



Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-466



Paladin Integrated Management (PIM)

As of FY 2019 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

~~This document contains information that may be exempt from mandatory disclosure under the FOIA.~~

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(U//FOUO) Sensitivity Originator

Organization: PM - Armored Fighting Vehicles (AFV)

Organization Email:

Organization Phone: 586-282-6766

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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

Paladin Integrated Management (PIM)

DoD Component

Army

Responsible Office

(b)(6)

References

SAR Baseline (Production Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated March 09, 2014

Approved APB

Army Acquisition Executive (AAE) Approved Acquisition Program Baseline (APB) dated November 5, 2017

Mission and Description

The M109 Family of Vehicles (FoV) 155-millimeter / 39-caliber Self-Propelled Howitzer (SPH) provides the primary indirect fire support for full spectrum operations. It has the ability to support Armored Brigade Combat Teams, Infantry Brigade Combat Teams and Stryker Brigade Combat Teams. The M109 FoV Carrier Ammunition Tracked (CAT) provides armored ammunition supply support to the SPH operating in support of full spectrum operations. Together, the M109 FoV is also referred to as Paladin Integrated Management (PIM) weapon system.

The M109A6 Paladin and the M992A2 Field Artillery Ammunition Support Vehicle (FAASV) are the currently fielded versions of the Army's SPH and CAT. The PIM SPH and CAT replace the M109A6 Paladin and M992A2 FAASV. Together, the M109A6 and M992A2 are also referred to as Paladin/FAASV weapon system.

The PIM program allows growth for improved force protection and technology insertion. PIM regains lost performance in the M109 FoV by addressing size, weight and power issues. The program helps to ensure greater vehicle supportability, maintainability and interoperability by leveraging fleet commonality for key components, replacing aging and obsolete components and leveraging Bradley and Non-Line-of-Sight Cannon technology.

~~(U//FOUO)~~ Executive Summary

~~(U//FOUO)~~ Program Highlights Since Last Report

(U) PIM is a post-Milestone C program in Production and Deployment. Production is underway at both the York, Pennsylvania and Elgin, Oklahoma facilities. RDT&E-funded work supporting LRIP continues under the EMD contract modification.

(b)(3):10 USC § 130

(U) Program funding is adequate to meet the cost baseline. PIM experienced increased schedule risk resulting in deliveries delayed four months behind schedule due to production issues. The major program risk for PIM is that it may fall short of Reliability Requirements due to legacy components that are not part of the current PIM upgrade.

(U) 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
June 2007	Start of the M109A7 Family of Vehicles (PIM) acquisition program
June 2011	PIM designated ACAT ID
October 2013	Achieved Milestone C,LRIP contract awarded
September 2015	Program delegated from OSD to Secretary of Army and designated ACAT IC

Threshold Breaches

APB Breaches

Schedule		<input type="checkbox"/>
Performance		<input type="checkbox"/>
Cost	RDT&E	<input type="checkbox"/>
	Procurement	<input type="checkbox"/>
	MILCON	<input type="checkbox"/>
	Acq O&M	<input type="checkbox"/>
O&S Cost		<input type="checkbox"/>
Unit Cost	PAUC	<input type="checkbox"/>
	APUC	<input type="checkbox"/>

Nunn-McCurdy Breaches

Current UCR Baseline


PAUC	None
APUC	None

Original UCR Baseline

PAUC	None
APUC	None

~~(U//FOUO)~~ Schedule

(b)(3):10 USC § 130



~~(U//FOUO)~~ Performance

(U//FOUO) Performance Characteristics			
SAR Baseline Production Estimate	Current APB Production Objective/Threshold	Demonstrated Performance	Current Estimate
KPP 1: Net-Ready			
The capability, system, and/or service must fully support execution of all operational activities and information exchanges identified in 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 compliant with DoD Enterprise Architecture based on integrated DoDAF content, including specified operationally effective information exchanges 2) Compliant with Net-Centric Data Strategy and Net-Centric Services Strategy, and the principles and rules identified in the DoD IEA, excepting tactical and non-IP communications 3) Compliant with GIG Technical Guidance to include IT Standards identified in the TV-I and implementation guidance of GESPs, necessary to meet all operational requirements specified in the DoD Enterprise	N/A	N/A	Threshold achieved.
			(b)(3):10 USC § 130

Architecture and solution architecture views 4) Information assurance requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA, and 5) Supportability requirements to include SAASM, Spectrum and JTRS requirements.

