision dated 11 May 1984 and TLR OPNAVINSTR C9010.333 dated 2 July 1986

Approved Program/Development Estimate: NDCP, dated 10 December 1987, subject "LSD 41 Cargo Variant".

Approved Program: FY88/89 amended Biennial Budget; DAE baseline, dated Feb 17, 1988.

10. (U) Technical/Operational Characteristics:

a. (U) Technical --	Planning Estimate/Approved Program	Demonstrated Performance	Current/DE Estimate
(U) Accommodations			
(1) Troops	504/504	-	504
(2) Crew	419/419	-	419
(U) Vehicle Square ft	14,200/14,200	-	14,200
(U) Marine Cargo (Cubic ft)	40,000/40,000	-	40,000
(U) Helicopter Spots	1 + 1/1 + 1	-	1 + 1
(U) Landing Craft	2 LCAC/2 LCAC	-	2 LCAC
(U) Length (ft)	609/609	-	609
(U) Beam (ft)	84/84	-	84
(U) Draft (ft)	20'4"/20'4"	-	20'4"

b. (U) Operational --

(U) Speed (kts)	21.6/21.6	-	21.6
(b)(1) [redacted]			
(U) Mission Completion Success Probability	.075/.075	-	.075

c. (U) Previous Change Explanations -- None.

d. (U) Current Change Explanations -- None.

e. (U) References --

Planning Estimate: Milestone I, SCIB decision dated 11 May 1984 and TLR OPNAVINSTR C9010.333 dated 2 July 1986

Approved Program/Development Estimate: NDCP, dated 10 December 1987, subject "LSD 41 Cargo Variant"; DAE baseline dated Feb 17, 1988.

11(U)Program Acquisition Cost: (Current Estimate in Millions of Dollars)

	Planning Estimate	Changes	Current/DE Estimate
a. Cost			
Development (RDT&E)	16.4	-1.0	15.4
Procurement (SCN)	1410.2	-74.9	1335.3
(Sailaway)	(1307.4)	(-74.0)	(1233.4)
(Ship System)	(4.6)	(0.0)	(4.6)
(Initial Spares)	(0.0)	(0.0)	(0.0)
(Outfitting/Post Delivery)	(98.2)	(-0.9)	(97.3)
Total FY88 Base-Year $	1426.6	-75.9	1350.7
Escalation	224.7	8.6	233.3
Development (RDT&E)	(-0.1)	(-0.1)	(-0.2)
Procurement	(224.8)	(8.7)	(233.5)
Total Then-Year $	1651.3	-67.3	1584.0
b. Quantities			
Development (RDT&E)	0	0	0
Procurement	5	0	5
Total	5	0	5
c. Unit Cost			
Procurement:			
FY88 Base-Year $	282.0	-14.9	267.1
Then-year $	327.0	-13.2	313.8
Program:			
FY88 Base-Year $	285.3	-15.2	270.1
Then-year $	330.3	-13.5	316.8

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

12(U)Program Acquisition/Current Procurement Unit Cost Summary:

(Current (Then-Year) Dollars in Millions)

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Sep 87 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	1584.0	1651.3	1584.0
(2) Quantity	5	5	5
(3) Unit Cost	316.8	330.3	316.8
b. Current Procurement --	(FY 1988)	(FY 1988)	(FY 1989)
(1) Cost	258.0	258.0	0.0
Less CY Adv Proc	0.0	0.0	0.0
Plus PY Adv Proc	0.0	0.0	0.0
Less OF/PD	0.0	0.0	0.0
Less PY Escal	0.0	0.0	0.0
Net Total	258.0	258.0	0.0
(2) Quantity	1	1	0
(3) Unit Cost	258.0	258.0	0.0

13(U)Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (PE)	16.3	1635.0	0.0	1651.3
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	16.9	0.0	16.9
Quantity	0.0	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	-1.1	-83.1	0.0	-84.2
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	-1.1	-66.2	0.0	-67.3
Total Changes	-1.1	-66.2	0.0	-67.3
Current Est ate/DE	15.2	1568.8	0.0	1584.0

13(U)Cost Variance Analysis (Continued):

a. Summary -- (FY 1984 (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Baseline Est. (Pe)	16.4	1410.2	0.0	1426.6
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	0.0	0.0	0.0
Schedule	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0
Estimating	-1.0	-74.9	0.0	-75.9
Other	0.0	0.0	0.0	0.0
Support	0.0	0.0	0.0	0.0
Subtotal	-1.0	-74.9	0.0	-75.9
Total Changes	-1.0	-74.9	0.0	-75.9
Current Estimate	15.4	1335.3	0.0	1350.7

b. Previous Change Explanation - N/A

13. Cost Variance Analysis (Continued):

c. Current Change Explanations

	(Dollars in Millions) Base-Year $	Then-Year $
1) RDT&E		
ESTIMATING		
REVISED PROGRAM ESTIMATES	0.1	0.0
DECREASE IN R&D CONTRACT DESIGN EFFORT	-1.1	-1.1
2) Procurement		
ECONOMIC		
REVISED JAN 88 ECONOMIC ESCALATION RATES	0.0	16.9
ESTIMATING		
REVISED PROGRAM ESTIMATES	-14.3	-16.9
REDUCTION BASED ON SIMILARITY TO LSD 41 CLASS	-60.6	-66.2

14(U)Program Acquisition Unit Cost (PAUC) History:

(Millions of Then-Year dollars)

a. Initial SAR Estimate to Development Baseline Estimate --

PAUC (Initial SAR Est)	Changes (Then Year Dollars in Millions) Econ	Qty	Sch	Eng	Est	Other	Spt	Total	PAUC (DE Estimate)
330.3	3.4	-0.1	0.0	0.0	-16.8	0.0	0.0	-13.5	316.8

b. Development Baseline Estimate to Current Estimate --

PAUC (DE Estimate)	Changes (Then Year Dollars in Millions) Econ	Qty	Sch	Eng	Est	Other	Sptr	Total	PAUC (Current Estimate)
316.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	316.8

15(U)Contract Information: (Then-Year Dollars in Millions)

(a) (U) RDT&E -- N/A
(b) (U) Procurement -- N/A
(c) (U) Milcon -- N/A

16(U)Program Funding Summary: (Current Estimate in Millions)

a. Program Status --

(1) Percent Program Completed: 6/17 = 35.3%
(Years Funds Appropriated/Total Program Years)

(2) Percent Program Cost Appropriated: 270.6/ 1584.0 = 17.1%
(Funds Appropriated To Date/Total Program Funding in Millions)

b. Appropriation Summary
(Then-Year Dollars in Millions)

Appropriation	Current & Prior yrs (FY83-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-93)	Beyond FYDP (FY94-99	Total
RDT&E	12.6	0.6	2.0	0.0	15.2
Procurement	258.0	0.0	1220.5	90.3	1568.8
Total	270.6	0.6	1222.5	90.3	1584.0

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	FY88 Base-Year Dollars: Sailaway Nonrec.	FY88 Base-Year Dollars: Sailaway Rec.	FY88 Base-Year Dollars: Total	Then-Year Dollars: Advance Proc Debit	Then-Year Dollars: Advance Proc Credit	Then-Year Dollars: Total	Escl Rate %
APPROPRIATION: RDT&E								
1983	0	0.0	0.0	0.3	0.0	0.0	0.3	4.90
1984	0	0.0	0.0	0.8	0.0	0.0	0.7	3.80
1985	0	0.0	0.0	3.0	0.0	0.0	2.8	3.40
1986	0	0.0	0.0	0.6	0.0	0.0	0.6	2.80
1987	0	0.0	0.0	7.1	0.0	0.0	7.0	2.70
1988	0	0.0	0.0	1.2	0.0	0.0	1.2	3.70
1989	0	0.0	0.0	0.6	0.0	0.0	0.6	3.80
1990	0	0.0	0.0	0.9	0.0	0.0	1.0	3.60
1991	0	0.0	0.0	0.9	0.0	0.0	1.0	3.30
Subtotal	0	0.0	0.0	15.4	0.0	0.0	15.2	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

c. Annual Summary --

Fiscal Year	Qty	FY88 Base-Year Dollars: Sailaway Nonrec.	Sailaway Rec.	Total	Then-Year Dollars: Advance Proc Debit	Advance Proc Credit	Total	Escl Rate %
APPROPRIATION: Procurement								
1987	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
1988	1	39.2	192.3	236.1	0.0	0.0	258.0	3.70
1989	0	0.0	0.0	0.0	0.0	0.0	0.0	3.80
1990	1	0.0	254.3	254.3	0.0	0.0	294.1	3.60
1991	1	0.0	256.6	256.6	0.0	0.0	304.0	3.30
1992	2	0.0	491.0	496.9	0.0	0.0	602.0	2.80
1993	0	0.0	0.0	17.4	0.0	0.0	20.4	2.30
1994	0	0.0	0.0	35.3	0.0	0.0	42.1	2.30
1995	0	0.0	0.0	19.6	0.0	0.0	24.0	2.30
1996	0	0.0	0.0	8.0	0.0	0.0	9.9	2.30
1997	0	0.0	0.0	7.0	0.0	0.0	8.9	2.30
1998	0	0.0	0.0	2.5	0.0	0.0	3.3	2.30
1999	0	0.0	0.0	1.6	0.0	0.0	2.1	2.30
Subtotal	5	39.2	1194.2	1335.3	0.0	0.0	1568.8	--
Total	5	39.2	1194.2	1350.7	0.0	0.0	1584.0	--

