



# Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-492



## **Patriot Advanced Capability-3 Missile Segment Enhancement (PAC-3 MSE)**

As of FY 2016 President's Budget

Defense Acquisition Management  
Information Retrieval  
(DAMIR)

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## Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance  
ACAT - Acquisition Category  
ADM - Acquisition Decision Memorandum  
APB - Acquisition Program Baseline  
APPN - Appropriation  
APUC - Average Procurement Unit Cost  
\$B - Billions of Dollars  
BA - Budget Authority/Budget Activity  
Blk - Block  
BY - Base Year  
CAPE - Cost Assessment and Program Evaluation  
CARD - Cost Analysis Requirements Description  
CDD - Capability Development Document  
CLIN - Contract Line Item Number  
CPD - Capability Production Document  
CY - Calendar Year  
DAB - Defense Acquisition Board  
DAE - Defense Acquisition Executive  
DAMIR - Defense Acquisition Management Information Retrieval  
DoD - Department of Defense  
DSN - Defense Switched Network  
EMD - Engineering and Manufacturing Development  
EVM - Earned Value Management  
FOC - Full Operational Capability  
FMS - Foreign Military Sales  
FRP - Full Rate Production  
FY - Fiscal Year  
FYDP - Future Years Defense Program  
ICE - Independent Cost Estimate  
IOC - Initial Operational Capability  
Inc - Increment  
JROC - Joint Requirements Oversight Council  
\$K - Thousands of Dollars  
KPP - Key Performance Parameter  
LRIP - Low Rate Initial Production  
\$M - Millions of Dollars  
MDA - Milestone Decision Authority  
MDAP - Major Defense Acquisition Program  
MILCON - Military Construction  
N/A - Not Applicable  
O&M - Operations and Maintenance  
ORD - Operational Requirements Document  
OSD - Office of the Secretary of Defense  
O&S - Operating and Support  
PAUC - Program Acquisition Unit Cost

PB - President's Budget  
PE - Program Element  
PEO - Program Executive Officer  
PM - Program Manager  
POE - Program Office Estimate  
RDT&E - Research, Development, Test, and Evaluation  
SAR - Selected Acquisition Report  
SCP - Service Cost Position  
TBD - To Be Determined  
TY - Then Year  
UCR - Unit Cost Reporting  
U.S. - United States  
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

## Program Information

**Program Name**

Patriot Advanced Capability-3 Missile Segment Enhancement (PAC-3 MSE)

**DoD Component**

Army

## Responsible Office

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**Date**

**Assigned:** July 24, 2013

## References

**SAR Baseline (Development Estimate)**

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated August 6, 2004

**Approved APB**

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated January 16, 2015

## Mission and Description

The Patriot Advanced Capability-3 Missile Segment Enhancement (PAC-3 MSE) is a high velocity, hit-to-kill, surface-to-air missile capable of intercepting and destroying Tactical Ballistic Missiles (TBM) and air-breathing threats. The PAC-3 MSE is the follow-on variant of the PAC-3 missile. The PAC-3 MSE's improved capability is achieved through a higher performance solid rocket motor, modified lethality enhancer, more responsive control surfaces, upgraded guidance software, and insensitive munitions improvements. The PAC-3 MSE employs kinetic energy to destroy targets through a hit-to-kill capability and provides the range, accuracy, and lethality to effectively defend against TBMs armed with weapons of mass destruction as well as providing expanded battlespace performance against evolving threats. The PAC-3 MSE is being initially integrated into the Patriot system requiring minor modifications to the launching station and using currently fielded system software, Post Deployment Build (PDB)-7. Additional system improvements, Radar Digital Processor and PDB-8 software, are in process and when fielded enable the system to fully utilize the PAC-3 MSE kinetic capabilities. There is no anticipated increase in Patriot operations or maintenance personnel as a result of integrating the PAC-3 MSE into Patriot.

## Executive Summary

On March 27, 2014, the DAE signed the Milestone C ADM authorizing PAC-3 MSE to enter the Production and Deployment phase and proceed with LRIP. The ADM directed PAC-3 MSE be established as a separate ACAT ID program. The MSE was previously reported as the Missile subprogram of the Patriot/Medium Extended Air Defense System Combined Aggregate Program, which terminated reporting in the December 2013 SAR. Therefore, the MSE is being reported for the first time as the separate PAC-3 MSE program.

The FY 2014 PAC-3 MSE Production Fixed Price Incentive Firm Target Undefined Contract Action (UCA) was awarded on March 28, 2014, following approval of the PAC-3 MSE Milestone C decision. Contract negotiations delayed definitization of the UCA, but definitization is currently anticipated to be completed in 3rd Quarter FY 2015.

The FY 2016 PB includes a program increase of \$148.0M in FY 2015 for procurement of additional PAC-3 MSE missiles to support the combatant commanders.

There are no significant software-related issues with this program at this time.

