DoD-3 PATRIOT PAC-3

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SELECTED ACQUISITION REPORT (RCS: DD-A&T(Q&A)823)
PROGRAM: PATRIOT PAC-3

AS OF DATE: December 31, 1996

INDEX

1. **(U) Designation and Nomenclature (Popular Name):** Guided Missile System, Air Defense (PATRIOT) PAC-3 Program

2. **(U) DoD Component:** BMDO

Joint Participants:
The Department of the Army is the Executing Agency

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

Project Manager
Patriot Project Office
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(U) Ballistic Missile Defense Organization, The Pentagon
Washington, DC 20301-7100

LTG Lester Lyles, USAF
Assigned: August 1, 1996
DSN 223-3025 COMM (703)693-3025

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

RDT&E:
(U) PE 0603216C (Shared)
(U) PE 0604216C (Shared)
(U) PE 0604225C (Shared)
(U) PE 0604865C
(U) PE 0604866C
(U) PE 23801D036

PROCUREMENT:

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4a. (U) Program Elements/Procurement Line Items (Cont'd):

(U) APPN 0300 ICN 0208060C (DCA/DNA) (Shared)
(U) APPN 2032 ICN C49200 (Army)
(U) APPN 2032 ICN C49300 (Army)
(U) APPN 2032 ICN C50700 (Army)
(U) APPN 2032 ICN CA0267 (Army)

5. (U) References:

SAR Baseline (Development Estimate):
(U) Milestone IV/II Acquisition Decision Memorandum, dated 7 July 1994, subject: "PAC-3 Acquisition Decision Memorandum," and the Defense Acquisition Executive (DAE) approved Acquisition Program Baseline (APB) dated February 22, 1995.

Approved Program:
(U) Approved Acquisition Program Baseline (APB) dated August 20, 1996.

6. (U) Mission and Description:

(U) PATRIOT, the centerpiece of the Army's echelon above corps and theater air defense forces, is an extremely capable high-to-medium altitude, long-range air defense missile system which provides air defense of ground combat forces and high-value assets against the air threat of the 1990s and beyond. PATRIOT is designed to cope with enemy defense suppression tactics that may include tactical ballistic missiles (TBM), cruise missiles, anti-radiation missiles, advanced aircraft employing saturation, maneuver, sophisticated electronic countermeasures (ECM), and low radar cross-section. In the Field Army, PATRIOT air defenses will be complemented by short-range, low altitude forward area defense weapons and will be integrated with other ground and air assets in the overall air defense of the theater of operations. The system can conduct multiple simultaneous engagements of high performance air breathing targets and TBMs with a high probability of target kill. The system will provide air defense protection in all weather conditions and in hostile ECM environments. At the battery level or Fire Unit (FU) level, the PATRIOT missile system consists of an Engagement Control Station (ECS), one Radar Set (RS), an Electric Power Plant (EPP), eight Launching Stations (LS), and associated communications equipment. At the battalion level, command and control is exercised through the Information and Coordination Central (ICC) and associated communications equipment including Communications Relay Groups (CRG). The PATRIOT RS is a multifunction phased array radar which performs a variety of surveillance, acquisition, and guidance tasks. The only manned element of the FU during air battle, the ECS, provides the human interface for control of automated operations.

The PATRIOT Advanced Capability (PAC-3) program is the result of a series of integrated, phased system improvements in combination with the PAC-3 missile (formerly ERINT). The PAC-3 missile is a high velocity hit-to-kill, surface-to-air missile capable of intercepting and destroying tactical missiles and air breathing threats. The PAC-3 missile provides the range, accuracy, and lethality to effectively defend against tactical missiles with nuclear, conventional high explosive, biological and chemical warheads. The missile uses a solid propellant rocket motor, aerodynamic vane controls, and inertial guidance to navigate to an intercept point. Shortly before arrival at the intercept point, the missile's rate of spin is increased, the on-board radar homing seeker acquires

6. (U) Mission and Description (Cont'd):
the target, and terminal homing guidance is initiated to achieve hit-to-kill by high resolution maneuvers.