KPP 4: Digital Fire Control System (DFCS)

Must be able to independently compute and execute precision fire missions.

Must be able to independently compute and execute precision fire missions.

Receive, process, compute and transmit technical fire control data from/to AFATDS to execute fire missions. Must be able to host current and future software upgrades.

Threshold achieved.

(b)(3):10 USC § 130

KPP 5: Rate of Fire

6 rpm un-guided, 3 rpm guided

N/A

N/A

The system has demonstrated the capability to meet the Rate of Fire requirement. However, due to the large contribution that crew training and experience makes to performance, the system has not consistently met the Rate of Fire requirement.

KPP 6: Range

Maximum range when firing guided munitions shall be no less than 40 km.

N/A

N/A

Threshold achieved.

(U//FOUO) KPP 7: Self-Propelled Howitzer Reliability

84 percent	N/A	N/A	Threshold achieved at the Production Qualification Test (PQT). To be updated after second IOT.	(b)(3):10 USC § 130
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KPP 8: Self-Propelled Howitzer Availability (Materiel Availability/Operational Availability)

Howitzer Am 83% and Ao 95%.	N/A	N/A	To be updated after second IOT.	(b)(3):10 USC § 130
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KPP 9: Carrier Ammunition Tracked Reliability

90 percent	N/A	N/A	Threshold achieved.	
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(b)(3):10 USC § 130

KPP 10: Carrier Ammunition Tracked Availability (Materiel Availability / Operational Availability)

CAT Am 72% and Ao 95%.

N/A

N/A

To be updated after second IOT.

(b)(3):10 USC § 130

KPP 1: Net-Ready: The capability, system and/or service must support Net-Centric military operations by providing sufficient SWaP capacity to integrate information and communication systems to ensure C2 and SA. The capability, system and/or service must be able to enter and be managed in the network and exchange data in a secure manner to enhance mission effectiveness. The capability, system and/or service must continuously provide survivable, interoperable, secure and operationally effective information exchanges to enable a Net-Centric military capability.

N/A

The capability, system and/or service must provide sufficient SWaP capacity to integrate information and communication systems to ensure C2 and SA in order to fully support execution of all operational activities and information exchanges identified in 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 compliant with DoD Enterprise Architecture based on integrated DoDAF content, including specified operationally effective information exchanges 2) Compliant with Net-Centric Data Strategy and Net-Centric

The capability, system and/or service must provide sufficient SWaP capacity to integrate information and communication systems to ensure C2 and SA in order to 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 compliant with DoD Enterprise Architecture based on integrated DoDAF content, including specified operationally effective information exchanges 2) Compliant with Net-Centric Data Strategy and Net-Centric

Threshold achieved.

(b)(3):10 USC § 130

(Ch-1)

Services Strategy, and the principles and rules identified in the DoD IEA, excepting tactical and non-IP communications 3) Compliant with GIG Technical Guidance to include IT Standards identified in the TV-1 and implementation guidance of GESPs, necessary to meet all operational requirements specified in the DoD Enterprise Architecture and solution architecture views 4) IA requirements including availability, integrity, authentication, confidentiality and non-repudiation, and issuance of an ATO by the DAA, and 5) Supportability requirements to include SAASM, Spectrum and JTRS requirements.	Services Strategy and the principles and rules identified in the DoD IEA, excepting tactical and non-IP communications 3) Compliant with GIG Technical Guidance to include IT Standards identified in the TV-1 and implementation guidance of GESPs necessary to meet all operational requirements specified in the DoD Enterprise Architecture and solution architecture views 4) IA requirements including availability, integrity, authentication, confidentiality and non-repudiation, and issuance of an IATO or ATO by the DAA, and 5) Supportability requirements to include SAASM, Spectrum and JTRS requirements.
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(U//FOUO) KPP 5: Range

N/A

Minimum indirect fire range using the M107 projectile and MACS propellant shall be no more than 4 km (T=O). Maximum range when firing the M795 projectile and MACS propellant shall be no less than 40 km. Maximum range when firing assisted (i.e. rocket assisted) projectile M549A1 shall be no less than 50 km. Maximum range when firing the Excalibur M982 guided projectile shall be no less than 50 km. All range requirements are specified IAW ICAO standard conditions.	Minimum indirect fire range using the M107 projectile and MACS propellant shall be no more than 4 km (T=O). Maximum range when firing the M795 projectile and MACS propellant shall be no less than 22 km. Maximum range when firing assisted (i.e. rocket assisted) projectile M549A1 shall be no less than 30 km. Maximum range when firing the Excalibur M982 guided projectile shall be no less than 35 km. All range requirements are specified IAW ICAO standard conditions. Threshold requirements
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Threshold achieved.

