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By kempr on Apr 24, 2023

Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

Selected Acquisition Report (SAR)



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

FY 2024 President's Budget

**Defense Acquisition Visibility Environment
(DAVE)**

Table of Contents

Acronyms and Abbreviations 3

Program Information 5

Responsible Office 5

Mission and Description 6

Executive Summary 7

Schedule 8

Performance 9

Acquisition Budget Estimate 13

Unit Cost 15

Risks 16

Low Rate Initial Production 17

Contracts 19

Deliveries and Expenditures 30

Operating and Support Costs 31

Common Acronyms and Abbreviations

\$B - Billions of Dollars
\$K - Thousands of Dollars
\$M - Millions of Dollars
ACAT - Acquisition Category
Acq O&M - Acquisition-Related Operations and Maintenance
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
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
FMS - Foreign Military Sales
FOC - Full Operational Capability
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
Inc - Increment
IOC - Initial Operational Capability
JROC - Joint Requirements Oversight Council
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
O&S - Operating and Support
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
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
U.S. - United States
UCR - Unit Cost Reporting
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

Program Information

Program Name

Patriot Advanced Capability-3 Missile Segment Enhancement

DoD Component

Army

Responsible Office

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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 complex threats. Integration of the PAC-3 MSE missile requires minor modifications to the launching station to accommodate cabling changes and an improved canister. Improved PAC-3 MSE kinematic capabilities are realized with system upgrades for Post Deployment Build-8 software.

Executive Summary

PAC-3 MSE

Program Highlights Since Last Report

The PAC-3 MSE requirements are stable and funding is adequate to meet cost, schedule, and performance objectives established in the current approved APB. There are no increased risks to the PAC-3 MSE program since the last SAR. In FY 2022, the program received two supplemental funding packages to procure additional U.S. PAC-3 MSE missiles: \$282.960M for the procurement of 72 missiles and \$288.490M for the procurement of 76 missiles. Due to capacity constraints, delivery of the supplemental missiles is scheduled to begin in FY 2025. On September 22, 2022, the Government of Switzerland signed a Patriot Letter of Offer and Acceptance (LOA) to become the 17th Patriot International Partner. The LOA value is \$1.6B and provides a Total Package Approach in support of five Patriot Fire Units, including 17 MSE-capable launching stations. A subsequent LOA for MSE missiles is in process. On October 4, 2022, Lockheed Martin held a ribbon-cutting ceremony for the new All-Up Round (AUR) III PAC-3 MSE production facility in Camden, AR. Detailed planning for this facility began in 2018, and the first missiles completely assembled there will be delivered in October 2022. Movement of production from the existing AUR I facility into AUR III is ongoing and will be completed by January 2023, at which point all new missiles will be produced in AUR III. This new facility provides the increased capacity and additional automation needed to meet global demand for the PAC-3 MSE missile while continually improving quality. There are no significant software-related issues with this program at this time.

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	Significant Development Description
Sep - 2022	On September 22, 2022, the Government of Switzerland signed a Patriot LOA to become the 17th Patriot International Partner. The LOA value is \$1.6B.
Oct - 2021	On October 18, 2021, Lockheed Martin completed production of the 1000th PAC-3 MSE missile at their Camden, Arkansas facility.
Apr - 2020	On April 30, 2020, the U.S. Government awarded Lockheed Martin Missiles and Fire Control a Firm Fixed Price contract for the FY 2021 - FY 2023 production of U.S. and Foreign Military Sales (FMS) PAC-3 MSE missiles and ancillary hardware with a total potential contract value of \$9.5B.
Dec - 2019	On December 5, 2019, a FY 2020 PAC-3 MSE Production contract modification was awarded to Lockheed Martin Missiles and Fire Control, Dallas, Texas, for U.S./FMS PAC-3 MSE missiles; U.S./FMS Launcher Modification Kits; and associated hardware. On December 30, 2019, an additional FY 2020 PAC-3 MSE Production contract modification was awarded to Lockheed Martin Missiles and Fire Control, Dallas, Texas, for the remaining U.S. PAC-3 MSE missiles and to incorporate the OUSD enablers.
Jul - 2019	On July 31, 2019, the Government of the Kingdom of Bahrain signed the Patriot LOA to become the 16th Patriot International Partner. The LOA value is \$1.1B.
Dec - 2018	On December 21, 2018, the FY 2019 PAC-3 MSE Production contract was awarded to Lockheed Martin Missiles and Fire Control, Dallas, Texas. The contract contains the first PAC-3 MSE FRP quantities. The FY 2019 - FY 2020 contract is a follow-on production contract to the program's previous LRIP contracts awarded FY 2014 through FY 2018.
Jul - 2018	On July 17, 2018, the Army Acquisition Executive (AAE) approved the PAC-3 MSE APB Change 1.
Jun - 2018	On June 13, 2018, the AAE signed an ADM authorizing PAC-3 MSE to proceed to FRP.
Apr - 2018	On April 16, 2018, the AAE chaired the PAC-3 MSE Army System Acquisition Review Council and approved Full Rate Production (FRP).