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPROPRIATION: RDT&E

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1983	0.3	0.3	0.3
1984	0.7	0.7	0.7
1985	2.8	2.8	2.7
1986	0.6	0.7	0.7
1987	7.0	6.9	6.2
1988	1.2	0.7	0.0
To Compl.	2.6	0.0	0.0
Total	15.2	12.1	10.6

16(U)Program Funding Summary (Continued): (Current Estimate in Millions)

d. Obligations and Expenditures --

APPROPRIATION: Procurement

Fiscal Year	Then Year Dollars (Current Estimate in Millions)		
	Total	Oblig.	Expended
1987	0.0	0.0	0.0
1988	258.0	0.0	0.0
To Compl.	1310.8	0.0	0.0
Total	1568.8	0.0	0.0

17(U)Production Rate Data:

* Annual Production rate is less than 6 yearly Per ASD Memo dated 12 Dec. 86, Production rate information is not applicable to the program.

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

(4)

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SAR-87-079

ATARS, 31 December 1987

SELECTED ACQUISITION REPORT (RCS:DD-COMP(Q&A)823)

PROGRAM: ATARS

AF-3 ATARS

AS OF DATE: December 31, 1987

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CLEARED FOR OPEN PUBLICATION MAR 31 1988 DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD(PA)) DEPARTMENT OF DEFENSE

1. Designation and Nomenclature (Popular Name): ATARS/Advanced Tactical Air Reconnaissance System

2. DoD Component: U.S. Air Force

3. Responsible Office and Telephone Number:

ATARS System Program Office
Deputy for Recon/Strike & EW Systems
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 63239F
PE 27217F (Shared funding)

PROCUREMENT: APPN 3010
APPN 3020

ATARS

88-0124-T

5. Related Programs: USN Mid-Range Remotely Piloted Vehicle (MRRPV).
Joint Services Imagery Processing System (JSIPS).

~~UPON REMOVAL OF PAGES 2 AND 4, THIS DOCUMENT MAY BE DOWNGRADED TO UNCLASSIFIED~~

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OASD(PA) DFOISR 88-T-0124

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 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-18D(RC)) and plan for a Follow-on Tactical Reconnaissance (FOTR) pod for carriage on a USAF fighter aircraft. TARS has future potential FMS applications. All FOTR data is excluded from this report.

b. The Unmanned Air Reconnaissance System (UARS) consists of either an EO or an 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 Remotely Piloted Vehicle (MRRPV) Program. UARS data includes sensor suites only. OSD is providing the unmanned vehicles as Government Furnished Equipment to the Air Force.

c. The Joint Services Imagery Processing System (JSIPS) is a joint (USAF/USMC/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 Milestone Decision (AMD), 30 Mar 1987, ATARS FSD source selection began 9 Jul 1987.

b. Significant Developments Since Last Report -- None.

FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 Congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

The ATARS system is expected to satisfy its mission requirement.

c. Changes Since "As Of" Date -- None.

8.(U) Decision Coordinating Paper (DCP) Threshold Breaches: The program does not have a DCP. There are currently no threshold breaches to the 30 Mar 1987 Acquisition Milestone Decision.

9. (U) Schedule: System: TARS

a. (U) Milestones

Milestones	Development Estimate/ Approved Program	Current Estimate
(U) DAB 0 (Program Init)	Aug 82/Aug 82	Aug 82
(U) DAB I	Dec 85/Dec 85	Dec 85
(U) DAB II	Nov 86/Nov 86	Nov 86
(U) ATARS ADM	Mar 87/Mar 87	Mar 87
(U) FSD Contract Award	May 88/May 88	May 88
(U) Preliminary Design Review*	Oct 88/Oct 88	Oct 88
(U) Critical Design Review*	Apr 89/Apr 89	Apr 89
(U) DAB IIIA -		
(U) Low Rate Production*	Aug 91/Aug 91	Aug 91
(U) DAB IIIB -		
(U) Full Production*	Sep 93/Sep 93	Sep 93

(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/31328F/63239F, 15 Apr 87.

Approved Program: Same as Development Estimate.

[redacted]

9. (S) Schedule (Con't): System: UARS

a. (S) Milestones

	Development Estimate/ Approved Program	Current Estimate
(U) DAB 0 (Program Init)	Aug 82/Aug 82	Aug 82
(U) DAB I	Dec 85/Dec 85	Dec 85
(U) DAB II	Nov 86/Nov 86	Nov 86
(U) ATARS ADM	Mar 87/Mar 87	Mar 87
(U) FSD Contract Award	May 88/May 88	May 88
(U) Preliminary Design Review*	Oct 88/Oct 88	Oct 88
(U) Critical Design Review*	Apr 89/Apr 89	Apr 89
(U) DAB IIIA -		
(U) Low Rate Production*	Aug 91/Aug 91	Aug 91
(U) DAB IIIB -		
(U) Full Production*	Sep 93/Sep 93	Sep 93

(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/31328F/63239F, 15 Apr 87.

Approved Program: Same as Development Estimate.

[redacted]

10. (U) Technical/Operational Characteristics: System: TARS

a. (U) Technical --	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(b)(1)			
(U) Continued Operations (degree bank)	90+/90+	N/A	90+
(U) On-Board Recording (minutes)	30/30	N/A	30
(U) Environmental Control	Compatible with ATARS platforms		Compatible with ATARS platforms
b. (U) Operational at Maturity (IOC + 2 years)			
Sensor Suite Break Rate (Percent)	1.2/1.2	N/A	1.2
Sensor Suite Combat Turnaround Time (minutes)	45/45	N/A	45
Sensor Suite Mean Repair Time ON Equipment (minutes)	20/20	N/A	20
OFF Equipment (minutes)	60/60	N/A	60

c. (U) Previous Change Explanations -- None.

d. (U) Current Change Explanations -- None.

e. (U) References --

Development Estimate: Program Management Directive 5063 (5)/27217F/27213F/27435F/31328F/63239F, 15 Apr 87.

Approved Program: Same as Development Estimate.

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~~DECLASSIFY ON: OADR~~

10. (S) Technical/Operational Characteristics: System: UARS

a. (S) Technical --	Dev Estimate/ Appr Program	Demonstrated Performance	Current Estimate
(b)(1)			
(U) Continued Operations (degree bank)	90+/90+	N/A	90+
(U) On-Board Recording (minutes)	30/30	N/A	30
(U) Environmental Control	Compatible with ATARS platforms		Compatible with ATARS platforms
b. (U) Operational at Maturity (IOC + 2 years)			
Sensor Suite Break Rate (Percent)	1.2/1.2	N/A	1.2
Sensor Suite Combat Turnaround Time (minutes)	45/45	N/A	45
Sensor Suite Mean Repair Time ON Equipment (minutes)	20/20	N/A	20
OFF Equipment (minutes)	60/60	N/A	60

c. (U) Previous Change Explanations -- None.

d. (U) Current Change Explanations -- None.

e. (U) References --

Development Estimate: Program Management Directive 5063 (5)/27217F/27213F/27435F/31328F/63239F, 15 Apr 87.

Approved Program: Same as Development Estimate.