7. (U) Executive Summary:

(U) The PATRIOT PAC-3 program is the evolution of the phased materiel change improvement program and new missile procurement to upgrade PATRIOT System performance. As a result of evolving threat and analysis of PATRIOT performance in Operation Desert Storm, several system upgrades are being implemented. These upgrades include the PAC-3 missile, radar enhancements, communications upgrades, and increased computer capability. In February 1994, the Army Systems Acquisition Review Committee (ASARC) made a down-select recommendation to proceed with development of the Extended Range Interceptor (ERINT) as the PAC-3 missile, in lieu of the Multimode missile. The Defense Acquisition Board (DAB) conducted a Milestone IV/II review in May 1994 and approved the PAC-3 missile for entry into the Engineering and Manufacturing Development (EMD) phase.

Program reviews with Army, BMDO, and OSD, in late FY95 and early FY96 determined significant schedule risk in executing the PAC-3 program. As a result of these reviews, budgeting decisions were made to minimize program risk by restructuring the program to extend the EMD schedule by up to ten months and establish fourth quarter FY99 as the objective date for PAC-3 First Unit Equipped. A new Acquisition Program Baseline was approved on 20 August 1996 which implemented the OSD directed program restructure based on the FY97 President's Budget. Contract modifications were incorporated into the PAC-3 Missile EMD and the Missile Segment Integration contracts to reflect the revised program.

A revised PAC-3 Test and Evaluation Master Plan (TEMP) was approved by the Director, OSD (OT&E), on November 1, 1996. A PAC-3 TEMP was initially approved by the Defense Acquisition Board in May 1994. The TEMP was updated in accordance with Congressional language approved in the FY96 Defense Authorization Bill which revised the Multiple Simultaneous Engagement requirement and added flight tests agreed to by Army and OSD.

First Unit Equipped (FUE) was achieved on December 5, 1996 for the second of three phases of the PATRIOT Growth Program. The FUE for Configuration 2 was declared with fielding of hardware and software to the 5/52 Air Defense Artillery. Configuration 2 adds communication upgrades for joint interoperability, improved radar performance, self defense capability against anti-radiation missile, and capability to receive and process information from external intelligence sources.

Developmental missile flight testing is scheduled to begin in the third quarter FY97.

8. (U) **Threshold Breaches:**

a. (U) Acquisition Program Baseline (APB):

Item	Breach
Schedule	No
Performance	No
Cost -- RDT&E	No
-- Procurement	No
-- MILCON	No
-- O&M	No
-- Average Procurement Unit Cost (APUC)	(Same as APUC, below)

b. (U) Nunn-McCurdy Unit Cost:

Item	Breach
Program Acquisition Unit Cost	No
Average Procurement Unit Cost	No

9. (U) **Schedule:**

a. Milestones --

	Development Estimate (SAR)	Approved Program (APB)	Current Estimate	
MISSILE				
Milestone II (Missile) (DAB)	MAY 94	MAY 94	MAY 94	
Development Contract Award	SEP 94	SEP 94	OCT 94	
Preliminary Design Review Complete	SEP 95	SEP 95	OCT 95	
Critical Design Review Complete	MAR 96	MAR 96	MAR 96	
Service Final DT&E				
Start	JAN 97	APR 97	JUN 97	(Ch-1)
Complete	DEC 97	DEC 98	DEC 98	
Low Rate Initial Production Decision (DAB)	JUN 97	SEP 97	DEC 97	(Ch-1)
Low Rate Initial Production Contract Award	JUL 97	OCT 97	JAN 98	(Ch-1)
Begin LRIP	N/A	N/A	DEC 97	
Low Rate Production First Delivery	MAY 98	APR 99	APR 99	
IOT&E				
Start	JAN 98	FEB 99	FEB 99	
Complete	JUN 98	MAR 99	MAR 99	
Milestone III Production Decision	AUG 98	JUN 99	JUN 99	
Full Rate Production Contract Award	AUG 98	OCT 99	OCT 99	
First Unit Equipped	SEP 98	JUL 99	JUL 99	
Service Depot Support	SEP 01	JUL 02	JUL 02	
[redacted]				
OTHER UPGRADES				
Configuration 1 Production Confirmatory Test	MAR 95	MAR 95	MAY 95	(Ch-2)
Configuration 1 First Unit Equipped	JUN 95	JUN 95	DEC 95	
Configuration 2 Follow On Test	DEC 95	DEC 95	MAY 96	