Jan - 2018	On January 24, 2018, the Program Manager (PM) provided a PDR notifying the AAE of an O&S Cost breach. The cumulative program increases caused the O&S Cost current estimate to exceed the threshold.
Jan - 2018	On January 25, 2018, the AAE approved an increase to the PAC-3 MSE LRIP quantity. This request is a result of multiple annual Congressional increases and OSD reprogramming to procure additional PAC-3 MSE missiles.
Dec - 2017	On December 21, 2017, the AAE as the Milestone Decision Authority (MDA), concurred with a Program Deviation Report (PDR) that provided notification of a deviation from the approved APB Procurement Cost threshold. The PM reported a deviation due to receipt of additional missile procurement funding in FY 2014 through FY 2018. The program increase supports procurement to the Army Acquisition Objective (AAO).
Aug - 2016	On August 10, 2016, the AAE approved an increase to the PAC-3 MSE LRIP quantity. This request is a result of multiple annual Congressional increases to procure additional PAC-3 MSE missiles.
Jul - 2016	PAC-3 MSE IOC was established with the 3-2 ADA on July 5, 2016.
May - 2016	On May 10, 2016, the DAE delegated milestone decision authority for the PAC-3 MSE program to the Secretary of the Army. The PAC-3 MSE program was designated ACAT IC with milestone decision authority assigned to the Army Acquisition Executive (AAE).
Oct - 2015	PAC-3 MSE First Unit Equipped was established with 3-2 Air Defense Artillery (ADA) on October 23, 2015.
Jan - 2015	On January 16, 2015, the DAE approved the PAC-3 MSE Production Acquisition Program Baseline (APB) Initial Operational Capability (IOC).
Mar - 2014	On March 27, 2014, the Defense Acquisition Executive (DAE) signed the Milestone C Acquisition Decision Memorandum (ADM) authorizing the PAC-3 MSE to enter Production and Deployment and proceed with Low Rate Initial Production (LRIP).
Mar - 2014	The FY 2014 PAC-3 MSE Production Fixed Price Incentive Firm Target Undefinitized Contract Action was awarded on March 28, 2014, following approval of the PAC-3 MSE Milestone C.

Schedule

PAC-3 MSE

Events	Milestone Baseline Objective	Current Baseline Objective/Threshold		Current Estimate/Actual	Deviation
MSE Milestone C Complete	Mar 2014	Mar 2014	Mar 2014	Mar 2014	
MSE FRP Complete	Dec 2017	Apr 2018	Apr 2018	Apr 2018	
MSE IOC Complete	Dec 2016	Jul 2016	Jul 2016	Jul 2016	
MSE FUE	Dec 2015	Oct 2015	Oct 2015	Oct 2015	
MSE First Intercept	Feb 2010	Feb 2010	Feb 2010	Feb 2010	

Notes

MSE FUE is achieved when the first Patriot Fire Unit is equipped with 12 MSE missiles. MSE IOC is considered achieved when a Patriot Battalion, consisting of four Fire Units, is equipped with 12 MSE missiles per Fire Unit.

Deviation Explanation

No deviations for this program/subprogram

Performance

PAC-3 MSE

Performance Characteristics				
Milestone Baseline	Current Baseline Objective/Threshold	Demonstrated Performance	Current Estimate/Actual	Deviation
(KPP) - 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 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.	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 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.	TBD. The Net Ready KPP applies to the integration of the PATRIOT command and control system into IBCS and is not specific to the performance of the MSE missile. Demonstrated Performance will coincide with IBCS First Unit Equipped.	Will meet Objective. 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 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.
(KPP)System Training - Proficiency Level				

	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.	Will meet Objective. Soldiers (Operators, Maintainers, and Leaders) are able to perform critical tasks to standard 95% of the time after training.	
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(KPP) - Sustainment Reliability