## Threshold Breaches

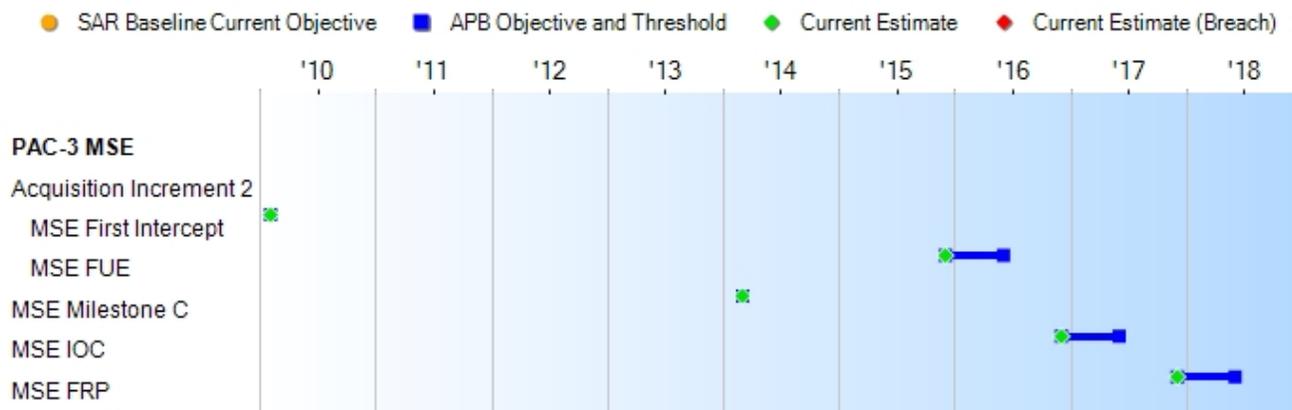
### APB Breaches

- Schedule
- Performance
- Cost
  - RDT&E
  - Procurement
  - MILCON
  - Acq O&M
- O&S Cost
- Unit Cost
  - PAUC
  - APUC

### Nunn-McCurdy Breaches

- Current UCR Baseline**
  - PAUC None
  - APUC None
- Original UCR Baseline**
  - PAUC None
  - APUC None

## Schedule



Schedule Events				
Events	SAR Baseline Development Estimate	Current APB Production Objective/Threshold		Current Estimate
Acquisition Increment 2				
MSE First Intercept	Feb 2010	Feb 2010	Feb 2010	Feb 2010
MSE FUE	Dec 2015	Dec 2015	Jun 2016	Dec 2015
MSE Milestone C	Mar 2014	Mar 2014	Mar 2014	Mar 2014
MSE IOC	Dec 2016	Dec 2016	Jun 2017	Dec 2016
MSE FRP	Dec 2017	Dec 2017	Jun 2018	Dec 2017

### Change Explanations

None

### Notes

MSE FUE is considered achieved when the first Patriot Fire Unit is equipped with twelve MSE missiles.

MSE IOC is considered achieved when a Patriot Battalion, consisting of four Fire Units, is equipped with twelve MSE missiles per Fire Unit.

### Acronyms and Abbreviations

FUE - First Unit Equipped

## Performance

Performance Characteristics				
SAR Baseline Development Estimate	Current APB Production Objective/Threshold	Demonstrated Performance	Current Estimate	
<b>System Training</b>				
<b>Proficiency Level</b>				
Soldiers (Operators, Maintainers, and Leaders) are able to perform critical tasks to standard 95% of the time after training.	Soldiers (Operators, Maintainers, and Leaders) are able to perform critical tasks to standard 95% of the time after training.	(T=O) Soldiers (Operators, Maintainers, and Leaders) are able to perform critical tasks to standard 95% of the time after training.	Soldiers (Operators, Maintainers, and Leaders) were able to perform critical tasks to standard 95% of the time after training during logistics demonstration and test unit training.	Soldiers (Operators, Maintainers, and Leaders) are able to perform critical tasks to standard 95% of the time after training.
<b>Time to Train</b>				
Duration of institutional training shall be no more than 20 weeks for AOC 14A and MOSs 14E, H, T, 140A, 35 weeks for MOS 140E to train to use the system capabilities properly.	Duration of institutional training shall be no more than 20 weeks for AOC 14A and MOSs 14E, H, T, 140A, 35 weeks for MOS 140E to train to use the system capabilities properly.	(T=O) Duration of institutional training shall be no more than 20 weeks for AOC 14A and MOSs 14E, H, T, 140A, 35 weeks for MOS 140E to train to use the system capabilities properly.	Fire Centers of Excellence currently conducts AOC 14A in 18 weeks 3 days, 14E in 19 weeks 4 days, 14H in 11 weeks 3 days, 14T in 10 weeks, 140A in 19 weeks 2 days and 140E in 35 weeks and 4 days.	Duration of institutional training shall be no more than 20 weeks for AOC 14A and MOSs 14E, H, T, 140A, 35 weeks for MOS 140E to train to use the system capabilities properly.
<b>Training Retention</b>				
Soldier sustainment training to maintain proficiency shall be required quarterly, semi-annually, and annually.	Soldier sustainment training to maintain proficiency shall be required quarterly, semi-annually, and annually.	(T=O) Soldier sustainment training to maintain proficiency shall be required quarterly, semi-annually, and annually.	Soldier sustainment training to maintain proficiency shall be required quarterly, semi-annually, and annually in accordance with FM 3-01.86, Air Defense Artillery Patriot Brigade Gunnery Program.	Soldier sustainment training to maintain proficiency shall be required quarterly, semi-annually, and annually.
<b>Training Support</b>				
Training resources shall be capable of providing 95% of training individual and collective critical tasks	Training resources shall be capable of providing 95% of training individual and collective critical	Training resources shall be capable of providing 90% of training individual and collective critical	All training support materials to include preliminary technical manuals, New Equipment Training	Training resources shall be capable of providing 95% of training individual and collective critical