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

	Development Estimate (SAR)	Approved Program (APB)	Current Estimate	
Configuration 2 First Unit Equipped	JUN 96	JUN 96	DEC 96	(Ch-3)
Configuration 3 Follow On Test	JUN 98	FEB 99	FEB 99	
Configuration 3 First Unit Equipped	SEP 98	JUL 99	JUL 99	

(U) PAC-3 Missile First Unit Equipped (FUE) is considered achieved when the first Fire Unit is equipped with sixteen PAC-3 missiles with which to load four PAC-3 missiles on each of four PAC-3 capable launching stations.

PAC-3 Initial Operational Capability (IOC) is considered achieved when a PATRIOT Battalion, consisting of five Fire Unit (FU), is equipped with thirty-two PAC-3 missiles per FU.

The Begin LRIP milestone is not an Acquisition Program Baseline milestone and will be deleted in the next SAR.

b. (U) Current Change Explanations --
(Ch-1) Current program planning is to conduct first missile flight test in 3rd quarter FY97. Schedule for subsequent flight tests required to meet Low Rate Initial Production Exit Criteria, requires change of Production Decision and Contract Award current estimates. Current Estimate changed for Service Final DT&E - Start, from APR 97 to JUN 97; Low Rate Initial Production Decision (DAB), from SEP 97 to DEC 97; and Low Rate Initial Production Contract Award, from OCT 97 to JAN 98.

(Ch-2) Current Estimate reflects actual completion of MAY 95.

(Ch-3) Current Estimate is actual accomplishment date.

10a. (U) **Performance Characteristics (Cont'd)**:

/4 (U) System Effectiveness = P(DET) x [1-(1-P(SSK))^n], where n=number of shots, and SSK=Single Shot Kill

/5 (U) Missile Reliability based on Reliability Growth Curve. Technical parameter which supports the key Joint Requirements Oversight Council validated characteristics.

/6 (U) Technical parameter which supports the key JROC validated characteristics.

b. Current Change Explanations -- None.

11. (U) **Total Program Cost and Quantity (Dollars in Millions)**:

a. (U) Cost --	Development Estimate (SAR)	Approved Program (APB)	Current Estimate
Development (RDT&E)	2015.6	2332.3	2376.4
Procurement	2783.2	3122.7	3204.1
Recurring Flyaway	(1498.8)		(2307.8)
Nonrecurring Flyaway	(1244.7)		(734.3)
Total Flyaway	(2743.5)		(3042.1)
Total Other Wpn Sys			(0.0)
Peculiar Support	(0.0)		(0.0)
Initial Spares	(39.7)		(162.0)
Construction (MILCON)	0.0	0.0	0.0
Acquisition O&M	0.0	0.0	0.0
Total FY 88 Base-Year $	4798.8	5455.0	5580.5
Escalation	1582.8	1798.4	1845.1
Development (RDT&E)	(420.2)	(528.5)	(542.5)
Procurement	(1162.6)	(1269.9)	(1302.6)
Construction (MILCON)	(0.0)	(0.0)	(0.0)
Acquisition O&M	(0.0)	(0.0)	(0.0)
Total Then Year $	6381.6	7253.4	7425.6

b. (U) Quantity --

Development (RDT&E)	0	0	0
Procurement	54	54	54
Total	54	54	54

(U) The Unit of Measure is a Fire Unit (FU) which consists of a Radar Set, an Engagement Control Station, an Electric Power Plant, and up to eight Launching Stations equipped with missiles.