(b)(3):10 USC § 130

(Ch-1)

	Combined cannon, projectile, and propellant and propellant development efforts shall increase the M109 maximum range to 70 km.	are based upon the current production caliber tube.		
(U//FOUO) KPP 6: Howitzer Reliability				
N/A	84%	Will have reliability of 75% probability of completing an 18 hour combat mission	Threshold achieved at the Production Qualification Test (PQT). To be updated after second IOT.	(b)(3):10 USC § 130 (Ch-1)
(U//FOUO) KPP 7: Howitzer Availability (Materiel Availability / Operational Availability)				
N/A	Howitzer Am 83% and Ao 95%.	The Howitzer shall demonstrate Am of 81%	To be updated after second	(Ch-1)

		(T), and an Ao of 78% (T).	IOT.	(b)(3):10 USC § 130	
(U//FOUO) KPP 8: Carrier Ammunition Tracked Reliability					
N/A	90%	Will have a reliability of 84% probability of completing an 18 hour combat mission.	Threshold achieved.		(Ch-1)
(U//FOUO) KPP 9: Carrier Ammunition Tracked Availability (Material Availability / Operational Availability)					
N/A	CAT Am 72% and Ao 95%.	The CAT shall demonstrate a Am of 66% and an Ao of 85%.	To be updated after second IOT.	(b)(3):10 USC § 130	(Ch-1)

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

Requirements Reference

CPD v5.1 approved November 30, 2016, CARDS #04028 and JROC Memorandum 150-16 dated December 6, 2016

(U//FOUO) Change Explanations

(U//FOUO) (Ch-1) KPP 1: Net-Ready, KPP 5: Range, KPP 6: Howitzer Reliability, KPP 7: Howitzer Availability, KPP 8: Carrier Ammunition Tracked Reliability and KPP 9: Carrier Ammunition Tracked Availability are redefined/renumbered per APB approved November 5, 2017.

(U//FOUO) Notes

All performance Objectives and Thresholds are based on current munitions.

Acronyms and Abbreviations

AFATDS - Advanced Field Artillery Tactical Data System
Am - Materiel Availability
Ao - Operational Availability
ATO - Approval to Operate
C2 - Command and Control
CAT - Carrier Ammunition Tracked
DAA - Designated Accrediting Authority
DoDAF - Department of Defense Architecture Framework
GESP - GIG Enterprise Service Profile
GIG - Global Information Grid
i.e. - id est, "that is"
IA - Information Assurance
IATO - Interim Approval to Operate
IAW - In Accordance With
ICAO - International Civil Aviation Organization
IEA - Information Enterprise Architecture
IOT - Initial Operational Test
IP - Internet Protocol
IT - Information Technology
JTRS - Joint Tactical Radio System
km - Kilometers
KSA - Key System Attribute
MACS - Modular Artillery Charge System
PD - Point Detonating
PQT - Production Qualification Test
RPM - Rounds Per Minute
SA - Situational Awareness
SAASM - Selective Availability Anti-Spoofing Module
TV - Technical View

Track to Budget

RDT&E

Appn	BA	PE	
Army	2040	05	0210609A
	Project	Name	
	ED8	Paladin Integrated Management (PIM)	
Army	2040	05	0604854A
	Project	Name	
	516	Paladin/Faasv (Sunk)	

Procurement

Appn	BA	PE	
Army	2033	01	0210609A
	Line Item	Name	
	2073GZ0410	Paladin Integrated Management (PIM)	

Acq O&M

Appn	BA	PE	
Army	2020	04	0702806A
	Subactivity Group	Name	
	435	Acquisition & Management Support: PIM (Shared)	