(march-order and emplacement, operations, maintenance, force operations, and engagement operations) related to tactically deployed systems while missiles are loaded.	tasks (march-order and emplacement, operations, maintenance, force operations, and engagement operations) related to tactically deployed systems while missiles are loaded.	tasks (march-order and emplacement, operations, maintenance, force operations, and engagement operations) related to tactically deployed systems while missiles are loaded.	Plans, Task Analysis', and Doctrine Impact Reports were provided to Fires Center of Excellence Directorate of Training Development and Doctrine.	tasks (march-order and emplacement, operations, maintenance, force operations, and engagement operations) related to tactically deployed systems while missiles are loaded.
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**Training Interoperability**

System specific training capabilities shall interoperate with and support collective training with existing live, virtual, and constructive training environments throughout the system lifecycle.	System specific training capabilities shall interoperate with and support collective training with existing live, virtual, and constructive training environments throughout the system lifecycle.	(T=O) System specific training capabilities shall interoperate with and support collective training with existing live, virtual, and constructive training environments throughout the system lifecycle.	The Patriot weapons system supports live, virtual and constructive training environments by using TADSS to conduct multi-level training for both operators and maintenance personnel. With the addition of DIS and TADiL-J demonstrated the ability to participate in a virtual environment in both AC-12 and JC-14. The constructive environment was demonstrated during PoP Test 1 (connected two PCOFT labs in different states) and PoP Test 2 (connected two PCOFT labs in different countries.)	System specific training capabilities shall interoperate with and support collective training with existing live, virtual, and constructive training environments throughout the system lifecycle.
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**Net Ready**

The PAC-3 Increment 2 system must fully support execution of all operational activities and information exchanges identified in the DoD Enterprise Architecture and solution architectures based on integrated DoDAF content, and	The PAC-3 Increment 2 system must fully support execution of all operational activities and information exchanges identified in the DoD Enterprise Architecture and solution architectures based on integrated DoDAF content, and	The PAC-3 Increment 2 system must fully support execution of joint critical operational activities and information exchanges identified in the DoD Enterprise Architecture and solution architectures based on integrated DoDAF content, and	TBD	The PAC-3 Increment 2 system must fully support execution of all operational activities and information exchanges identified in the DoD Enterprise Architecture and solution architectures based on integrated DoDAF content, and
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<p>must satisfy the technical requirements for transition to Net-Centric military operations to include: (1) Solution architecture products; (2) Compliant with Net-Centric data strategy and Net-Centric Services strategy; (3) Compliant with GIG Technical Guidance; (4) Information assurance requirements; (5) Supportability requirements.</p>	<p>must satisfy the technical requirements for transition to Net-Centric military operations to include: (1) Solution architecture products; (2) Compliant with Net-Centric data strategy and Net-Centric Services strategy; (3) Compliant with GIG Technical Guidance; (4) Information assurance requirements; (5) Supportability requirements.</p>	<p>must satisfy the technical requirements for transition to Net-Centric military operations to include: (1) Solution architecture products; (2) Compliant with Net-Centric data strategy and Net-Centric Services strategy; (3) Compliant with GIG Technical Guidance; (4) Information assurance requirements; (5) Supportability requirements.</p>		<p>must satisfy the technical requirements for transition to Net-Centric military operations to include: (1) Solution architecture products; (2) Compliant with Net-Centric data strategy and Net-Centric Services strategy; (3) Compliant with GIG Technical Guidance; (4) Information assurance requirements; (5) Supportability requirements.</p>
<p><b>Sustainment Reliability</b></p>				
<p>The material sustainment reliability will exceed 41 hours MTBCMF.</p>	<p>The material sustainment reliability will exceed 41 hours MTBCMF.</p>	<p>The material sustainment reliability will exceed 20 hours MTBCMF.</p>	<p>Will be demonstrated during Post Deployment Build-8 and Radar Digital Processor-Configuration Operational testing.</p>	<p>The material sustainment reliability will exceed 20 hours MTBCMF.</p>

Classified Performance information is provided in the classified annex to this submission.

**Requirements Reference**

Patriot Advanced Capability-3 (PAC-3) Increment 2 Capability Production Document (CPD) dated January 24, 2013

**Change Explanations**

None

## Acronyms and Abbreviations

AC-12 - Austere Challenge 2012  
AOC - Area of Concentration  
DIS - Distributive Interactive Simulation  
DoDAF - Department of Defense Architecture Format  
FM - Field Manual  
GIG - Global Information Grid  
JC-14 - Juniper Cobra 2014  
MOS - Military Occupational Specialty  
MTBCMF - Mean Time Between Critical Mission Failure  
O - Objective  
PCOFT - Patriot Conduct of Fire Trainer  
PoP - Proof of Principle  
T - Threshold  
TADiL-J - Tactical Digital Information Link-Joint  
TADSS - Training Aids, Devices, Simulators, and Simulations

## Track to Budget

### General Notes

A budget activity code for MILCON is not yet established. The Army is working prioritization that establishes depot capability within four years of IOC.