The Low Rate Initial Production (LRIP) quantity for the PAC-3 missile established by the 7 July 1994 Milestone IV/II Acquisition Decision Memorandum was 90. The LRIP missile quantity changed to 120, in accordance with the OSD directed program restructure based on the FY97 President's Budget. The change was approved by the USD(A&T) in December 1996, as part of the program rebaselining action. The LRIP missile quantity is 10% of the production quantity.

c. Foreign Military Sales -- None.

11d. (U) Total Program Cost and Quantity (Cont'd):

d. Nuclear Costs -- None.

12. (U) Unit Cost Summary:

	Current Estimate (Dec 96 SAR)	UCR Baseline (AUG 96 APB)	Percent Change
a. (U) Prog. Acq. Unit Cost (PAUC)			
(1) Cost (FY 88 BY$)	5580.5	5455.0	
(2) Quantity	54	54	
(3) Unit Cost	103.343	101.019	+2.30
b. (U) Avg. Proc. Unit Cost (APUC)			
(1) Cost (FY 88 BY$)	3204.1	3122.7	
(2) Quantity	54	54	
(3) Unit Cost	59.335	57.828	+2.61

13. (U) Cost Variance Analysis:

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

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	2435.8	3945.8	-	6381.6
Previous Changes:				
Economic	-3.2	-123.9	-	-127.1
Quantity	-	-	-	-
Schedule	+296.6	-444.5	-	-147.9
Engineering	-	+282.2	-	+282.2
Estimating	+131.6	+616.0	-	+747.6
Other	-	-	-	-
Support	-	+117.0	-	+117.0
Subtotal	+425.0	+446.8	-	+871.8
Current Changes:				
Economic	+0.4	-11.6	-	-11.2
Quantity	-	-	-	-
Schedule	-	-3.8	-	-3.8
Engineering	+52.6	+145.2	-	+197.8
Estimating	+5.1	-70.0	-	-64.9
Other	-	-	-	-
Support	-	+54.3	-	+54.3
Subtotal	+58.1	+114.1	-	+172.2
Total Changes	+483.1	+560.9	-	+1044.0
Current Estimate	2918.9	4506.7	-	7425.6

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

(U) Summary (FY 1988 Constant (Base-Year) Dollars in Millions)

	RDT&E	PROC	MILCON	TOTAL
Development Estimate	2015.6	2783.2	-	4798.8
Previous Changes:				
Quantity	-	-	-	-
Schedule	+218.6	-375.3	-	-156.7
Engineering	-	+190.4	-	+190.4
Estimating	+97.7	+440.2	-	+537.9
Other	-	-	-	-
Support	-	+84.2	-	+84.2
Subtotal	+316.3	+339.5	-	+655.8
Current Changes:				
Economic	-	-	-	-
Quantity	-	-	-	-
Schedule	-	-	-	-
Engineering	+40.9	+93.5	-	+134.4
Estimating	+3.6	-50.2	-	-46.6
Other	-	-	-	-
Support	-	+38.1	-	+38.1
Subtotal	+44.5	+81.4	-	+125.9
Total Changes	+360.8	+420.9	-	+781.7
Current Estimate	2376.4	3204.1	-	5580.5

b. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
(1) RDT&E		
Revised escalation indices. (Economic)	N/A	+0.4
Adjustment for Current and Prior Inflation. (Estimating)	-1.1	-1.4
Return of funds previously provided to Navy (Estimating)	+3.2	+4.1
Small Business Innovative Research reduction (Estimating)	-4.4	-5.7
Reprogramming to Air Defense Command and Control System (Estimating)	-1.2	-1.5
Revised estimate to include target costs. (Estimating)	+7.5	+10.1
Revised program office estimate. (Estimating)	-0.4	-0.5
Multi-Mode Missile Risk Reduction Requirement (Engineering)	+9.9	+11.6