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11. Program Acquisition Cost (Current Estimate in Millions of Dollars)
System: TARS (Sensor Suite)

a. Cost --	Development Estimate	Changes	Current Estimate
Development (RDT&E)	142.7	-	142.7
Procurement	498.1	-	498.1
Total Flyaway	(417.6)	-	(417.6)
Other Wpn Sys Cost	(57.0)	-	(57.0)
Initial Spares	(23.5)	-	(23.5)
Construction (MILCON)	0.0	-	0.0
Total FY 85 Base-Year $	640.8	-	640.8
Escalation	197.1	-	197.1
Development (RDT&E)	(25.2)	-	(25.2)
Procurement	(171.9)	-	(171.9)
Construction (MILCON)	0.0	-	0.0
Total Then-Year $	837.9	-	837.9
b. Quantities --			
Development (RDT&E)	6	-	6
Procurement	300	-	300
Total	306	-	306
c. Unit Cost --			
Procurement:			
FY 85 Base-Year $	1.660	-	1.660
Then-Year $	2.233	-	2.233
Program:			
FY 85 Base-Year $	2.094	-	2.094
Then-Year $	2.738	-	2.738

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

11. Program Acquisition Cost (Con't)
System: UARS (Sensor Suites)

a. Cost --	Development Estimate	Changes	Current Estimate
Development (RDT&E)	21.1	-	21.1
Procurement	312.9	-	312.9
Total Flyaway	(280.0)	-	(280.0)
Other Wpn Sys Cost	(16.3)	-	(16.3)
Initial Spares	(16.6)	-	(16.6)
Construction (MILCON)	0.0	-	0.0
Total FY 85 Base-Year $	334.0	-	334.0
Escalation	120.6	-	120.6
Development (RDT&E)	(4.9)	-	(4.9)
Procurement	(115.7)	-	(115.7)
Construction (MILCON)	0.0	-	0.0
Total Then-Year $	454.6	-	454.6
b. Quantities --			
Development (RDT&E)	3	-	3
Procurement	260	-	260
Total	263	-	263
c. Unit Cost --			
Procurement:			
FY 85 Base-Year $	1.203	-	1.203
Then-Year $	1.648	-	1.648
Program:			
FY 85 Base-Year $	1.270	-	1.270
Then-Year $	1.729	-	1.729

d. Approved Design to Cost Goal -- None.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

12. Program Acquisition/Current Procurement Unit Cost Summary:
(Current (Then-Year) Dollars in Millions)

System: TARS

	Current Year		Budget Year
	Current Est Dec 87 SAR	UCR Baseline Dec 87 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	837.9	837.9	837.9
(2) Quantity	306	306	306
(3) Unit Cost	2.738	2.738	2.738
b. Current Procurement -- N/A			

System: UARS

a. Program Acquisition --			
(1) Cost	454.6	454.6	454.6
(2) Quantity	263	263	263
(3) Unit Cost	1.729	1.729	1.729
b. Current Procurement -- N/A			

NOTE: Cost, quantities and unit costs are for procurement of sensor suites.

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) Dollars in Millions)

(1) 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	-	-	-	-
Current Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	167.9	670.0	0.0	837.9

13. Cost Variance Analysis (Con't):

(1) 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	-	-	-	-
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	142.7	498.1	0.0	640.8

13. Cost Variance Analysis (Con't):

a. Summary -- (Current (Then-Year) Dollars in Millions)

(2) 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	-	-	-	-
Current Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	26.0	428.6	0.0	454.6

13. Cost Variance Analysis (Con't):

(2) 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	-	-	-	-
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal	-	-	-	-
Total Changes	-	-	-	-
Current Estimate	21.1	312.9	0.0	334.0

b. Previous Change Explanations -- None.

c. Current Change Explanations -- None.

d. References --

Development Estimate: Program Management Directive 5063 (5)/27217F/27213F/27435F/31328F/63239F, 15 Apr 87.

14. Program Acquisition Unit Cost (PAUC) History:
(Millions of then-year dollars)

Initial SAR Estimate to Current Baseline Estimate --

(1) TARS

PAUC (Initial SAR Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
2.738	-	-	-	-	-	-	-	-	2.738

(2) UARS

PAUC (Initial SAR Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.729	-	-	-	-	-	-	-	-	1.729

15. Contract Information: (Then-Year Dollars in Millions) --

a. RDT&E -- None at this time. Program is currently in Source Selection.

b. Procurement -- None.

c. MILCON -- None.

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

System: TARS

a. Program Status --

(1) Percent Program Completed: 30.8% (4yrs/13yrs)

(2) Percent Program Cost Appropriated: 5.6% (46.9/837.9)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY85-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93-97)	Total
RDT&E	46.9	46.1	53.2	21.7	167.9
Procurement (3010)	0.0	0.0	184.3	485.7	670.0
MILCON	0.0	0.0	0.0	0.0	0.0
Total	46.9	46.1	237.5	507.4	837.9

16. Program Funding Summary (Con't):

System: TARS

c. Annual Summary --

Fiscal Year	QTY	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway*		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1985				2.8			2.8	3.4
1986				2.1			2.2	2.8
1987				8.1			8.7	2.7
1988				29.7			33.2	3.7
1989				39.7			46.1	3.8
1990				24.4			29.3	3.6
1991				8.6			10.6	3.3
1992				10.5			13.3	2.8
1993				16.8			21.7	2.3
SUBTOTAL	6			142.7			167.9	

*Not Available

NOTE:

1. FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 Congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

2. 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):

System: TARS

Fiscal Year	QTY	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement (3010)								
1990				14.4			17.8	3.6
1991	21	23.0	39.8	52.6			66.9	3.3
1992	33	7.7	49.8	76.6			99.6	2.8
1993	68		90.2	108.0			143.7	2.3
1994	68		82.5	100.4			136.7	2.3
1995	66		75.8	88.5			123.2	2.3
1996	44		48.8	57.6			82.1	2.3
SUBTOTAL	300	30.7	386.9	498.1			670.0	
TOTAL	306	30.7	386.9	640.8			837.9	

NOTE: FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 Congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Con't):

System: UARS

a. Program Status --

(1) Percent Program Completed: 14.3% (2yrs/14yrs)

(2) Percent Program Cost Appropriated: 0.0% (0.2/454.6)

b. Appropriation Summary -- (Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY87-88)	Budget Year (FY89)	Balance FYDP (FY90-92)	To Complete Beyond FYDP (FY93-00)	Total
RDT&E	0.2	0.0	25.8	0.0	26.0
Procurement (3020)	0.0	0.0	86.9	341.7	428.6
MILCON	0.0	0.0	0.0	0.0	0.0
Total	0.2	0.0	112.7	341.7	454.6

NOTE: UARS FY88 and out year funds will be obtained through the OSD/C3I DOD Family of Remotely Piloted Vehicles (RPVs). RPVs will be developed by the Navy under the Mid-Range RPV program.

16. Program Funding Summary (Con't): System: UARS

c. Annual Summary --

Fiscal Year	QTY	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway*		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: RDT&E								
1987				0.2			0.2	2.7
1988				0.0			0.0	3.7
1989				0.0			0.0	3.8
1990				5.0			6.0	3.6
1991				9.9			12.2	3.3
1992				6.0			7.6	2.8
SUBTOTAL	3			21.1			26.0	

*Not Available.

NOTE:

1. FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 Congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

2. UARS FY88 and out year funds will be obtained through the OSD/C3I DOD Family of Remotely Piloted Vehicles (RPVs). RPVs will be developed by the Navy under the Mid-Range RPV program.

16. Program Funding Summary (Con't):

System: UARS

Fiscal Year	QTY	FY 85 Base-Year Dollars			Then-Year Dollars			Escl Rate (%)
		Flyaway		Total	Advance Proc		Total	
		Nonrec	Rec		Debit	Credit		
Appropriation: Procurement (3020)								
1990				12.0			14.9	3.6
1991	10	15.4	15.8	19.7			25.1	3.3
1992	20	5.2	25.2	36.0			46.9	2.8
1993	40		43.8	51.9			69.2	2.3
1994	40		39.9	51.1			69.6	2.3
1995	50		46.9	48.9			68.2	2.3
1996	50		44.7	47.3			67.5	2.3
1997	50		43.1	46.0			67.2	2.3
SUBTOTAL	260	20.6	259.4	312.9			428.6	
TOTAL	263	20.6	259.4	334.0			454.6	

NOTE:

1. FY90 and beyond numbers have not been completely adjusted to reflect the impact of FY88 Congressional actions and FY89 PBDs. Proper adjustments will be completed and reported in a future SAR.