	The material sustainment reliability will exceed 41 hours MTBCMF.	The material sustainment reliability will exceed 20 hours MTBCMF.	Will be demonstrated during Post Deployment Build-8.1 Operational testing.	Will meet Threshold. The material sustainment reliability will exceed 20 hours MTBCMF.	
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(KPP)System Training - Time to Train

	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 4days, 14H in 11 weeks 3 days, 14T in 10 weeks, 140A in 19 weeks 2 days and 140E in 35 weeks and 4 days.	Will meet Objective. 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.	
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(KPP)System Training - 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.	(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.)	Will meet Objective. 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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(KPP)System Training - Training Retention

	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.	Will meet Objective. Soldier sustainment training to maintain proficiency shall be required quarterly, semi-annually, and annually.	
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(KPP)System Training - Training Support

	<p>Training resources shall be capable of providing 95% of training individual and collective critical tasks (march-order and emplacement, operations, maintenance, force operations, and engagement operations) related to tactically deployed systems while missiles are loaded.</p>	<p>Training resources shall be capable of providing 90% of training individual and collective critical tasks (march-order and emplacement, operations, maintenance, force operations, and engagement operations) related to tactically deployed systems while missiles are loaded.</p>	<p>All training support materials to include preliminary technical manuals, New Equipment Training Plans, Task Analysis, and Doctrine Impact Reports were provided to Fires Center of Excellence Directorate of Training Development and Doctrine.</p>	<p>Will meet Objective. Training resources shall be capable of providing 95% of training individual and collective critical tasks (march-order and emplacement, operations, maintenance, force operations, and engagement operations) related to tactically deployed systems while missiles are loaded.</p>	
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Requirement Reference

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

Deviation Explanation

No deviations for this program/subprogram

Notes

None

Acquisition Budget Estimate

PAC-3 MSE

Total Acquisition Cost

		Milestone APB	Current Baseline		Budget Estimate PB 2024		
Category	Base Year	Objective (BY\$M)	Objective (BY\$M)	Threshold (BY\$M)	BY\$M	TY\$M	Deviation
RDT&E	2014	940.8	927.8	1,020.6	933.2	869.8	
Procurement	2014	5,087.2	12,134.5	13,348	11,575.4	13,894.3	
MILCON	2014	9	25.3	27.8	24.4	30	
Acq. O&M	2014	0	36.1	39.7	35.9	46.7	
Total		6,037.0	13,123.7		12,568.9	14,840.8	
PAUC	2014	5.711	4.233	4.656	3.952	4.667	
APUC	2014	4.813	3.914	4.305	3.640	4.369	

Appropriation Category Deviation Explanations

PAUC Deviation Explanation

APUC Deviation Explanation

Budget Notes

Army Acquisition Executive approved Current APB, July 17, 2018. CAPE Cost Risks: A Program Office Estimate was completed to reflect programmatic changes to the procurement buy profile. The program baseline estimate included the effect of notional FMS requirements in addition to U.S. requirements when determining total quantities for costing. If FMS quantities do not materialize, then the U.S. procurement costs could increase, impacting quantities to be procured. Leveraging FMS investments enables cost sharing, contract pricing synergies, production efficiencies, and mitigates risks of future production gaps.

Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	0	
Procurement	3100	3180
O&M-Acquired		

Quantity Notes

Army Procurement Objective (APO) is 3,100 missiles; increased total estimated quantity of 3,180 missiles reflects supplemental funding received in FY 2022 and funding requested across the FYDP. An increase in total quantity does not constitute nor create any breaches.

Unit Cost**PAC-3 MSE**

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Category (\$M) Base Year:2014	Current UCR Baseline	Current Estimate	% Change
Program Acquisition Unit Cost			
Cost	13,123.7	12,568.9	
Quantity	3,100	3180	
Unit Cost	4.233	3.952	-6.63%
Average Procurement Unit Cost			
Cost	12,134.5	11,575.4	
Quantity	3,100	3,180	
Unit Cost	3.914	3.640	-7.00%
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Category (\$M) Base Year:2004	Original UCR Baseline	Current Estimate	% Change
Program Acquisition Unit Cost			
Cost	6,220.9	10,303.1	
Quantity	1,528	3180	
Unit Cost	4.071	3.240	-20.41%
Average Procurement Unit Cost			
Cost	5,760.0	9,488.0	
Quantity	1,528	3,180	
Unit Cost	3.770	2.984	-20.85%
Cost Growth Details			
Current Baseline PAUC Breach Explanation			
Current Baseline APUC Breach Explanation			
Original Baseline PAUC Breach Explanation			
Original Baseline APUC Breach Explanation			
Impacts of Schedule Changes on Unit Cost			
Impacts of Performance Changes on Unit Cost			
Actions Taken or Proposed to Control Future Cost Growth			