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2013 \$M			BY 2013 \$M	TY \$M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	1084.3	1084.3	1192.7	1075.9	1102.0	1102.0	1085.6
Procurement	5759.3	5759.3	6335.2	5974.5	6850.5	6850.5	6984.1
Flyaway	--	--	--	5534.5	--	--	6463.7
Recurring	--	--	--	5501.4	--	--	6428.7
Non Recurring	--	--	--	33.1	--	--	35.0
Support	--	--	--	440.0	--	--	520.4
Other Support	--	--	--	312.2	--	--	371.9
Initial Spares	--	--	--	127.8	--	--	148.5
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	--	30.1	0.0	0.0	35.9
Total	6843.6	6843.6	N/A	7080.5	7952.5	7952.5	8105.6

Cost Notes

In accordance with Section 842 of the National Defense Authorization Act for FY 2017, which amended title 10 U.S.C. § 2334, the Director of Cost Assessment and Program Evaluation, and the Secretary of the military department concerned or the head of the Defense Agency concerned, must issue guidance requiring a discussion of risk, the potential impacts of risk on program costs, and approaches to mitigate risk in cost estimates for MDAPs and major subprograms. The information required by the guidance is to be reported in each SAR. This guidance is not yet available; therefore, the information on cost risk is not contained in this SAR.

Beginning in FY 2019, the Army realigned direct civilian personnel pay costs from RDT&E and Procurement investment accounts to O&M to provide additional transparency and auditability.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	2	2	2
Procurement	556	556	574
Total	558	558	576

Quantity Notes

A quantity of two PIM systems are the RDT&E-funded quantity. One and one-half PIM systems are RDT&E-funded LRIP which were procured in FY 2014 for Full Up System Live Fire Testing. The remaining one-half system represents a prototype Self-Propelled Howitzer 5A considered to be production-representative for PAUC calculation purposes.

The procurement quantity represents 574 PIM systems. This includes six PIM systems requested in FY 2019 Overseas Contingency Operations funding.

Cost and Funding

Funding Summary

Appropriation Summary									
FY 2019 President's Budget / December 2017 SAR (TY\$ M)									
Appropriation	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
RDT&E	1079.5	6.1	0.0	0.0	0.0	0.0	0.0	0.0	1085.6
Procurement	1452.0	772.1	418.8	639.7	660.8	645.2	659.2	1736.3	6984.1
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	4.4	4.4	4.5	4.6	4.7	13.3	35.9
PB 2019 Total	2531.5	778.2	423.2	644.1	665.3	649.8	663.9	1749.6	8105.6
PB 2018 Total	2541.8	778.3	511.1	602.2	627.2	603.0	707.5	1624.5	7995.6
Delta	-10.3	-0.1	-87.9	41.9	38.1	46.8	-43.6	125.1	110.0

Quantity Summary										
FY 2019 President's Budget / December 2017 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
Development	2	0	0	0	0	0	0	0	0	2
Production	0	113	71	36	60	60	60	55	119	574
PB 2019 Total	2	113	71	36	60	60	60	55	119	576
PB 2018 Total	2	113	71	47	56	57	56	60	108	570
Delta	0	0	0	-11	4	3	4	-5	11	6

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
2007	--	--	--	--	--	--	1.6
2008	--	--	--	--	--	--	34.8
2009	--	--	--	--	--	--	61.0
2010	--	--	--	--	--	--	147.5
2011	--	--	--	--	--	--	176.2
2012	--	--	--	--	--	--	126.3
2013	--	--	--	--	--	--	149.7
2014	--	--	--	--	--	--	121.3
2015	--	--	--	--	--	--	77.2
2016	--	--	--	--	--	--	142.4
2017	--	--	--	--	--	--	41.5
2018	--	--	--	--	--	--	6.1
Subtotal	2	--	--	--	--	--	1085.6

Annual Funding							
2040 RDT&E Research, Development, Test, and Evaluation, Army							
Fiscal Year	Quantity	BY 2013 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2007	--	--	--	--	--	--	1.7
2008	--	--	--	--	--	--	37.0
2009	--	--	--	--	--	--	64.1
2010	--	--	--	--	--	--	152.7
2011	--	--	--	--	--	--	178.9
2012	--	--	--	--	--	--	126.2
2013	--	--	--	--	--	--	147.1
2014	--	--	--	--	--	--	117.0
2015	--	--	--	--	--	--	73.3
2016	--	--	--	--	--	--	133.9
2017	--	--	--	--	--	--	38.4
2018	--	--	--	--	--	--	5.6
Subtotal	2	--	--	--	--	--	1075.9