### RDT&E

Appn	BA	PE
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Army 2040 05 0605456A

Project	Name
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PA3 PATRIOT PAC-3/Missile Segment (Shared)  
Enhancement

### Procurement

Appn	BA	PE
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Army 2032 02

Line Item	Name
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C53101 MSE Missile

## Cost and Funding

### Cost Summary

Total Acquisition Cost							
Appropriation	BY 2014 \$M			BY 2014 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Production Objective	Current Estimate
RDT&E	567.8	940.8	1034.9	933.5	482.0	871.1	871.1
Procurement	7096.2	5087.2	5595.9	5225.6	7574.0	5840.7	5944.6
Flyaway	--	--	--	4787.0	--	--	5443.9
Recurring	--	--	--	4705.6	--	--	5362.7
Non Recurring	--	--	--	81.4	--	--	81.2
Support	--	--	--	438.6	--	--	500.7
Other Support	--	--	--	438.6	--	--	500.7
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	9.0	9.9	9.1	0.0	10.5	10.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	7664.0	6037.0	N/A	6168.2	8056.0	6722.3	6826.2

#### Current APB Cost Estimate Reference

Army Cost Position dated February 28, 2014

#### Confidence Level

Confidence Level of cost estimate for current APB: 85%

The PAC-3 MSE missile Program Office Estimate is estimated at a confidence level of 85%. Over 90% of the Research, Development, Test, and Evaluation costs are sunk; however, there are still Initial Operational Test and Evaluation flight tests remaining that are planned through FY 2017. The PAC-3 MSE missile is a variation of the current PAC-3 missile; therefore, there was substantial PAC-3 cost data available to support the PAC-3 MSE missile cost estimate. There are design changes to several components of the missile, which prevent using a higher confidence level.

The Base Year for the program has been updated from FY 2004 to FY 2014 using the following deflators:

Appn Category	Deflation Factor
RDT&E	1.23198226
Procurement	1.23198226
MILCON	1.23198226

#### Cost Notes

The PAC-3 MSE APB objective Cost and Quantity represent total Army requirements with planned procurement from 2014 through 2025. The Army will continue to assess emerging threats, technology improvements, and material obsolescence for impacts and implementation to the current product configuration baseline.

Total Quantity			
Quantity	SAR Baseline Development Estimate	Current APB Production	Current Estimate
RDT&E	0	0	0
Procurement	1528	1057	1093
<b>Total</b>	<b>1528</b>	<b>1057</b>	<b>1093</b>

## Cost and Funding

### Funding Summary

Appropriation Summary									
FY 2016 President's Budget / December 2014 SAR (TY\$ M)									
Appropriation	Prior	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	To Complete	Total
RDT&E	833.8	35.0	2.3	0.0	0.0	0.0	0.0	0.0	871.1
Procurement	629.2	532.6	414.9	430.6	462.7	493.6	569.5	2411.5	5944.6
MILCON	0.0	0.0	0.0	0.0	0.0	10.5	0.0	0.0	10.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2016 Total	1463.0	567.6	417.2	430.6	462.7	504.1	569.5	2411.5	6826.2
PB 2015 Total	1558.9	384.6	419.8	422.6	458.7	497.6	503.0	5258.7	9503.9
Delta	-95.9	183.0	-2.6	8.0	4.0	6.5	66.5	-2847.2	-2677.7

Quantity Summary										
FY 2016 President's Budget / December 2014 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	92	108	80	85	93	95	104	436	1093
PB 2016 Total	0	92	108	80	85	93	95	104	436	1093
PB 2015 Total	0	86	70	76	80	88	94	90	944	1528
Delta	0	6	38	4	5	5	1	14	-508	-435

## Cost and Funding

### Annual Funding By Appropriation

Annual Funding							
2040   RDT&E   Research, Development, Test, and Evaluation, Army							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2004	--	--	--	--	--	--	62.5
2005	--	--	--	--	--	--	53.2
2006	--	--	--	--	--	--	101.8
2007	--	--	--	--	--	--	113.9
2008	--	--	--	--	--	--	60.5
2009	--	--	--	--	--	--	75.6
2010	--	--	--	--	--	--	115.7
2011	--	--	--	--	--	--	125.1
2012	--	--	--	--	--	--	67.2
2013	--	--	--	--	--	--	25.3
2014	--	--	--	--	--	--	33.0
2015	--	--	--	--	--	--	35.0
2016	--	--	--	--	--	--	2.3
Subtotal	--	--	--	--	--	--	871.1