2. UARS FY88 and out year funds will be obtained through the OSD/C3I DOD Family of Remotely Piloted Vehicles (RPVs). RPVs will be developed by the Navy under the Mid-Range RPV program.

3. RPV development & procurement costs are not included in this report.

16. Program Funding Summary (Con't):

d. Obligations and Expenditures --

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
Appropriation: RDT&E (TARS + UARS)			
1985	2.8	2.8	2.8
1986	2.2	2.2	2.2
1987	8.9	1.3	0.8
1988	33.2	0.0	0.0
To Complete	146.8	0.0	0.0
TOTAL	193.9	6.3	5.8
Appropriation: PROCUREMENT (TARS + UARS)			
To Complete	1098.6	0.0	0.0
TOTAL	1098.6	0.0	0.0

17. Production Rate Data: System: TARS (Program is currently in source selection - Production rates vary with offerors.)

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	21	N/A	21	N/A
1992	33	N/A	33	N/A
1993	68	N/A	68	N/A
1994	68	N/A	68	N/A
1995	66	N/A	66	N/A
1996	44	N/A	44	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	640.8	-	N/A
TY $	N/A	N/A	837.9	-	N/A
PAUC BY $	N/A	N/A	2.094	-	N/A
TY $	N/A	N/A	2.738	-	N/A

*Program Acquisition Cost

c. Schedule Variance --

	Production Estimate	Variance (CE vs PdE)	Current Est	Variance (CE vs Max)	Maximum Econ
Start (Mo/Yr)	N/A	N/A	Aug 91	-	N/A
Duration (Mo)	N/A	N/A	77	-	N/A
End (Mo/Yr)	N/A	N/A	Dec 97	-	N/A

d. Deliveries (Plan/Actual) -- N/A

17. Production Rate Data (Con't): System: UARS (Program currently in source selecti
Production rates vary with offerors.)

a. Annual Production Rates --

Fiscal Year	Production Rates (Quantity/Year)			
	Development Estimate	Production Estimate	Current Estimate	Maximum Economic
1991	10	N/A	10	N/A
1992	20	N/A	20	N/A
1993	40	N/A	40	N/A
1994	40	N/A	40	N/A
1995	50	N.A	50	N/A
1996	50	N/A	50	N/A
1997	50	N/A	50	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	334.0	-	N/A
TY $	N/A	N/A	454.6	-	N/A
PAUC BY $	N/A	N/A	1.270	-	N/A
TY $	N/A	N/A	1.729	-	N/A

*Program Acquisition Cost

c. Schedule Variance --

	Production Estimate	Variance (CE vs PdE)	Current Est	Variance (CE vs Max)	Maximum Econ
Start (Mo/Yr)	N/A	N/A	Aug91	-	N/A
Duration (Mo)	N/A	N/A	77	-	N/A
End (Mo/Yr)	N/A	N/A	Dec 97	-	N/A

d. Deliveries (Plan/Actual) -- N/A

18. Operating and Support Costs:

a. Assumptions and Ground Rules --

(1) 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 standard three level consisting of Organizational (on equipment) Intermediate (off equipment), 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 1.2%. 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.

(2) UARS: The concept of operation is 20 UARS per squadron. Approximately two vehicles per month will be used for training flights. After each flight, the sensor suites and air vehicles will be refurbished and returned to operational use. The sensor suite maintenance concept is a baseline standard three level consisting of Organizational (on equipment), Intermediate (off equipment) and Depot. The TAF sensor suite manning requirement is 0.5 sensor technician per UARS. Sensor suite reliability/maintainability is based upon a subsystem break rate of 1.2%. The sensor suite depot cost is a summary cost which includes interim contractor support, sensor system LRU/SRU repair, and software support. The sensor suite sustaining investment support. The sensor suite sustaining investment consists primarily of replenishment spares and repair parts, support equipment replacement, and modification kits for prime mission hardware. The air vehicle support posture will also be a baseline standard three level. Vehicle support manning will come from existing aircraft support AFSC's but will not exceed 1.6 technicians per vehicle. Manpower requirements for the UARS vehicle launch/recovery team will not exceed 0.9 personnel per vehicle. Vehicle reliability/maintainability is based upon a system breakrate of 5% for a 2.5 hour average sortie duration. The vehicle support posture will be developed under the Navy Mid-Range Remotely Piloted Vehicle FSD contract.

b. Costs -- Not submitted at this time. The ATARS Program is currently in Source Selection. Cost information is source selection sensitive and varies with each offeror. This data will be provided after contract award.

SAR-87-093

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

Program: Peacekeeper Rail Garrison

AF-27 PEACEKEEPER RAIL GARRISON AS OF DATE: December 31, 1987

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SAF/PAS
88-0154-C

1. Designation and Nomenclature (Popular Name): Peacekeeper Rail Garrison

2. DoD Component: U.S. Air Force

3. 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. Program Elements/Procurement Line Items:

RDT&E: PE 64312F (Shared Funding)

PROCUREMENT: PE 11215F (Shared Funding)

MILCON: PE 11215F (Shared Funding)

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AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

OASD(PA) DFOISR 88-S-0729

5. Related Programs: Peacekeeper, Small ICBM

6. 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.

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, 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. 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. Program Highlights:

a. Significant Historical Developments - On 19 December 1986, the President selected Rail Garrison as the basing mode for the second 50 Peacekeeper missiles. A 7 Jan 87 message amendment 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 January 1987, the Ballistic Missile Office (BMO) began siting work at the 11 candidate bases. Final bases will be selected in December 1988, with the Main Operating Base directed to be at F.E. Warren AFB, WY. The site-specific Environmental Impact Statement (EIS) for the final garrison sites will be submitted in December 1988.

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).

b. Significant Developments Since Last Report - The BT&SS contract was awarded in Sep 87. The MLC and LCS contracts are scheduled for award in May 88. FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

The Peacekeeper Rail Garrison system is expected to satisfy its mission.

c. Changes Since "As Of" Date - None.

8. Decision Coordinating Paper (DCP) Threshold Breaches: None (DCP not available.

9. Schedule:

a. Milestones —

	Planning Estimate/ Approved Program	Current Estimate
Full-Scale Development (FSD)	Oct 87/Mar 88 (CH-4)	Apr 88 (CH-2)
System Design Review (SDR)	TBD/Aug 88 (CH-3)	Aug 88 (CH-1)
Critical Design Review (CDR)	TBD/Mar 90 (CH-3)	Mar 90 (CH-1)
Initial Operational Capability (IOC)1	Dec 91/Dec 91	Dec 91
Full Operational Capability (FOC)2	Jun 93/Dec 93 (CH-4)	Dec 93

(1) IOC is defined as two missiles (one train) on alert and one spare train.

(2) Fifty missiles deployed.

(3) Not earlier than.

b. Previous Change Explanations — None.

c. Current Change Explanations —
CH-1 SDR and CDR schedules determined, previously TBD.
CH-2 Delay in receiving formal OSD approval.
CH-3 Established approved program dates for SDR and CDR.
CH-4 Reflects USD(A) baseline approval.

d. References—Planning Estimate: Program Management Directive (PMD) amendment dated 7 Jan 87 amended by DEPSECDEF Memo dated 5 May 87.

Approved Program: Program Management Directive (PMD)-0075(18) dated 2 Sep 87; USD(A) memo, 9 Feb 1988.

10. Technical/Operational Characteristics: TBD

11. Program Acquisition Cost (Current Estimate in Millions of Dollars): 1/

a. Cost —	Planning Estimate	Changes	Current Estimate
Development (RDT&E)	$2487.5	-510.9	$1976.63/
Procurement	3253.2	-31.9	3221.3
Other Weapon System Costs	(2834.5)	(+11.2)	(2845.7)
Initial Spares	(418.7)	(-43.1)	(375.6)
Construction (MILCON)	587.8	—	587.8
Total FY 82 Base-Year $	6328.5	-542.8	5785.7
Escalation	2778.3	-112.5	2665.8
Development (RDT&E)	(797.7)	(-147.8)	(649.9)
Procurement	(1743.0)	(+31.9)	(1774.9)
Construction (MILCON)	(237.6)	(+3.4)	(241.0)
Total Then-Year $	9106.8	-655.3	8451.5
b. Quantities -- (Basing Units) 2/			
Development (RDT&E)	0	—	0
Procurement	50	—	50
Total	50	—	50
c. Unit Cost —			
Procurement:			
FY 82 Base Year $	65.064	-0.638	64.426
Then-Year $	99.924	—	99.924
Program:			
FY 82 Base Year $	126.570	-10.856	115.714
Then-Year $	182.136	-13.106	169.030

1/ Production missile costs for Rail Garrison program are excluded and are included in the Peacekeeper Selected Acquisition Report (SAR).