Risk and Sensitivity Analysis**PAC-3 MSE**

Risk and Sensitivity Analysis
Current Procurement Cost (December - 2022)
Original Baseline Estimate (August - 2004) The August 6, 2004, Patriot/MEADS Combined Aggregate Program (CAP) Milestone B ADM directed the Army to fully fund to the OSD Cost Analysis Improvement Group estimate. At the time, no cost risks were documented.
Current Baseline Estimate (July - 2018) The July 17, 2018, Army-approved PAC-3 MSE FRP APB Change 1 established the program baseline estimate, which reflects the Army Cost Position approved at the FRP decision. The Deputy Assistant Secretary of the Army for Cost and Economics (DASA(CE)) directed the program baseline estimate to include the effect of notional FMS requirements in addition to U.S. requirements when determining total quantities to be costed. Concurrent FMS quantities create contract pricing synergies.

Schedule Risk		
Technical Risks		
Current	December 30, 2022	PAC-3 MSE Obsolescence. The program actively manages obsolescence redesign efforts. The PAC-3 MSE risk is assessed as Low.
MS C	March 30, 2014	Supplier Quality Management. The supplier of missile actuators is experiencing product quality issues that are creating cost and schedule program impacts to the PAC-3 MSE program. The current Vendor Rating/Supply Chain Management System has not prevented recent issues. The U.S. Government and Prime Contractor are leading a quality focus team to ensure high visibility on quality concerns. The supplier initiated the Achieving Competitive Excellence (ACE) Operating System at the Vergennes, VT facility. The supplier conducted purchase order flow-down reviews and First Article refresh activities with key suppliers. The suppliers are to execute controlled hardware builds and process certification activities.
MS C	March 30, 2014	Supplier Viability. The supplier of missile thermal batteries is experiencing financial issues that may affect its ability to supply product for the PAC-3 MSE program. If interruptions occur, then missile production may be impacted. The missile prime contractor, Lockheed Martin, is assessing supplier health and seeking potential second source. Mitigation actions include using prime contractor internal funding to initiate early turn-on to support initial production quantities and identifying alternate source and conducting vendor qualification to support FY 2015 production requirements.

Low Rate Initial Production

PAC-3 MSE

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	08/06/2004	01/25/2018

Approved Quantity	148	750
Reference	Milestone B ADM	Army Acquisition Executive ADM
Start Year	2010	2014
End Year	2011	2018

Rationale if quantity exceeds 10% of the total number of articles to be procured:

The Current Total LRIP Quantity is more than 10% of the total production quantity due to receipt of additional Congressional funding and OSD reprogramming to buy additional missiles.

Notes

The March 27, 2014, Milestone C ADM approved a PAC-3 MSE LRIP quantity of 330 based on the Army Acquisition Objective of 3,376 missiles. On August 10, 2016, the MDA approved a PAC-3 MSE LRIP increase from 330 to 600 missiles. On January 25, 2018, the MDA approved a PAC-3 MSE LRIP increase from 600 to 750 missiles.

Contracts & Efforts

Contract Data	
Contract Number	W31P4Q-20-C-0023
Effort Number	
Modification Number	P00070
Award Date	04/30/2020
Definitization Date	03/31/2021
Order Number	
CAGE Code/CAGE Legal Name	64059/Lockheed Martin Missiles and Fire Control
Contract Title	FY 21/FY 22/FY 23 PAC-3/MSE Production
Contract Address	Dallas, TX
Contracting Office	ACC-RSA
Supported Phase	Production
Contract Strategy	FAR 15 (Negotiated)
Contract Type	Firm-Fixed-Price
Modification Date	December 21, 2022
Work Start Date	March 31, 2021
Technical Data Rights	None
Work Completed	

Contracts/Effort Price, Quantity, and Performance (TY\$M)		
Initial Target Price	Current Target Price	
\$4,196.9	\$6,549.9	
Initial Ceiling Price	Current Ceiling Price	
Contractor EAC	PM EAC	
Initial Quantity	Current Quantity	Delivered Quantity
1088	1684	
BAC	BCWP	ACWP