Annual Funding 2040   RDT&E   Research, Development, Test, and Evaluation, Army							
Fiscal Year	Quantity	BY 2014 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2004	--	--	--	--	--	--	74.5
2005	--	--	--	--	--	--	61.6
2006	--	--	--	--	--	--	114.7
2007	--	--	--	--	--	--	125.4
2008	--	--	--	--	--	--	65.3
2009	--	--	--	--	--	--	80.6
2010	--	--	--	--	--	--	121.5
2011	--	--	--	--	--	--	128.9
2012	--	--	--	--	--	--	68.1
2013	--	--	--	--	--	--	25.2
2014	--	--	--	--	--	--	32.1
2015	--	--	--	--	--	--	33.4
2016	--	--	--	--	--	--	2.2
Subtotal	--	--	--	--	--	--	933.5

Annual Funding 2032   Procurement   Missile Procurement, Army							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2012	--	--	--	70.4	70.4	--	70.4
2013	--	--	--	10.8	10.8	--	10.8
2014	92	508.9	--	--	508.9	39.1	548.0
2015	108	492.7	--	--	492.7	39.9	532.6
2016	80	374.3	--	--	374.3	40.6	414.9
2017	85	389.2	--	--	389.2	41.4	430.6
2018	93	420.5	--	--	420.5	42.2	462.7
2019	95	450.6	--	--	450.6	43.0	493.6
2020	104	525.7	--	--	525.7	43.8	569.5
2021	90	474.8	--	--	474.8	44.6	519.4
2022	90	468.9	--	--	468.9	45.5	514.4
2023	90	448.2	--	--	448.2	46.4	494.6
2024	90	424.9	--	--	424.9	47.2	472.1
2025	76	384.0	--	--	384.0	27.0	411.0
Subtotal	1093	5362.7	--	81.2	5443.9	500.7	5944.6

Annual Funding 2032   Procurement   Missile Procurement, Army							
Fiscal Year	Quantity	BY 2014 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2012	--	--	--	70.8	70.8	--	70.8
2013	--	--	--	10.6	10.6	--	10.6
2014	92	493.8	--	--	493.8	38.0	531.8
2015	108	470.6	--	--	470.6	38.2	508.8
2016	80	350.7	--	--	350.7	38.0	388.7
2017	85	357.7	--	--	357.7	38.0	395.7
2018	93	378.9	--	--	378.9	38.0	416.9
2019	95	398.1	--	--	398.1	38.0	436.1
2020	104	455.3	--	--	455.3	37.9	493.2
2021	90	403.2	--	--	403.2	37.8	441.0
2022	90	390.3	--	--	390.3	37.9	428.2
2023	90	365.8	--	--	365.8	37.9	403.7
2024	90	340.0	--	--	340.0	37.7	377.7
2025	76	301.2	--	--	301.2	21.2	322.4
Subtotal	1093	4705.6	--	81.4	4787.0	438.6	5225.6

Annual Funding 2050   MILCON   Military Construction, Army	
Fiscal Year	TY \$M
	Total Program
2019	10.5
Subtotal	10.5

Annual Funding 2050   MILCON   Military Construction, Army	
Fiscal Year	BY 2014 \$M
	Total Program
2019	9.1
Subtotal	9.1

## Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
<b>Approval Date</b>	8/6/2004	3/27/2014
<b>Approved Quantity</b>	148	330
<b>Reference</b>	Milestone B ADM	Milestone C ADM
<b>Start Year</b>	2010	2014
<b>End Year</b>	2011	2018

The Current Total LRIP Quantity is more than 10% of the total production quantity in accordance with the March 27, 2014 ADM, which approved a PAC-3 MSE LRIP quantity of 330 that is based on an Army Acquisition Objective (AAO) of 3,376 missiles. Procurement is expected to continue beyond the approved program with current or future MSE variants to meet the AAO.