2/ One Rail Garrison basing unit is defined as one Peacekeeper rail launch car and all associated support equipment.

3/ Includes the cost of five Peacekeeper missiles to support the basing verification.

11. Program Acquisition Cost (Cont'd)

d. Approved Design to Cost Goal — None

e. Foreign Military Sales — None

f. Nuclear Costs — N/A

12. Program Acquisition/Current Procurement Unit Cost Summary): (Current [Then-Year] Dollars in Millions.

	Current Year		Budget Year
	Current Est (Dec 87 SAR)	UCR Baseline (Dec 86 SAR)	UCR Baseline (Dec 87 SAR)
a. Program Acquisition —			
(1) Cost	8451.5	9106.8	8451.5
(2) Quantity	50	50	50
(3) Unit Cost	169.030	182.136	169.030
b. Current Procurement —	(FY 1988)	(FY 1988)	(FY 1989)
(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: 1/

a. Summary — (Current [Then-Year] Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	3285.2	4996.2	825.4	9106.8
Previous Changes:	0	0	0	0
Economic	—	—	—	—
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	—	—	—	—
Other	—	—	—	—
Support	—	—	—	—
Subtotal	—	—	—	—
Current Changes:				
Economic	-0.8	49.4	3.7	52.3
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	-657.9	8.0	-0.3	-650.2
Other	—	—	—	—
Support	—	-57.4	—	-57.4
Subtotal	—	—	—	—
Total Changes	-658.7	0	3.4	-655.3
Current Estimate	2626.5	4996.2	828.8	8451.5

(FY 1982 Constant [Base-Year] Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	2487.5	3253.2	587.8	6328.5
Previous Changes:				
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	—	—	—	—
Other	—	—	—	—
Support	—	—	—	—
Subtotal	—	—	—	—
Current Changes:				
Quantity	—	—	—	—
Schedule	—	—	—	—
Engineering	—	—	—	—
Estimating	-510.9	11.2	—	-499.7
Other	—	—	—	—
Support	—	-43.1	—	-43.1
Subtotal	—	—	—	—
Total Changes	-510.9	-31.9	0	-542.8
Current Estimate	1976.6	3221.3	587.8	5785.7

1/ Production missile costs for Rail Garrison program are excluded and are included in the Peacekeeper Selected Acquisition Report (SAR).

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		
Revised escalation indices (Economic)	-	-0.8
Adjustment for current and prior year escalation (Estimating)	3.1	3.9
Adjustment for FY 90 and beyond escalation (Estimating)	-2.1	-3.1
Refinements of estimate and congressional funding cuts (Estimating)	-511.9	-658.7
(2) Procurement		
Revised escalation indices (Economic)		49.4
Adjustment for FY 90 and beyond escalation (Estimating)	-27.8	-43.1
(Support)	-4.1	-6.3
Correction between other weapon system and initial spares estimates	0.0	0.0
(Estimating)	(39.0)	(51.1)
(Support)	(-39.0)	(-51.1)
(3) MILCON		
Revised escalation indices (Economic)	-	3.7
Adjustment for FY 90 and beyond escalation (Estimating)	-2.6	-3.7
Design costs added to FY 88 budget (Estimating)	2.6	3.4

d. References — FY 1988/89 President's Budget, January 1987.

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	
182.136	1.046	0.0	0.0	0.0	-13.004	0.0	-1.148	-13.106	169.030

15. Contract Information: (Then-Year Dollars in Millions)

	Initial Contract Price		
	Target	Ceiling	Qty
Boeing, Seattle WA Basing, Test, and Systems Support F04704-87-C-0108 (CPIF/AF) Award: Sep 87 Definitized: Sep 87	$235.5	N/A	N/A

"No valid CPR data received to date."

16. Program Funding Summary: (Current Estimate in Millions of Dollars)

a. Program Status —

(1) Percent Program Completed: 25% (2/8 yrs)

(2) Percent Program Cost Appropriated: 5.0% (425.8/8451.5)

b. Appropriation Summary —

(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY87-88)	Budget Year (FY89)	Balance to Complete FYDP (FY90-92)	Balance to Complete Beyond FYDP (FY93-94)	Total
RDT&E	422.3	792.9	1411.3	—	2626.5
Procurement	—	—	4996.2	—	4996.2
MILCON	3.5	44.4	755.7	25.2	828.8
Total	425.8	837.3	7163.2	25.2	8451.5

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

c. Annual Summary* —

Fiscal Year	Qty	FY 82 Base-Year Dollars: Other Weapon Sys: Nonrec	Other Weapon Sys: Rec	Total	Then-Year Dollars: Advance Proc: Debit	Advance Proc: Credit	Total	Escl Rate %
Appropriation: RDT&E (1)								
1987				74.1			90.0	2.7
1988				263.9			332.3	3.7
1989				607.1			792.9	3.8
1990				581.9			785.6	3.6
1991				443.4			616.8	3.3
1992				6.2			8.9	2.8
Subtotal	0			1976.6			2626.5	—
Appropriation: Procurement								
1990	5			819.1			1237.7	3.6
1991	25			1428.2			2213.7	3.3
1992	20			974.0			1544.8	2.8
Subtotal	50			3221.3			4996.2	—
Appropriation: MILCON (2)								
1988				2.7			3.5	3.7
1989				33.0			44.4	3.8
1990				253.7			351.9	3.6
1991				195.6			278.6	3.3
1992				85.9			125.2	2.8
1993				15.9			23.7	2.3
1994				1.0			1.5	2.3
Subtotal	0			587.8			828.8	—
Total	50			5785.7			8451.5	—

(1) RDT&E Appropriation includes the cost of five missiles to support the Basing Verification Program.

(2) Planning and design funds are included in FY 88 and FY 89.

* FY 90 and beyond numbers have not been completely adjusted to reflect the impacts of FY 88 Congressional actions and FY 89 Program Budget Decisions. Proper adjustments will be completed and reported in a future SAR.

16. Program Funding Summary (Cont'd): (Current Estimate in Millions of Dollars)

d. Obligations and Expenditures —

Fiscal Year	Then-Year Dollars (Current Estimate in Millions) Total	Obligated	Expended
Appropriation: RDT&E			
1987	90.0	82.2	34.5
1988	332.3	19.6	0.1
To Complete	2204.2	—	—
Subtotal	2626.5	101.8	34.6
Appropriation: Procurement			
1987	—	—	—
1988	—	—	—
To Complete	4996.2	—	—
Subtotal	4996.2	—	—
Appropriation: MILCON			
1987	—	—	—
1988	3.5	—	—
To Complete	825.3	—	—
Subtotal	828.8	—	—
Total	8451.5	—	—

17. Production Rate Data: TBD

18. Operating and Support Costs: TBD

SELECTED ACQUISITION REPORT (RCS: DD-COMP (O&A) 823)

PROGRAM: FORWARD AREA AIR DEFENSE SYSTEM (FAADS)
LINE OF SIGHT-REAR (LOS-R)

87-030

A-11 FAADS LOS-R

AS OF DATE: December 31, 1987

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AND SECURITY REVIEW (OASD—PA)
DEPARTMENT OF DEFENSE

1. Description and nomenclature (popular name): Forward Area Air Defense System (FAADS) Line of Sight Rear (Pedestal Mounted STINGER) (PMS).

2. DOD Component: Department of the Army.

3. Responsible Office and Telephone Number:

Project Manager
STINGER Project Office
Redstone Arsenal, AL
35898-5630

Col. Robert A. Drolet
Assigned 9 Jan 86
Autovon: 746-6191
Commercial (205) 876-6191

No SECURITY Objection to PUBLIC RELEASE
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4. Program Elements/Procurement Line Items:

RDT&E: PE 64306 Project 646 (LOS-R/PMS)

PROCUREMENT: APPN 2032 SSN CC9803 (LOS-R/PMS)

MILCON: None

5. Related Programs: Line of Sight-Forward-Heavy: Non-line of sight, and Forward Area Air Defense Command, Control and Intelligence.