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

b. (U) Current Change Explanations --

	(Dollars in Millions) Base-Year	Then-Year
Horizontal Battlefield Digitization (Engineering)	+4.4	+6.0
Anti-Cruise Missile Requirement (Engineering)	+26.6	+35.0
RDT&E Subtotal	+44.5	+58.1
(2) Procurement		
Revised escalation indices. (Economic)	N/A	-13.3
Economic adjustment for negative program change. (Economic)	N/A	+1.7
Adjustment for Current & Prior Inflation. (Estimating)	+0.9	+1.2
Realignment of procurement buy profile due to extension of EMD to reduce risk (Schedule)	0.0	-3.8
Refined Flyaway Cost estimate. (Estimating)	-51.1	-71.2
Special Target Funding (Engineering)	+6.4	+8.6
FY97 Congressional Supplement for Integrated Diagnostics Support System (IDSS)/Guidance Enhancement Missile (GEM) (Engineering)	+9.1	+12.1
Revised IDSS and missile modification (Engineering)	+22.3	+34.5
Modification kits for Radar, Remote Launch/Communications Enhancement Upgrades (RLCEU) and other upgrades (Engineering)	+55.7	+90.0
Adjustment for Current and Prior Inflation. (Support)	+0.2	+0.2
Initial Spares Requirement (Support)	+37.9	+54.1
Procurement Subtotal	+81.4	+114.1

14. (U) Unit Cost and Other History (Then-Year Dollars in Millions):

a. (U) Program Acquisition Unit Cost (PAUC) History

Current SAR Baseline to Current Estimate

PAUC Dev Est	Changes								PAUC Cur Est
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
118.18	-2.56	--	-2.81	+8.89	+12.64	--	+3.17	+19.33	137.51

b. (U) Procurement Unit Cost (PUC) History

Current SAR Baseline to Current Estimate

PUC Dev Est	Changes								PUC Cur Est
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
73.07	-2.51	+0.01	-8.30	+7.91	+10.11	--	+3.17	+10.39	83.46

c. (U) Schedule, Cost, and Quantity History

Item/Event	SAR Planning Estimate(PE)	SAR Development Estimate(DE)	SAR Production Estimate(PdE)	Current Estimate
Milestone I	N/A	N/A	N/A	N/A
Milestone II	N/A	MAY 94	N/A	MAY 94
Milestone III	N/A	AUG 98	N/A	JUN 99
FUE/IOC	N/A	SEP 98	N/A	JUL 99
Total Cost	N/A	6381.6	N/A	7425.6
Total Quantity	N/A	54	N/A	54
Prog Acq Unit Cost	N/A	118.18	N/A	137.51

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

a. RDT&E --

(U) FY89 ENGINEERING DEVEL:
RAYTHEON Co., BEDFORD, MA
DAAH01-89-C-0458, CPIF
Award: April 10, 1989
Definitized: April 10, 1989

Initial Contract Price		
Target	Ceiling	Qty
$159.8	N/A	0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$162.0	N/A	0	$185.6	$185.6

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

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-24.5	$-2.4
Cumulative Variances To Date (12/31/96)	$-26.6	$-2.1
Net Change	$-2.1	$0.3

Explanation of Change:

(U) This contract contains five independent tasks with varying periods of performance. The tasks are: Pulse Doppler Processor (PDP), Expanded Weapon Control Computer (EWCC), Responsive Threat Analysis, Radar Enhancement Phase III, and Classification, Discrimination, and Identification Phase III (CDI-3). The PDP, EWCC, Responsive Threat and Radar Enhancement Phase III tasks have been completed. The PDP, EWCC, and Responsive Threat tasks are Army P3I funded, and the Radar Enhancement and CDI-3 tasks are BMDO funded.