## **Foreign Military Sales**

None

## **Nuclear Costs**

None

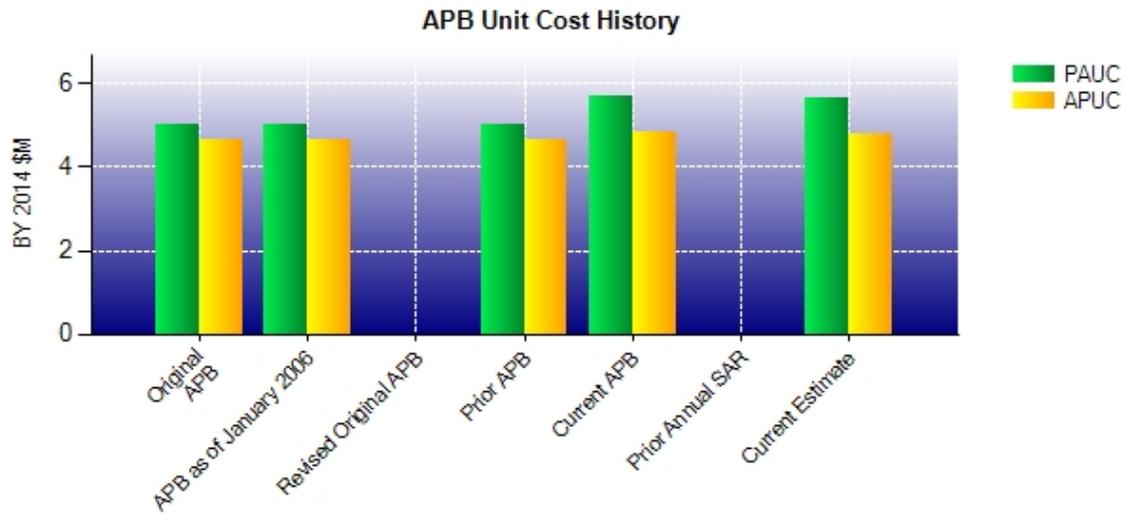
## Unit Cost

### Unit Cost Report

Item	BY 2014 \$M	BY 2014 \$M	% Change
	Current UCR Baseline (Jan 2015 APB)	Current Estimate (Dec 2014 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	6037.0	6168.2	
Quantity	1057	1093	
Item	5.711	5.643	-1.20
<b>Average Procurement Unit Cost</b>			
Cost	5087.2	5225.6	
Quantity	1057	1093	
Unit Cost	4.813	4.781	-0.66

Item	BY 2014 \$M	BY 2014 \$M	% Change
	Original UCR Baseline (Aug 2004 APB)	Current Estimate (Dec 2014 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	7664.0	6168.2	
Quantity	1528	1093	
Unit Cost	5.016	5.643	+12.51
<b>Average Procurement Unit Cost</b>			
Cost	7096.2	5225.6	
Quantity	1528	1093	
Unit Cost	4.644	4.781	+2.95

**Unit Cost History**



Item	Date	BY 2014 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Aug 2004	5.016	4.644	5.272	4.957
APB as of January 2006	Aug 2004	5.016	4.644	5.272	4.957
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Aug 2004	5.016	4.644	5.272	4.957
Current APB	Jan 2015	5.711	4.813	6.360	5.526
Prior Annual SAR	N/A	N/A	N/A	N/A	N/A
Current Estimate	Dec 2014	5.643	4.781	6.245	5.439

**SAR Unit Cost History**

Current SAR Baseline to Current Estimate (TY \$M)									
Initial PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
5.272	0.311	0.411	0.398	0.000	0.021	0.000	-0.168	0.973	6.245

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
4.957	0.287	0.286	0.398	0.000	-0.321	0.000	-0.168	0.482	5.439

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	N/A	N/A	N/A
Milestone B	N/A	N/A	N/A	N/A
Milestone C	N/A	N/A	Mar 2014	Mar 2014
IOC	N/A	N/A	Dec 2016	Dec 2016
Total Cost (TY \$M)	N/A	N/A	6722.3	6826.2
Total Quantity	N/A	N/A	1057	1093
PAUC	N/A	N/A	6.360	6.245

## Cost Variance

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	482.0	7574.0	--	8056.0
Previous Changes				
Economic	+17.4	+271.7	--	+289.1
Quantity	--	--	--	--
Schedule	--	+472.2	--	+472.2
Engineering	--	--	--	--
Estimating	+285.9	+336.3	--	+622.2
Other	--	--	--	--
Support	--	+64.4	--	+64.4
Subtotal	+303.3	+1144.6	--	+1447.9
Current Changes				
Economic	+7.9	+42.5	--	+50.4
Quantity	--	-1844.3	--	-1844.3
Schedule	--	-36.8	--	-36.8
Engineering	--	--	--	--
Estimating	+77.9	-687.2	+10.5	-598.8
Other	--	--	--	--
Support	--	-248.2	--	-248.2
Subtotal	+85.8	-2774.0	+10.5	-2677.7
Adjustments	--	--	--	--
Total Changes	+389.1	-1629.4	+10.5	-1229.8
CE - Cost Variance	871.1	5944.6	10.5	6826.2
CE - Cost & Funding	871.1	5944.6	10.5	6826.2

Summary BY 2014 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	567.8	7096.2	--	7664.0
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	-196.6	--	-196.6
Engineering	--	--	--	--
Estimating	+296.9	+374.8	--	+671.7
Other	--	--	--	--
Support	--	+4.9	--	+4.9
Subtotal	+296.9	+183.1	--	+480.0
Current Changes				
Economic	--	--	--	--
Quantity	--	-1337.3	--	-1337.3
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+68.8	-525.4	+9.1	-447.5
Other	--	--	--	--
Support	--	-191.0	--	-191.0
Subtotal	+68.8	-2053.7	+9.1	-1975.8
Adjustments	--	--	--	--
Total Changes	+365.7	-1870.6	+9.1	-1495.8
CE - Cost Variance	933.5	5225.6	9.1	6168.2
CE - Cost & Funding	933.5	5225.6	9.1	6168.2

Previous Estimate: December 2013

RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+7.9
Revised estimate to align with approved program cost position. (Estimating)	+9.5	+15.5
Adjustment for current and prior escalation. (Estimating)	-8.4	-7.9
Revised estimate to reflect additional costs associated with operational testing. (Estimating)	+67.7	+70.3
<b>RDT&amp;E Subtotal</b>	<b>+68.8</b>	<b>+85.8</b>