6. Mission and Description: The FAADS PMS encompasses an integrated air defense program to meet the growing air threat to the forward area of the battlefield through the 1990's and provides total coverage in the division area which permits the enemy no preferred attack option.

The PMS system is a lightweight, highly mobile and transportable surface-to-air missile/0.50 caliber machine gun system operated by a two man crew for defense against helicopters and fixed-wing aircraft at low altitude in day or

OASD(PA) DPOISR 3-2-1988

6. Mission and Description: (Continued)

the Standard Vehicle Mounted Launcher (SVML) (including seeker coolant bottles and related hardware) to support and launch multiple STINGER missiles. SVML provides output signals that shall be used to display to the gunner exactly where the STINGER missile is pointed. This driven sight reticule capability aids the gunner in severe background clutter and ECM environments. The system interfaces and functions with standard unmodified Basic STINGER, STINGER-POST, and STINGER-RMP missile rounds. The PMS incorporates a 0.50 caliber machine gun to provide virtual attrition/suppression of threat aircraft operation, ranging from degradation of ordnance delivering accuracy to total abort of mission.

The PMS Fire Unit (FU) includes all subsystems necessary for an operator to conduct an engagement sequence (detect, acquire, identify, track, and fire weapons) against hostile aircraft with either a missile or the machine gun. The PMS FU provides man machine interface to maximize STINGER missile operational effectiveness in the threat environment.

The PMS system does not degrade the current overall STINGER missile system performance. The system provides:

- A weapons platform for eight ready-to-fire STINGER missile in two external SVMLs (four-round STINGER missile launcher), a Browning M3P 0.50 caliber machine gun, and acquisition, identification and tracking sensors (including a laser range finder).
- A gunner's position with controls, displays, and suitable environment.
- Fire control electronics.
- Communication equipment.
- Identification Friend or Foe (IFF) equipment.
- Electric power equipment.
- Basic load (200 rounds) of 0.50 caliber machine gun ammunition.
- Forward Area Air Defense Command, Control and Intelligence (FAAD C2I) equipment.
- Crew ballistic protection commensurate with the HMMWV (desired).

7. Program Highlights:

a. Significant Historical Developments -- A production contract was awarded to the Boeing Company in August 1987. This contract provides for the production of 20 PMS units in conjunction with other support effort such as Product Assurance, Configuration Management, Test and Evaluation, and Logistics Planning. It also provided for five additional options for a total production of 273 PMS units for delivery through December 1993, and contractor integration of fielded items.

b. Significant Developments Since Last Report -- Option II contract was awarded for 39 PMS units in November 1987. The PMS (LOS-R) system is expected to satisfy the mission requirements. Program funding and quantities reflect the FY 88-89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 89 amended budget decisions.

c. Changes Since "As Of" Date -- Design freeze for PMS scheduled for 1 July 1988.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There is no DCP for the LOS-R system.

9. Schedule:

a. (U) Milestone (LOS-R-PMS)--

	Planning Estimate/ Approved Program1/	Current Estimate
Start Competitive Test	2QFY87/Jul 1987	Jul 1987
Contract Award-Option I	4QFY87/Aug 1987	Aug 1987
Contract Award-Option II	Nov 1987/Nov 1987	Nov 1987
Contract Award-Option III	Sep 1988/Sep 1988	Sep 1988
Contract Award-Option IV	Nov 1989/Nov 1989	Nov 1989
Contract Award-Option V	Oct 1990/Oct 1990	Oct 1990
Full Rate Production -(Option III)	Sep 1988/Sep 1988	Sep 1988
First unit equipped	2QFY89/Apr 1989	Apr 1989

b. Previous Change Explanation -- none
c. Current Change Explanation -- none
d. References --
Planning Estimate: FY 88/89 President's Budget.
Approved Program: Amended FY 89 President's Budget.

1/ Award of PMS contract provides new milestones not previously available.

10. Technical/Operational Characteristics:

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. Technical --			
(1) Compatible with MANPADS STINGER, STINGER POST and STINGER RMP	WILL MEET/WILL MEET	TBD	WILL MEET
(2) Passive sensor for day night capability	WILL MEET/WILL MEET	TBD	WILL MEET
(3) Four ready to fire STINGER missiles (8 desired)	8/8	TBD	8
b. Operational --			
(1) Ready time from standby mode	10 SEC/10 SEC	5 SEC	10 SEC
(2) Remote operation	50 METERS/50 METERS	TBD	50 METERS
(3) Reload time	15 MIN/15 MIN	TBD	15 MIN

c. Previous Change Explanations -- None.

10. Technical/Operational Characteristics: (Continued)

d. Current Changes Explanations -- none.

e. References --
Planning Estimate: Draft ROC, October 15, 1986; FY 88/89 President's Budget
Approved Program: Amended FY 89 President's Budget

11. Program Acquisition Cost (Current Estimate in Million of $):

	Planning Estimate	Changes	Current Estimate
a. Cost --			
Developement (RDT&E)			
FAAD System	11.7	-0.8	10.9
Procurement	1045.9	-0.2	1045.7
FAADS LOS-R Weapon System	(928.2)	(2.1)	(930.3)
Initial Spares	(117.7)	-(2.3)	(115.4)
Total Rollaway	TBD		930.3
Other Wpn Sys Cost	TBD		TBD
Construction (MILCON)	0.0	0.0	0.0
Total FY 87 Base Year $	1057.6	-1.0	1056.6
Escalation	200.0	19.7	219.7
Development (RDT&E)	(0.4)	-(0.1)	(0.3)
Procurement	(199.6)	(19.8)	(219.4)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Total Then-Year $	1257.6	18.7	1276.3
b. Quantities --			
Developement (RDT&E)	TBD		0
Procurement	TBD		1207
Total	TBD		1207
c. Unit Cost --			
Procurement:			
FY 87 Base-Year $	TBD		0.87
Then-Year $	TBD		1.05
Program:			
FY 87 Base-Year $	TBD		0.88
Then-Year $	TBD		1.06

11. Program Acquisition Cost (Current Estimate in Million of $): (Continued)

d. Approved Design-to-Cost Goal (DTC) -- Since LOS-R consists primarily of off-the-shelf NDI, Design-to-Cost Goals are not applicable.

e. Foreign Military Sales -- None.

f. Nuclear Costs -- None.

12. Program Acquisition/Current Procurement Unit Cost Summary (Current $ in millions):

	Current Year		Budget Year
	Current EST Dec 87 SAR	UCR Baseline Dec 86 SAR	UCR Baseline Dec 87 SAR
a. Program Acquisition --			
(1) Cost	$1,276.3	$1,257.6	$1,276.3
(2) Quantity	1207	TBD	1207
(3) Unit Cost	$1.06	TBD	$1.06
b. Current Procurement --	(FY 88)	(FY 88 APPN)	(FY 89)
(1) Cost	$53.9	$53.9	$98.1
Advance Procurement -- N/A			
(2) Quantity	39	39	100
(3) Unit Cost	$1.38	$1.38	$0.98

13. Cost Variance Analysis:

a. Summary -- (Current (Then-Year) $ in millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	12.1	1245.5	TBD	1257.6
Previous Changes:				
Economic				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Current 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
Total Changes	-0.9	+19.6	0.0	+18.7
Current Estimate	11.2	1265.1	TBD	1276.3

(FY 87 Constant Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	11.7	1045.9	TBD	1057.6
Previous Changes:				
Quantity				
Schedule				
Engineering				
Estimating				
Other				
Support				
Subtotal				
Current Changes:				
Quantity				
Schedule				
Engineering				
Estimating	-0.8	-0.2		-1.0
Other				
Support				
Subtotal	-0.8	-0.2	0.0	-1.0
Total Changes	-0.8	-0.2	0.0	-1.0
Current Estimate	10.9	1045.7	TBD	1056.6

b. Previous Changes Explanations -- none

13. Cost Variance Analysis: (Continued)

c. Current Change Explanations --

		(Dollars in Millions) Base Year	Then Year
(1)	RDT&E		
	Below Threshold Reprograming (Estimating)	-.8	-.9
(2)	Procurement		
	Revised economic escalation rates (Economic)	N/A	+19.6
	Revised Base Year Estimate (Estimating)	-.2	N/A

d. References --
Planning Estimate: FY89 President's Amended Budget

14. Program Acquisition Unit Cost (PAUC) History (Millions Then-Year $):

Current Baseline Estimate to Current Estimate --

PAUC (Plan Est)**	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
1.057									1.057

15. Contract Information: (Then-Year Dollars in Millions)

a. RDT&E -- none

b. Procurement -- CPR data is not required on FFP contracts.