All contract effort since the prior report is associated with the CDI-3 task. The change in the estimated price at completion and the cumulative cost variance is due to the increased system complexity and problems experienced with integration and checkout of hardware, additional labor for rework and retest of modules, and more extensive development required for operational and diagnostic software.

There are no significant impacts to the contract because of the unfavorable variances.

This contract has met the 90% completion criteria and this is the final report for this contract.

(U) PAC-3 MISSILE EMD:
LORAL VOUGHT SYSTEMS, DALLAS, TX
DAAH01-95-C-0021, CPIF/AF
Award: October 26, 1994
Definitized: November 7, 1995

Initial Contract Price		
Target	Ceiling	Qty
$515.8	N/A	0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$693.1	N/A	0	$693.1	$713.5

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-15.1	$-17.2
Cumulative Variances To Date (12/31/96)	$-24.4	$-11.5
Net Change	$-9.3	$5.7

Explanation of Change:

(U) Per FY96 funding guidance, EMD was extended to minimize program risk. Current Contract Price and the Contractor Estimated Price at Completion increased $110.6M for risk abatement modifications. The Program Manager Estimated Price at Completion includes the modifications and the projected overrun.

The cost variance change was primarily driven by extended design and

15. (U) **Contract Information (Cont'd)**:
integration activities for the Enhanced Launcher Electronics System, seeker development refinements to improve performance and reduce costs, and greater than planned efforts in Radio Frequency Down Link brassboard and first flight article fabrication.

There are no significant impacts to the contract because of the unfavorable variances.

(U) PAC-3 MSL INTEGRATION:
RAYTHEON CO., BEDFORD, MA
DAAH01-95-C-0022, CPIF/AF
Award: October 31, 1994
Definitized: October 23, 1995

Initial Contract Price		
Target	Ceiling	Qty
$104.8	N/A	0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$138.2	N/A	0	$138.2	$138.2

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.5	$-2.5
Cumulative Variances To Date (12/31/96)	$1.1	$-3.2
Net Change	$0.6	$-0.7

Explanation of Change:

(U) The Current Contract Price and Estimated Price at Completion increased $33.4M for the contract modification to align contract activities with the overall PAC-3 program restructure initiated by the program funding changes.

The schedule variance change is primarily due to delays in delivery of the Fire Solution Computer and Enhanced Launcher Electronics System hardware which impacted the start of system integration testing.

There is no significant impact to the contract because of the unfavorable schedule variance.

(U) REM LCH COMMO ENH UPGRAD:
Raytheon Co., Bedford, MA
DAAF01-96-C-0018, CPIF
Award: November 6, 1995
Definitized: December 23, 1996

Initial Contract Price		
Target	Ceiling	Qty
$66.5	N/A	0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$66.5	N/A	0	$66.5	$66.5

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

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$0.0	$0.0
Cumulative Variances To Date (12/31/96)	$0.0	$-2.8
Net Change	$0.0	$-2.8

Explanation of Change:

(U) The Initial Contract Price, Current Contract Price, and Estimated Price at Completion are shown at the definitized contract target price of $66.5M.

The schedule variance change is primarily due to delays in the Integrated Digital Operator Control System system design which caused slips in hardware selection and subsequent manufacturing effort.

There is no significant impact to the contract because of the unfavorable schedule variance.