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+42.5
Quantity variance resulting from a decrease of 435 missiles from 1,528 to 1,093. (Quantity)	-1337.3	-1844.3
Acceleration of procurement buy profile to reflect increase in missile quantity in FY 2015. (Schedule) (QR)	0.0	-36.8
Revised estimate to reflect acceleration of procurement buy profile and approved program cost position. (Estimating)	-93.7	-104.5
Adjustment for current and prior escalation. (Estimating)	-4.9	-4.9
Revised estimate due to removing procurement of 435 missiles in FY 2026 through FY 2033. (Estimating) (QR)	-426.8	-577.8
Adjustment for current and prior escalation. (Support)	-0.5	-0.7
Decrease in Other Support due to revised estimate to reflect acceleration of procurement buy profile. (Support) (QR)	-190.5	-247.5
<b>Procurement Subtotal</b>	<b>-2053.7</b>	<b>-2774.0</b>

(QR) Quantity Related

MILCON	\$M	
Current Change Explanations	Base Year	Then Year
Revised estimate to support new depot requirement in FY 2019. (Estimating)	+9.1	+10.5
<b>MILCON Subtotal</b>	<b>+9.1</b>	<b>+10.5</b>

## Contracts

### Contract Identification

**Appropriation:** Procurement  
**Contract Name:** FY 2014 PAC-3/MSE Production  
**Contractor:** Lockheed Martin Missiles and Fire Control  
**Contractor Location:** P.O. Box 650003  
 Dallas, TX 75265-0003  
**Contract Number:** W31P4Q-14-C-0034  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** December 31, 2013  
**Definitization Date:**

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
263.4	N/A	56	1469.0	N/A	301	1469.0	1469.0

### Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract modifications to add PAC-3 MSE missiles, as well as FMS missile quantities and ground support equipment for Qatar.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date	0.0	0.0
Previous Cumulative Variances	--	--
Net Change	+0.0	+0.0

### Cost and Schedule Variance Explanations

None

### General Contract Variance Explanation

Cost and schedule variances are not reported for this contract, because EVM reporting has not commenced due to incomplete negotiations. Negotiations to definitize the contract as FPIF are ongoing and projected to be completed in 3rd Quarter FY 2015.

**Notes**

This is the first time this contract is being reported.

The FY 2014 PAC-3 Cost Reduction Initiative (CRI) missile and PAC-3 MSE Production contract was awarded on December 31, 2013 to Lockheed Martin Missiles and Fire Control, Dallas, Texas as a letter contract valued at \$263.4M (\$203.9M U.S. and \$59.5M FMS). The original effort includes 56 PAC-3 CRI missiles for the U.S. Army, seven Launcher Modification Kits (LMK), one portable four-pack test set and initial spares for Kuwait, and missile/LMK production tooling.

On March 28, 2014, the contract was modified to change the contract type from Firm Fixed Price to FPIF. The modification added 92 PAC-3 MSE missiles, 50 LMKs, associated hardware, and initial spares. The PAC-3 CRI and PAC-3 MSE missiles share a high degree of commonality, therefore, combining requirements on a single production contract yields cost synergies.

On October 14, 2014, the contract was modified to add FMS case requirements for Qatar for 153 PAC-3 CRI missiles, 15 LMKs, and other associated ground support equipment.

Negotiations to definitize the contract as FPIF are ongoing and projected to be completed in 3rd Quarter FY 2015. Requirements for contractor EVM reporting were implemented as part of the contract type change; the contractor will begin submitting cost and schedule variance information following contract definitization.

PAC-3 MSE deliveries are scheduled to begin in 3rd Quarter FY 2015 and PAC-3 CRI deliveries are scheduled to begin in 4th Quarter FY 2015.

**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** MSE IPF  
**Contractor:** Lockheed Martin Missiles and Fire Control  
**Contractor Location:** P.O. Box 650003  
 Dallas, TX 75265-0003  
**Contract Number:** W31P4Q-12-C-0001  
**Contract Type:** Cost Plus Incentive Fee (CPIF)  
**Award Date:** July 02, 2012  
**Definitization Date:** July 02, 2012

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
69.0	N/A	0	76.3	N/A	0	78.1	81.7

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a contract modification to extend the period of performance to fabricate four missile assemblies and purchase several major subcontractor components (Ignition Safety Devices, Lethality Enhancers, Batteries, and Thermally Initiated Venting Systems).

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2014)	-3.9	+0.4
Previous Cumulative Variances	+2.2	-9.3
Net Change	-6.1	+9.7

**Cost and Schedule Variance Explanations**

The unfavorable net change in the cost variance is due to prime contractor missile assembly operations working on delayed drawings; new engineering requirements; additional tooling rework; special test equipment requiring additional updates to specific tooling; and additional cost for personnel to support missile control surface troubleshooting.

The favorable net change in the schedule variance is due to validation of tooling ahead of schedule.

**Notes**

The purpose of the effort is to set forth the requirements for the manufacture, modification, and/or procurement of production special tooling, special test equipment, and special inspection equipment to support the PAC-3 MSE missile program. The Initial Production Facilities (IPF) equipment is to be proven out and in place 24 months following contract award. The PAC-3 MSE IPF contract stresses production of MSE missiles at the lowest feasible life cycle cost. The objective of the PAC-3 MSE IPF is to establish and sustain the capability to produce PAC-3 MSE missiles at a rate of up to 20 per month. The contract was awarded and definitized on July 2, 2012, with a total contract value of \$69.0M.