PMS/Avenger:
Boeing Aerospace Co., Huntsville, AL,
DAAH01-86-C-A077, FFP*,
Award: Aug 87 (Option -- Mar 88)
Definitized: Aug 87 (Option -- Mar 88)

Initial Contract Price		
Target	Ceiling	Qty
$42.6	$42.6	59

Current Contract Price			Estimated Price at Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$42.6	$42.6	59	$42.6	$42.6

* FY 87/88 production buys.
** First SAR with production quantities.

16. Program Funding Summary: (Current Estimate in Million of Dollars)

a. Program Status --
(1) Percent Program Completed: 37.5% (3/8)
(2) Percent Program Cost Appropriated: 8.3% (105.7/1276.3)

b. Appropriation Summary --
(Then-Year Dollars in Millions)

Appropriation	Current & Prior Yrs (FY 86-88)	Year (FY 89)	FYDP (FY 90-92)	Beyond FYDP	Total
RDT&E	11.2	0.0	0.0	0.0	11.2
Procurement	94.5	98.1	603.1	469.4	1265.1
MILCON	0.0	0.0	0.0	0.0	0.0
Total	105.7	98.1	603.1	469.4	1276.3

c. Annual Summary -- FAAD Line of Sight-Rear (PMS)

FISCAL YEAR	QTY	FY 87 BASE-YEAR DOLLARS			THEN-YEAR DOLLARS			ESCL RATE %
		ROLLAWAY		TOTAL	ADVANCE PROC		TOTAL	
		NONREC	REC		DEBIT	CREDIT		
APPROPRIATION: RDT&E								
1986				4.0			4.0	2.8
1987				2.4			2.4	2.7
1988				4.5			4.8	2.3
SUBTOTAL	0			10.9			11.2	
APPROPRIATION: PROCUREMENT								
1987	20		34.3	38.2			40.6	2.7
1988	39		39.7	49.1			53.9	3.7
1989	100		81.6	86.8			98.1	3.8
1990	130		126.4	152.5			179.2	3.6
1991	132		123.7	149.0			179.6	3.3
1992	132		165.7	198.1			244.3	2.8
To Compl	654		358.8	372.0			469.4	2.3
SUBTOTAL	1207		930.3	1045.7			1265.1	
TOTAL	1207		930.3	1056.6			1276.3	

Program funding and quantities reflect the FY 88-89 President's Budget, except as adjusted for FY 88 Congressional direction and FY 88/FY 89 Amended President's Budget.

16. Program Funding Summary: (Current Estimate in Million of Dollars) (Continued)

d. Obligations and Expenditures --

FISCAL YEAR	Then-Year Dollars (current Estimate in Millions)		
	Total	Obligated	Expended
	APPROPRIATION: RDT&E		
1986	4.000	4.000	3.041
1987	2.438	2.438	0.654
1988	4.775	0.995	0.000
SUBTOTAL	11.2	7.4	3.7
	APPROPRIATION: PROCUREMENT		
1987	40.600	29.400	2.000
1988	53.900	0.000	0.000
To Compl	1170.600	0.000	0.000
TOTAL	1,265.1	29.4	2.0

17. Production Rate Data :

a. Annual Production Rates -- Based on a 1-8-5 production schedule.

Fiscal Year	Development Estimate*	Production Estimate*	Current Estimate	Maximum Economic
1987			20	TBD
1988			39	TBD
1989			100	TBD
1990			130	TBD
1991			132	TBD
1992			132	TBD
1993			132	TBD
1994			130	TBD
1995			129	TBD
1996			127	TBD
1997			136	TBD

* Development and production estimates are unavailable.

17. Production Rate Data : (Continued)

b. Cost Variance --

ITEM	PRODUCTION ESTIMATE	VARIANCE (CE LESS PDE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ECONOMIC
Prog Acq Cost (BY $)	N/A	N/A	1,050.0		TBD
(TY $)	N/A	N/A	1,276.3		TBD
PAUC (BY $)	N/A	N/A	0.870		TBD
(TY $)	N/A	N/A	1.057		TBD

ITEM	PRODUCTION ESTIMATE	VARIANCE (CE LESS PDE)	CURRENT ESTIMATE	VARIANCE (CE LESS MAX)	MAXIMUM ECONOMIC
Start Date (mo/Yr)	N/A	N/A	Nov-88		TBD
Duration (in months)	N/A	N/A	129		TBD
End Date (Mo/Yr)	N/A	N/A	Sep-99		TBD

d. Deliveries (Plan/Actuals) --

	To Date
RDT&E	0/0
Procurement	0/0

Nov 88 → Oct 99

11 x 12 = 132

+ 1

131

18. Operating and Support Costs:

a. Assumptions and Ground Rules--TBD

b. Costs--TBD

SELECTED ACQUISITION REPORT (RCS: DD-COMP(Q&A)823)

PROGRAM: FORWARD AREA AIR DEFENSE SYSTEM (FAADS)
NON-LINE OF SIGHT (NLOS)

87-031

A-12 FAADS NLOS

AS OF DATE: December 31, 1987

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1. Designation and Nomenclature (Popular Name): Forward Area Air Defense System (FAADS) Non-Line of Sight, Fiber Optics Guided Missile System (FOG-M)

2. DoD Component: Department of the Army

3. Responsible Office and Telephone Number:

Project Manager
Non-Line of Sight
Redstone Arsenal, AL 35898

Oleh B. Koropey COL
ASSIGNED: 1 July 1987
AUTOVON: 746-8454
COMMERCIAL: (205) 876-8454

4. Program Elements/Procurement Line Items:

RDT&E PE 63757 Project 465 (NLOS)

PROCUREMENT: TBD

MILCON: TBD

No SECURITY Objection to PUBLIC RELEASE
23 MAR 1988
SECURITY REVIEW, ODCSINT, HQDA

5. Related Programs: Combined Arms, Line of Sight-Forward-Heavy, Line of Sight-Rear, and Forward Area Air Defense Command Control Intelligence.

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DIRECTORATE FOR FREEDOM OF INFORMATION AND SECURITY REVIEW (OASD-PA) DEPARTMENT OF DEFENSE

OASD(PA) DFOISR 88-R-0760

6. Mission and Description: The Army has worked with the Office of the Secretary of Defense (OSD) to develop an effective and affordable program to fill the void in the Air Defense of our forward maneuver units. In January 1986, the Secretary of Defense approved in principle an integrated air defense program to meet the growing air threat to the forward area of the battlefield. The FAADS program, of which NLOS is a key component, integrates weapons, sensors, and Command, Control and Intelligence (C2I) architecture to counter the entire spectrum of the air threat to the forward area through the 90's. The FAADS concept is designed to provide total coverage in the division area and permits the enemy no preferred attack option. The FAADS acquisition strategy relies heavily on non-developmental items (NDI) and preplanned product improvements (P3I) to overcome our current air defense deficiencies rapidly and keep pace with the advancing threat. A Cost and Operational Effectiveness Analysis (COEA) is being conducted to assure the optimum mix of weapon characteristics.

The FAADS concept consists of weapons delivery elements tied together by a C2I network which also integrates FAADS into the Army command and control system architecture. The C2I initiative incorporates a family of sensors and identification of equipment (ground and aerial, active and passive) with improved data processing and distribution capability.

The Non-Line of Sight (NLOS) component will defeat threat class helicopters and ground armored vehicles masked to line of sight systems. The Fiber Optic Guided Missile (FOG-M) is being developed to fill this void. FOG-M, which is controlled through a fiber optic link from a ground station, is capable of locating and engaging targets by passing the seeker image through the fiber link to the remote gunner. The NLOS FOG-M system is capable of engaging stationary or moving targets at extended ranges. The system consists of the missile, the missile launcher, gunner station, communications equipment, and the system prime mover. The FOG-M is fired from the gunners station, emplaced in a defiladed area for protection. After launch, the gunner has a view of the area beneath and to the front of the missile, transmitted from an on-board television (TV) camera or an imaging infrared (IIR) sensor scan through a fiber optics cable spooling out the rear. The FOG-M system can sequentially launch missiles and control multiple missile flights to different targets within a given target array.