BCWS	Cost Variance	Schedule Variance

Contract Notes:

On April 30, 2020, the U.S. Government awarded Lockheed Martin Missiles and Fire Control a Firm Fixed Price contract for the FY 2021-FY 2023 production of U.S. and FMS PAC-3 MSE missiles and ancillary hardware with a total potential contract value of \$9.5B. In this award, the FMS missile requirements were awarded. The FY 2021/FY 2022/FY 2023 contract consists of three annual production contract options. The total quantity of U.S. and FMS missiles listed here will be procured across those options. On June 12, 2020, modification P00001 added Cost Plus Fixed Fee (CPFF) NTEs for Seeker Block V and the Integrated Guidance System (IGS). These two CLINs are reported separately on the following pages and are not included in the Current Target Price of the FFP CLIN listed here. On October 6, 2020, modification P00004 added the missile tooling and obsolescence associated with the missile production. On December 23, 2020, the initial FY 2021 U.S. production contract option was exercised, procuring 134 U.S. PAC-3 MSE missiles and U.S./FMS ancillary hardware. Due to the limitations of the Continuing Resolution in place at the time of initial U.S. production award, an additional option to procure the remaining 12 FY 2021 U.S. PAC-3 MSE missiles was exercised on March 31, 2021. The initial FY 2022 PAC-3 MSE production contract option was exercised in December 2021. This option procured 112 U.S., 84 Kuwait, and 34 The Netherlands MSE missiles. The second FY 2022 PAC-3 MSE production contract option was exercised on February 23, 2022. This option procured 42 U.S. PAC-3 MSE missiles and associated ancillary hardware. The third FY 2022 PAC-3 MSE production contract option was exercised on April 29, 2022. This option procured 26 U.S. PAC-3 MSE missiles and associated ancillary hardware. The initial FY 2023 PAC-3 MSE production contract option was exercised on June 15, 2022. This contract action was funded with Supplemental Funding and awarded 72 U.S. PAC-3 MSE Missiles and associated missile tooling. The second FY 2023 PAC-3 MSE production contract option was exercised on August 30, 2022. This contract action was funded with Supplemental Funding and awarded 76 U.S. PAC-3 MSE Missiles and associated missile tooling. The third FY 2023 PAC-3 MSE production contract option was exercised on September 27, 2022. This contract action was funded with Supplemental Funding and awarded Launcher Modification Kits (LMKs) and other ground equipment. The fourth FY 2023 PAC-3 MSE production contract option was exercised on November 8, 2022. This contract action awarded 83 U.S. PAC-3 MSE Missiles and tooling and 54 U.S. PAC-3 LINK on ELES Kits. The fifth FY 2023 PAC-3 MSE production contract option was exercised on December 21, 2022. This contract action awarded 55 U.S. PAC-3 MSE Missiles and tooling. FY 2021 PAC-3 MSE deliveries are scheduled to begin 3rd Quarter FY 2023. FY 2022 PAC-3 MSE deliveries are scheduled to begin 3rd Quarter FY 2024. FY 2023 PAC-3 MSE deliveries are scheduled to begin 3rd Quarter FY 2025.

Factors Contributing to Cost Variance and Projected Effects on Program Costs**Factors Contributing to Schedule Variance and Projected Effects on Program Schedule**

Contract Data	
Contract Number	W31P4Q-19-C-0011
Effort Number	1
Modification Number	PZ0126
Award Date	12/21/2018
Definitization Date	06/03/2022
Order Number	
CAGE Code/CAGE Legal Name	64059/Lockheed Martin Missiles and Fire Control
Contract Title	FY 2019 PAC-3/MSE Production
Contract Address	Dallas, TX
Contracting Office	ACC-RSA
Supported Phase	Production
Contract Strategy	FAR 16.603 (Letter)
Contract Type	Fixed-Price Incentive (Firm Target)
Modification Date	June 03, 2022
Work Start Date	December 21, 2018
Technical Data Rights	None
Work Completed	92.17%