**Contract Identification**

**Appropriation:** RDT&E  
**Contract Name:** MSE Follow on Test Program  
**Contractor:** Lockheed Martin Missiles and Fire Control  
**Contractor Location:** P.O. Box 650003  
 Dallas, TX 75265-0003  
**Contract Number:** W31P4Q-07-G-0001/12  
**Contract Type:** Cost Plus Fixed Fee (CPFF)  
**Award Date:** August 23, 2010  
**Definitization Date:** July 18, 2011

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
49.1	N/A	N/A	70.9	N/A	N/A	76.3	71.8

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a contract modification to extend the period of performance to make components for four test missiles.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2014)	-0.3	-0.1
Previous Cumulative Variances	-0.1	-0.5
Net Change	-0.2	+0.4

**Cost and Schedule Variance Explanations**

The unfavorable net change in the cost variance is due to additional personnel required to complete work.

The favorable net change in the schedule variance is due to recovery of parts delivery schedule.

**Notes**

The purpose of this effort is to conduct two flight test campaigns to intercept two Tactical Ballistic Missile and one Air Breathing Threat representative targets for Patriot. The contractor will provide and utilize five PAC-3 MSE missiles representing the PAC-3 MSE production configuration that incorporates the PAC-3 obsolescence upgrades.

This contract is more than 90% complete; therefore, this is the final report for this contract.

## Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	1093	0.00%
Total Program Quantity Delivered	0	0	1093	0.00%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	6826.2	Years Appropriated	12
Expended to Date	920.4	Percent Years Appropriated	54.55%
Percent Expended	13.48%	Appropriated to Date	2030.6
Total Funding Years	22	Percent Appropriated	29.75%

The above data is current as of January 31, 2015.

## Operating and Support Cost

### Cost Estimate Details

<b>Date of Estimate:</b>	February 02, 2015
<b>Source of Estimate:</b>	POE
<b>Quantity to Sustain:</b>	1093
<b>Unit of Measure:</b>	Total Quantity
<b>Service Life per Unit:</b>	30.00 Years
<b>Fiscal Years in Service:</b>	FY 2015 - FY 2057

The PAC-3 MSE approved procurement quantity is 1,057 missiles, however, the program received a Congressional plus up in FY 2015 to buy additional missiles and the program's current estimate is now 1,093 missiles.

The PAC-3 MSE O&S cost estimate was established in the PAC-3 MSE APB in support of the PAC-3 MSE Milestone C decision.

The current O&S cost estimate for the PAC-3 MSE missile was updated since APB approval to reflect the program procurement quantity current estimate. The estimate includes the repair and recertification of PAC-3 MSE missiles. In addition, it includes all sustainment tasks needed to maintain the missile.

### Sustainment Strategy

The missile is transported and operates in a sealed container as a self-contained major end item and does not require sustainment in the field. The missile will be certified twice, at ten-year intervals, within its 30-year planned service life. Interim Contractor Support will be the sustainment strategy until an organic capability is established in FY 2021 (IOC plus four years). Once established, missiles will be shipped to Letterkenny Army Depot for diagnosis/testing, de-canning, repair and return of faulty or degraded missile subassemblies, reassembly, re-coating, and re-canning. Checkout and fault detection/isolation will be accomplished using depot test, measurement, and diagnostic equipment and peculiar test/support equipment. Missile sub-assemblies (five major sections) are returned to the original equipment manufacturer for repair. After the missile is repaired, an inspection will be performed prior to inserting the missile back into a tube to verify that current tactical software has been uploaded as required.

### Antecedent Information

No Antecedent

Cost Element	Annual O&S Costs BY2014 \$M	
	PAC-3 MSE Average Annual Cost Per Total Quantity	No Antecedent (Antecedent)
Unit-Level Manpower	--	--
Unit Operations	--	--
Maintenance	34.567	--
Sustaining Support	14.228	--
Continuing System Improvements	14.053	--
Indirect Support	--	--
Other	--	--
<b>Total</b>	<b>62.848</b>	<b>--</b>

Item	Total O&S Cost \$M			
	PAC-3 MSE			No Antecedent (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	2660.6	2926.7	2702.5	N/A
Then Year	4354.3	N/A	4488.2	N/A

Disposal Cost is included in the Operating and Support Cost of the current APB objective and threshold for this program.

#### Equation to Translate Annual Cost to Total Cost

Total Missile O&S = \$62.848M (Average Annual O&S Cost) x 43 (years of service life) = \$2702.5M

O&S Cost Variance		
Category	BY 2014 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2013 SAR	4164.0	
Programmatic/Planning Factors	-1096.1	O&S cost estimate revised for program decrease of 435 missiles from 1,528 to 1,093.
Cost Estimating Methodology	-365.4	Cost methodology changed from Contractor Logistics Support only to Interim Contractor Support with transition to Organic Depot support.
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	-1461.5	
Current Estimate	2702.5	

#### Disposal Estimate Details

**Date of Estimate:** February 02, 2015  
**Source of Estimate:** POE  
**Disposal/Demilitarization Total Cost (BY 2014 \$M):** Total costs for disposal of all Total Quantity are 13.4

Demilitarization costs were provided by Army Environmental Command.