(U) TMD Targets Program:
Coleman Research Corp., Orlando FL
DASG60-92-C-0217, CPFF
Award: October 14, 1992
Definitized: October 14, 1992

Initial Contract Price		
Target	Ceiling	Qty
$144.2	N/A	25

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$219.2	N/A	25	$208.2	$215.0

	Cost Variance	Schedule Variance
Previous Cumulative Variances	$-4.1	$-1.6
Cumulative Variances To Date (12/31/96)	$-5.4	$-3.9
Net Change	$-1.3	$-2.3

Explanation of Change:

(U) The unfavorable cost variance is the result of various problems from development to reworking hardware and performing additional testing. The remaining 19 Hera targets are to be re-designed to provide four new types of re-entry threat signature. This change in contract scope resulted in an increase of $40M to the contract.

There is no significant impact to the contract because of the unfavorable variances.

b. Procurement --

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

(U) RADAR ENH PH3 MOD KITS:
Raytheon, Co., Bedford, MA
DAAH01-95-C-0446, FFP
Award: September 29, 1995
Definitized: December 6, 1996

Initial Contract Price		
Target	Ceiling	Qty
$201.3	N/A	0

Current Contract Price			Estimated Price At Completion	
Target	Ceiling	Qty	Contractor	Program Manager
$201.3	N/A	0	$201.3	$201.3

Explanation of Change:

(U) This contract was initially awarded in Sep 95 for six modification kits and spares to support program test and evaluation. A full production decision was authorized in Dec 95 for up sixty-nine additional modification kits and spares to retrofit the balance of PATRIOT Fire Unit radars. A contract modification for procurement of sixteen kits and spares was awarded in Dec 95.

Cost and schedule variance reporting is not required for this FFP contract.

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

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

Appropriation	Prior Years (FY83-97)	Budget Year (FY98)	Budget Year (FY99)	Balance To Complete (FY00-07)	Total
RDT&E	2578.9	218.5	110.9	10.6	2918.9
Procurement	1308.2	372.7	389.1	2436.7	4506.7
MILCON	-	-	-	-	-
O&M	-	-	-	-	-
Total	3887.1	591.2	500.0	2447.3	7425.6

b. Annual Summary -- FIRE UNIT

Appropriation: 0400 RDT&E, Defense Agencies

Fiscal Year	Qty	Flyaway FY88 Dollars Nonrec	Flyaway FY88 Dollars Rec	Total Program Base-Year $	Total Program Then-Year $
1983				38.0	33.3
1984				26.5	24.1
1985				21.8	20.4
1986				15.7	15.1
1987				30.4	30.2
1988				17.4	18.0
1989				60.6	65.2
1990				34.3	38.3
1991				126.5	146.5

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

Appropriation: 0400 RDT&E, Defense Agencies

Fiscal Year	Qty	Flyaway FY88 Dollars Nonrec	Flyaway FY88 Dollars Rec	Total Program Base-Year $	Total Program Then-Year $
1992				258.2	306.0
1993				189.2	229.5
1994				174.9	216.2
1995				273.8	345.4
1996				291.8	375.9
1997				288.3	379.2
1998				153.6	206.1
1999				74.0	101.4
Subtotal				2075.0	2550.8

(U) Base Year dollars calculated using Army indices prepared on 27 Dec 96.

Appropriation: 2040 Research, Development, Test + Eval, Army

Fiscal Year	Qty	Flyaway FY88 Dollars Nonrec	Flyaway FY88 Dollars Rec	Total Program Base-Year $	Total Program Then-Year $
1989				21.8	23.4
1990				28.8	32.1
1991				39.6	45.9
1992				32.0	37.9
1993				37.8	45.8
1994				30.9	38.2
1995				18.2	22.9
1996				33.5	43.1
1997				35.2	46.3
1998				9.2	12.4
1999				6.9	9.5
2000				4.1	5.8
2001				3.4	4.8
Subtotal				301.4	368.1

Appropriation: 0300 Procurement, Defense Agencies

Fiscal Year	Qty	Flyaway FY88 Dollars Nonrec	Flyaway FY88 Dollars Rec	Total Program Base-Year $	Total Program Then-Year $
1992		20.5		20.5	24.9
1993		60.8		60.8	75.2
1994		95.2		95.2	120.1
1995		195.0		195.0	251.1
1996		219.0		219.0	286.0
1997		143.8		163.2	217.9
Subtotal		734.3		753.7	975.2

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

(U) Base Year dollars calculated using Army indices prepared on 27 Dec 96.