Contracts/Effort Price, Quantity, and Performance (TY\$M)		
Initial Target Price	Current Target Price	
\$1,821	\$2,304.6	
Initial Ceiling Price	Current Ceiling Price	
\$2,586.7	\$2,351.5	
Contractor EAC	PM EAC	
\$1,929	\$1,929	
Initial Quantity	Current Quantity	Delivered Quantity
288	288	288
BAC	BCWP	ACWP
\$1,947.9	\$1,795.3	\$1,809.4
BCWS	Cost Variance	Schedule Variance

\$1,882.4	-\$14.1	-\$87.1
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Contract Notes:

The FY 2019 PAC-3 MSE Production contract was awarded on December 21, 2018. The USG issued a continuation of contract modification (continuation of FY 2017/2018 PAC-3 Production contract W31P4Q-17-C-0006), W31P4Q-19-C-0011, to exercise the FY 2019 option for PAC-3 Production. The FY 2019 PAC-3 Production option includes: US and FMS PAC-3 MSE missiles, FMS PAC-3 Cost Reduction Initiative missiles, US and FMS Launcher Modification Kits (LMKs), and associated ground support equipment. On August 23, 2021, FY 2019 funds that were held to cover contingent liability for FY 2019 FPIF contract ceiling were released and realigned to the FY 2021 missile production contract after a successful bilateral agreement to reduce contract ceiling was achieved. The corresponding FY 2021 funds that were released were obligated in December 2021. Final Not-To-Exceed line items were definitized on June 3, 2022. This contract is now fully definitized. FY 2019 PAC-3 MSE deliveries began in 3rd Quarter FY 2021 and concluded in 1st Quarter FY 2023. This contract is more than 90% complete; therefore, this is the final report for this contract.

Factors Contributing to Cost Variance and Projected Effects on Program Costs**Factors Contributing to Schedule Variance and Projected Effects on Program Schedule**

The unfavorable schedule variance is driven by a combination of delayed Boeing seeker deliveries, and loans of seekers and other subassembly hardware from the FY 2019 contract to the FY 2020 contract to support prioritized FMS PAC-3 CRI and MSE missile deliveries. The delayed delivery of seekers has occurred as production transitioned from Seeker Block III to Seeker Block IV in April 2022. The technical challenges of the transition resulted in production delays, with the supplier falling months behind purchase order. Hardware loan paybacks are ongoing, and recovery to production schedule and Earned Value Management (EVM) baseline of all PAC-3 production contracts is expected by 3rd Quarter FY 2023.

Contract Data	
Contract Number	W31P4Q-19-C-0011
Effort Number	2
Modification Number	PZ0112
Award Date	03/01/2019
Definitization Date	03/03/2022
Order Number	
CAGE Code/CAGE Legal Name	64059/Lockheed Martin Missiles and Fire Control
Contract Title	FY 2020 PAC-3/MSE Production
Contract Address	Dallas, TX
Contracting Office	ACC-RSA
Supported Phase	Production
Contract Strategy	FAR 16.603 (Letter)
Contract Type	Fixed-Price Incentive (Firm Target)
Modification Date	March 03, 2022
Work Start Date	March 01, 2019
Technical Data Rights	None
Work Completed	85.20%

Contracts/Effort Price, Quantity, and Performance (TYSM)		
Initial Target Price	Current Target Price	
\$1,565.9	\$1,666.3	
Initial Ceiling Price	Current Ceiling Price	
\$1,635.8	\$1,740.6	
Contractor EAC	PM EAC	
\$1,462.7	\$1,462.7	
Initial Quantity	Current Quantity	Delivered Quantity
312	312	64
BAC	BCWP	ACWP
\$1,434.1	\$1,221.9	\$1,213.2
BCWS	Cost Variance	Schedule Variance

\$1,290.7	\$8.7	-\$68.8
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Contract Notes:

On December 21, 2018, the USG issued a continuation of contract modification (continuation of FY17/18 PAC-3 Production contract W31P4Q-17-C-0006), W31P4Q-19-C-0011, to exercise the FY 2019 option and to incorporate FY 2020 priced options for PAC-3 Production. On March 21, 2019, the FY 2020 Option was partially exercised, awarding 67 MSE missiles. On May 14, 2019, the FY 2020 Option was partially exercised, awarding an additional 50 MSE missiles. On September 9, 2019, the FY 2020 Option was partially exercised, awarding 120 FMS MSE missiles. On December 5, 2019, the FY 2020 Option was partially exercised, awarding the ground support equipment. On February 27, 2020, the FY 2020 Option was fully exercised. In March 2022, FY 2020 funds that were held to cover contingent liability for FY 2020 FPIF contract ceiling were released and realigned to the FY 2022 missile production contract after a successful bilateral agreement to reduce contract ceiling was achieved. The corresponding FY 2022 funds that were released were obligated in September 2022. Final Not-To-Exceed line items were definitized on March 3, 2022. This contract is now fully definitized. FY 2020 PAC-3 MSE deliveries began in 1st Quarter FY 2023.