Other than the NLOS (FOG-M) system, the components of FAADS are not new to air defense. Planning for C2I along with requirements for combined arms initiatives and improved air defense weapons has existed for several years. The FAADS program, using a systems approach, will integrate these relatively independent systems together to defeat the future enemy threat in the forward area. The components will work together to maximize total force effectiveness.

7. Program Highlights:

a. Significant Historical Developments -- on 29 July 1986, the Joint Requirements & Management Board (JRMB) approved the concept for execution of the overall FAAD program as a system of systems. A draft RFP for Full Scale Development of NLOS (FOG-M) was released to industry in Dec 86. After a Defense Acquisition Board (DAB) Committee review in Oct 87, the final RFP was released in Nov 87. The Army will provide a detailed briefing to the DAB in Jul 88, which will be a Milestone II decision review. Award of the Full Scale Development contract is planned for Aug 88. The FAADS, to include the NLOS component, is expected to satisfy mission requirements. Program funds and quantities reflect the FY 88 and 89 President's budget except as adjusted for FY 88 congressional direction and FY 89 budget decisions.

b. Changes Since "As Of" Date -- None.

8. Decision Coordinating Paper (DCP) Threshold Breaches: There is no DCP for the NLOS system. Secretary of Defense Decision Memoranda issued to date have not established thresholds for the program.

9. Schedule:

	Planning Estimate/ Approved Program	Current Estimate
a. Milestones --		
RFP Release	TBD/1QFY88	1QFY88 (Ch-1)
Milestone II Decision	3QFY87/3QFY88	4QFY88 (Ch-2)
First Unit Equipped - Light	TBD/TBD	TBD
First Unit Equipped - Heavy	TBD/TBD	TBD
Milestone III Decision (DAB III)	TBD/TBD	TBD

b. Previous Change Explanations -- N/A

c. Current Change Explanations --

(Ch-1) DAB Committee meeting approved Acquisition Strategy Change October 1987.

(Ch-2) DA/OSD Revised Acquisition Strategy and System Required Operational Capability (ROC).
Fy88 Congressional Guidance necessitated amendment to November 9, 1987, Request for Proposal (RFP).

d. References --

Planning Estimate: SDDM, August 14, 1986, and FY 88/89 President's Budget

Approved Program: FY89 Amended Budget Submission

10. Technical/Operational Characteristics:

	Planning Estimate/ Approved Program	Demonstrated Performance	Current Estimate
a. Technical --			
6 Missiles per light Fire Unit	TBD/6	TBD	6 (Ch-1)
12-24 Missiles per heavy Fire Unit	TBD/12-24	TBD	12-24 (Ch-2)
b. Operational -- NLOS Mission	TBD/Helicopter or armored targets	TBD	Helicopter or armored targets (Ch-3)

c. Previous Change Explanations -- N/A

d. Current Change Explanations --

(Ch-1) 29 Oct 87 approved Required Operational Capability (ROC)

(Ch-2) 29 Oct 87 approved Required Operational Capability (ROC)

(Ch-3) 29 Oct 87 approved Required Operational Capability (ROC)

e. References --

Planning Estimate: SDDM, August 14, 1986, and FY88/89 President's Budget

Approved Program: FY89 Amended Budget Submission

11. Program Acquisition Cost (Current Estimate in Millions of Dollars):

	Planning Estimate	Change	Current Estimate
a. Cost --			
Development (RDT&E)	485.8	+5.8	491.6
Procurement	TBD		TBD
Construction (MILCON)	TBD		TBD
Total FY 87 Base Year $	485.8	+5.8	491.6
Escalation	46.6	+23.3	69.9
Development (RDT&E)	(46.6)	(23.3)	(69.9)
Procurement	TBD		TBD
Construction (MILCON)	TBD		TBD
Total Then-Year $	532.4	+29.1	561.5
b. Quantities -- N/A			
Development (RDT&E)	TBD		TBD
Procurement	TBD		TBD
Total	TBD		TBD

c. Unit Cost -- N/A
d. Approved Design to Cost Goal -- N/A
e. Foreign Military Sales -- None planned at this time.
f. Nuclear Costs -- None.

12. Program Acquisition/Current Procurement Unit Cost Summary (Current Dollars in Millions): N/A
NOTE: In accordance with Title 10 U.S. Code 2433, Unit Cost reporting shall not apply to reports that are limited to the RDT&E program.

13. Cost Variance Analysis:

a. Summary (Current (Then-Year) Dollars in Millions) --

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	532.4	TBD	TBD	532.4
Previous Changes:	--	--	--	--
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	0	--	--	0
Current Changes				
Economic	23.3	--	--	23.3
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	5.8	--	--	5.8
Other	--	--	--	--
Support	--	--	--	--
Subtotal	29.1	--	--	29.1
Total Changes	29.1	--	--	29.1
Current Estimate	561.5	--	--	561.5

(FY87 Constant Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Planning Estimate	485.8	TBD	TBD	485.8
Previous Changes:	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	0	--	--	485.8
Current Changes:				
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	5.8	--	--	5.8
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	5.8	--	--	5.8
Total Changes	5.8	--	--	5.8
Current Estimate	491.6	--	--	491.6

13. Cost Variance Analysis (Cont'd)

b. Previous Change Explanations -- N/A

c. Current Change Explanations

(Dollars in Millions)

RDT&E	Base Year	Then Year
Revised ROC necessitates development of high speed, variable speed objective missile with increased range and improved navigation and Block I Technical Risk Reduction (Engineering) $37.7M	5.8	5.8
Delete Technology Transfer (Engineering) ($31.2M)		
Small Business Innovative Research (SBIR), (Engineering) (1987) (.7M)		
Development Escalation Resulting from Contractor and Government Engineering delay (Development)	-0-	23.3

d. References --

Planning Estimate: SDDM, August 14, 1986 and FY 88/89 President's Budget

Approved Program: FY 89 Amended Budget Submission

14. Program Acquisition Unit Cost (PAUC) History (Millions of Then-Year Dollars):

Current Baseline Estimate to Current Estimate --

PAUC (Plan Est)	Changes								PAUC (Current Est)
	Econ	Qty	Sch	Eng	Est	Other	Spt	Total	
TBD	--	--	--	--	--	--	--	--	TBD

15. Contract Information (Then-Year Dollars in Millions): N/A

16. Program Funding Summary (Current Estimate in Millions of Dollars):

a. Program Status --

(1) Percent Program Completed: TBD

(2) Percent Program Cost Appropriated: TBD

b. Appropriation Summary --

(Then-Year Dollars in Millions

Appropriation	Current + Prior Yrs FY 87-88	Budget Year FY 89	Balance FYDP FY 90-93	To Complete Beyond FYDP FY 94	1/ Total
RDT&E	118.2	114.5	328.8	TBD	561.5
Procurement	--	TBD	TBD	TBD	TBD
MILCON	--	TBD	TBD	TBD	TBD
Total	118.2	114.5	328.8	TBD	561.5

1/ Program funding and quantity reflects the FY 88 presidents budget except as adjusted for FY 88 congressional direction and FY 89 budget decisions.

c. Annual Summary -- FAAD Non-Line of Sight (NLOS)
Fiber Optics Guided Missile System (FOG-M)

Appropriation: RDT&E

Fiscal Year	Qty	FY87 Base-Year Dollars Then-Year Dollars						Escl Rate (%)
		Flyaway			Advance Proc			
		Nonrec	Rec	Total	Debit	Credit	Total	
1987	0			58.7			60.2	2.7
1988	TBD			54.5			58.0	3.7
1989	TBD			103.9			114.5	3.8
1990	TBD			54.2			61.7	3.6
1991	TBD			45.4			53.3	3.3
1992	TBD			50.4			60.6	2.8
1993	TBD			124.5			153.2	2.3
Subtotal	TBD			491.6			561.5	-

d. Obligations and Expenditures --

Appropriation: RDT&E

Fiscal Year	Then-Year Dollars (Current Estimate in Millions)		
	Total	Obligated	Expended
1987	60.2	60.2	44.1
1988	58.0	41.6	1.1
To Complete	443.3	N/A	N/A
Total	561.5	101.8	45.2

17. Production Rate Data: TBD

18. Operating and Support Costs:

a. Assumptions and Ground Rules -- TBD

b. Costs -- TBD