Appropriation: 2032 Missile Procurement, Army

Fiscal Year	Qty	Flyaway FY88 Dollars Nonrec	Flyaway FY88 Dollars Rec	Total Program Base-Year $	Total Program Then-Year $
1990			16.5	16.5	19.1
1991			126.1	126.1	149.6
1992			39.8	39.8	48.3
1993			13.7	14.3	17.7
1994			14.8	20.1	25.4
1995			20.1	25.1	32.3
1996			5.2	7.8	10.2
1997			17.5	22.8	30.4
1998	52		242.2	273.0	372.7
1999	68		253.4	279.1	389.1
2000	180		322.0	339.0	482.7
2001	212		312.1	324.7	472.5
2002	220		294.4	305.3	454.8
2003	240		261.4	271.6	414.9
2004	228		257.5	265.9	416.7
2005			50.6	54.5	87.7
2006			53.0	55.8	92.1
2007			7.5	9.0	15.3
Subtotal	1200		2307.8	2450.4	3531.5

(U) The Program Acquisition Unit Cost (PAUC) unit of measure is tactical Fire Units (FUs), see Section 12. The end item quantities reported above are missile procurements. Non-recurring procurement costs include all costs except missile hardware costs.

Service	Qty	Flyaway Dollars Nonrec	Flyaway Dollars Rec	Total Program Base-Year $	Total Program Then-Year $
OSD		734.3		2828.7	3526.0
Army	1200		2307.8	2751.8	3899.6
Grand Total	1200	734.3	2307.8	5580.5	7425.6

17. (U) Delivery/Expenditure Information:

a. (U) Deliveries To Date

	Plan	Actual
RDT&E	0	0
Procurement	0	0

(U) Percent Total Program Quantities Delivered: 0.0%

b. (U) Total Expenditures To Date (In Millions of Dollars): $ 2012.7

17b. (U) Delivery/Expenditure Information (Cont'd):
(U) Percent Total Program Expended: 27.1%

18. (U) Operating and Support Costs:

a. (U) Assumptions and Ground Rules --
The O&S assumptions and costs are based on PATRIOT Operating Tempo, Fire Unit Mean Time Between Failure (MTBF), and the PATRIOT Baseline Cost Estimate dated February 1994.

The concept of operation is 54 tactical Fire Units (FUs). The costs are the direct cost to support the primary personnel and to operate the FUs. The O&S consumables are replenishment spares, repair parts, and petroleum, oil and lubricants (POL). The Direct Depot Maintenance costs are the labor, materials, and transportation for repair of major FU component parts, and software support. The sustaining investment consists of modification kits and support operations. Other Direct Support costs include maintenance civilian labor, and other direct support for mod kit installation. The Indirect Costs are for indirect support operations, Military Occupational Specialty (MOS) training costs, Quarters Maintenance and Utilities, Post Production Engineering, Central Supply, Unit Operations, Base Operations, and training activities. PAC-3 is an upgrade program to the fielded PATRIOT system, therefore, O&S costs remain unchanged. There is no antecedent system.

b. (U) Costs -- (FY 1988 Constant (Base-Year) Dollars in Millions)

Cost Element	Avg Annual Cost Per Patriot PAC-3 Fire Unit	Avg Annual Cost Per Antecedent System N/A
Mission Pay & Allowances	N/A	N/A
Unit Level Consumption	2.0	0.0
Intermediate Maintenance	0.9	0.0
Depot Maintenance	0.6	0.0
Contractor Support	0.2	0.0
Sustaining Support	0.1	0.0
Indirect Costs	1.2	0.0
Total	5.0	0.0