Factors Contributing to Cost Variance and Projected Effects on Program Costs**Factors Contributing to Schedule Variance and Projected Effects on Program Schedule**

The unfavorable schedule variance is due to loans of missiles from the FY 2020 contract to the FY 2021 contract to support prioritized FMS MSE missile deliveries.

Contract Data	
Contract Number	W31P4Q-20-C-0023
Effort Number	2
Modification Number	P00008
Award Date	04/30/2020
Definitization Date	03/15/2022
Order Number	
CAGE Code/CAGE Legal Name	64059/Lockheed Martin Missiles and Fire Control
Contract Title	Integrated Guidance Subsystem (IGS)
Contract Address	Dallas, TX
Contracting Office	ACC-RSA
Supported Phase	Production
Contract Strategy	FAR 15 (Negotiated)
Contract Type	Cost-Plus-Fixed-Fee
Modification Date	March 15, 2022
Work Start Date	June 10, 2020
Technical Data Rights	None
Work Completed	42.83%

Contracts/Effort Price, Quantity, and Performance (TYSM)		
Initial Target Price	Current Target Price	
\$147.1	\$157.1	
Initial Ceiling Price	Current Ceiling Price	
	\$157.1	
Contractor EAC	PM EAC	
\$145	\$145	
Initial Quantity	Current Quantity	Delivered Quantity
BAC	BCWP	ACWP
\$136	\$58.2	\$67.8
BCWS	Cost Variance	Schedule Variance

\$65.3	-\$9.5	-\$7
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Contract Notes:

Contract W31P4Q-20-C-0023 was modified on June 6, 2020 to add NTEs for Seeker Block V and the Integrated Guidance Subsystem (IGS) Redesign. On March 15, 2022, modification P00008 to contract W31P4Q-20-C-0023 definitized the IGS Redesign NTE. On June 4, 2021, an additional NTE for the IGS Backwards Compatibility effort was added. This modification has not yet been definitized. The IGS efforts represented here are 100% FMS funded.

Factors Contributing to Cost Variance and Projected Effects on Program Costs

Unfavorable CV in Materials is due to an increase in miscellaneous materials required for lab operations, combined with dual procurement to reduce brassboard circuit card build schedule risk.

Factors Contributing to Schedule Variance and Projected Effects on Program Schedule

Unfavorable SV is due to Electrical Engineering flex and cable designs external to the IGS Assembly because of prioritizing IGS level brass board design work.

Contract Data	
Contract Number	W31P4Q-20-C-0023
Effort Number	1
Modification Number	P00024
Award Date	04/30/2020
Definitization Date	12/07/2022
Order Number	
CAGE Code/CAGE Legal Name	64059/Lockheed Martin Missiles and Fire Control
Contract Title	Seeker Block V
Contract Address	Dallas, TX
Contracting Office	ACC-RSA
Supported Phase	Production
Contract Strategy	FAR 15 (Negotiated)
Contract Type	Cost-Plus-Fixed-Fee
Modification Date	December 07, 2022
Work Start Date	June 12, 2020
Technical Data Rights	None
Work Completed	37.64%

Contracts/Effort Price, Quantity, and Performance (TYSM)		
Initial Target Price	Current Target Price	
\$405	\$421.4	
Initial Ceiling Price	Current Ceiling Price	
Contractor EAC	PM EAC	
\$441.7	\$441.7	
Initial Quantity	Current Quantity	Delivered Quantity
BAC	BCWP	ACWP
\$421.4	\$158.6	\$167.5
BCWS	Cost Variance	Schedule Variance

\$172.7	-\$8.9	-\$14.1
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Contract Notes:

Contract W31P4Q-20-C-0023 was modified on June 6, 2020 to add NTEs for Seeker Block V and the Integrated Guidance Subsystem (IGS) Redesign. On December 7, 2022, modification P00024 to contract W31P4Q-20-C-0023 definitized the Seeker Block V Redesign NTE. The definitized baseline is not yet reflected in the earned value data. On June 4, 2021, an additional NTE for the Seeker Block V Backwards Compatibility effort was added. This modification has not yet been definitized. The Seeker Block V effort represented here is 16.5% US funded and 83.5% FMS funded.

Factors Contributing to Cost Variance and Projected Effects on Program Costs

Unfavorable Cost Variance is due to cost overruns in the seeker subcontractor and Guidance Processor Unit Redesign (GPU-R) software areas.

Factors Contributing to Schedule Variance and Projected Effects on Program Schedule

Unfavorable Schedule Variance is due to late receipt of materials at the seeker subcontractor.

External Government Activities

Activity Title		Government Entity	Supported Phase
CAGE		Work Start Date	
City		State/Province:	
Notes			

Deliveries and Expenditures

PAC-3 MSE

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development				
Production	1,034	1,042	3,180	32.77%
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Total Program Quantity Delivered	1034	1042	3180	32.77%
Expended and Appropriated (TY \$M)				

Years Appropriated to date: 20

Total Years Appropriated Funding (Current Baseline): 35

Percent Years Appropriated: 57.14%

Then-Year Funding Appropriated as Percentage of Total Acquisition Estimate: 65.70%

Then-Year Funding Expended as Percentage of Total Acquisition Estimate: 35.96%

Total Acquisition Cost: 14,840.8

Deliveries & Expenditures Notes:

MILCON is not executed at the PM level, and no product-specific expenditures are available. Deliveries and Expenditures as of December 13, 2022.

Operating and Support Costs

PAC-3 MSE

O&S Cost Breakdown:

Category (BY\$ Million)	PAC-3 MSE
Unit-Level Manpower	
Unit Operations	
Maintenance	
Sustaining Support	
Continued System Improvements	
Other	
Total	.0

Category (BY\$ Million)	PAC-3 MSE Missile
Unit-Level Manpower	
Unit Operations	
Maintenance	4,199.1
Sustaining Support	387.5
Continued System Improvements	687.0
Other	3.0
Total	5,276.6

Cost Estimate Source: CCP dated April 06, 2018

O&S Cost Notes:

Approved by: ASA(FM&C), April 6, 2018

Notes: Army Cost Position dated April 06, 2018.

Total Program O&S Cost Compared with Baseline					
	Current Baseline				
	Objective (BY\$M)	Threshold (BY\$M)	Current Estimate (BY\$M)	Current Estimate (TY\$M)	Deviation
Total O&S	5,155.7	5,671.3	5,276.6	9,169.7	

Note:

Current Then-Year Estimate: \$9,169.69

O&S Cost Deviation Explanation

Operating and Support Costs - Disposal and Unitized Costs**PAC-3 MSE****Annual Unitized O&S Cost Definition and Calculation Relative to Total O&S Cost:**

Sustainment Factors	System Name: PAC-3 MSE	Antecedent System Name:
Quantity to Sustain	3180	
Unit of Measure	Total Quantity	
Unit Expected Service Life	30	

Base Year:

Annual Unitized O&S Cost by Category Base Year \$ Unit:(\$M)	System Name: PAC-3 MSE	Antecedent System Name:
Unit-Level Manpower		
Unit Operations		
Maintenance	79.2	
Sustaining Support	7.3	
Continued System Improvements	13.0	
Other	0.1	
Total O&S	99.6	0.0

Disposal/Demilitarization Cost Estimate

(Base Year \$Millions)	System Name: PAC-3 MSE	Antecedent System Name:
Total Disposal	47.6	

Cost Estimate Source - Disposal	
Type:	Program Office Estimate
Approval Authority and Date:	PM, SHIELD 12/14/2022
Note:	
Demilitarization costs were provided by Army Environmental Command.	
Disposal Cost Notes:	
Additional O&S Estimate Assumptions:	
Sustainment Strategy:	

The missile is transported and operates in a hermetically sealed canister as a self-contained major end item. There is no missile field maintenance; however, Preventive Maintenance Checks and Services are conducted only on the external canister. Removal and Replacement of failed exterior canister minor hardware components, approved "render safe" procedures, and semi-annual Missile Field Test status testing are completed by the Patriot user. All other maintenance is considered sustainment (depot) level maintenance. 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. Once established, missiles will be shipped to Letterkenny Army Depot for diagnosis/testing, decanning, 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 reinserting the missile into its canister to verify that current tactical software was uploaded as required.

Antecedent Estimate Assumptions:

No antecedent.