Annual Funding							
2033 Procurement Procurement of Weapons and Tracked Combat Vehicles, Army							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2013	--	123.5	28.9	17.2	169.6	19.0	188.6
2014	17	100.7	58.6	--	159.3	6.2	165.5
2015	18	155.0	71.4	--	226.4	13.5	239.9
2016	30	247.1	11.8	3.3	262.2	11.7	273.9
2017	48	441.1	94.5	14.5	550.1	34.0	584.1
2018	71	620.0	108.8	--	728.8	43.3	772.1
2019	36	304.3	86.0	--	390.3	28.5	418.8
2020	60	478.6	108.0	--	586.6	53.1	639.7
2021	60	498.8	106.1	--	604.9	55.9	660.8
2022	60	509.4	81.7	--	591.1	54.1	645.2
2023	55	485.7	123.2	--	608.9	50.3	659.2
2024	60	555.5	163.8	--	719.3	52.0	771.3
2025	59	594.9	134.8	--	729.7	43.1	772.8
2026	--	--	68.7	--	68.7	31.6	100.3
2027	--	--	67.8	--	67.8	24.1	91.9
Subtotal	574	5114.6	1314.1	35.0	6463.7	520.4	6984.1

Annual Funding							
2033 Procurement Procurement of Weapons and Tracked Combat Vehicles, Army							
Fiscal Year	Quantity	BY 2013 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2013	--	119.9	28.1	16.7	164.7	18.4	183.1
2014	17	96.8	56.3	--	153.1	6.0	159.1
2015	18	146.9	67.7	--	214.6	12.8	227.4
2016	30	230.0	11.0	3.1	244.1	10.9	255.0
2017	48	403.6	86.5	13.3	503.4	31.1	534.5
2018	71	557.2	97.7	--	654.9	38.9	693.8
2019	36	268.2	75.9	--	344.1	25.1	369.2
2020	60	413.6	93.4	--	507.0	45.9	552.9
2021	60	422.6	90.0	--	512.6	47.3	559.9
2022	60	423.1	67.9	--	491.0	45.0	536.0
2023	55	395.5	100.3	--	495.8	41.0	536.8
2024	60	443.5	130.8	--	574.3	41.5	615.8
2025	59	465.7	105.5	--	571.2	33.7	604.9
2026	--	--	52.7	--	52.7	24.3	77.0
2027	--	--	51.0	--	51.0	18.1	69.1
Subtotal	574	4386.6	1114.8	33.1	5534.5	440.0	5974.5

Cost Quantity Information 2033 Procurement Procurement of Weapons and Tracked Combat Vehicles, Army		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2013 \$M
2013	--	--
2014	17	192.5
2015	18	159.8
2016	30	254.8
2017	48	289.8
2018	71	543.6
2019	36	401.9
2020	60	419.9
2021	60	416.1
2022	60	413.5
2023	55	411.9
2024	60	525.1
2025	59	357.7
2026	--	--
2027	--	--
Subtotal	574	4386.6

Annual Funding		
2020 Acq O&M Operation and Maintenance, Army		
Fiscal Year	TY \$M	
	Total Program	
2019		4.4
2020		4.4
2021		4.5
2022		4.6
2023		4.7
2024		3.3
2025		3.3
2026		3.3
2027		3.4
Subtotal		35.9

Annual Funding		
2020 Acq O&M Operation and Maintenance, Army		
Fiscal Year	BY 2013 \$M	
	Total Program	
2019		4.0
2020		3.9
2021		3.9
2022		3.9
2023		3.9
2024		2.7
2025		2.6
2026		2.6
2027		2.6
Subtotal		30.1

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	10/21/2013	4/7/2017
Approved Quantity	67	115
Reference	Milestone C ADM	Extended LRIP ADM
Start Year	2014	2014
End Year	2017	2018

The Current Total LRIP Quantity is more than 10% of the total production quantity as authorized in the Milestone C ADM to provide enough test assets to complete all required tests and to provide a gradual ramp-up to FRP.

The Current Total LRIP Approved Quantity buy of 115 PIM systems includes one and one-half RDT&E-funded LRIP systems procured in FY 2014 for Full Up System Live Fire Testing and 113 Procurement-funded PIM systems.

PIM

December 2017 SAR

Foreign Military Sales

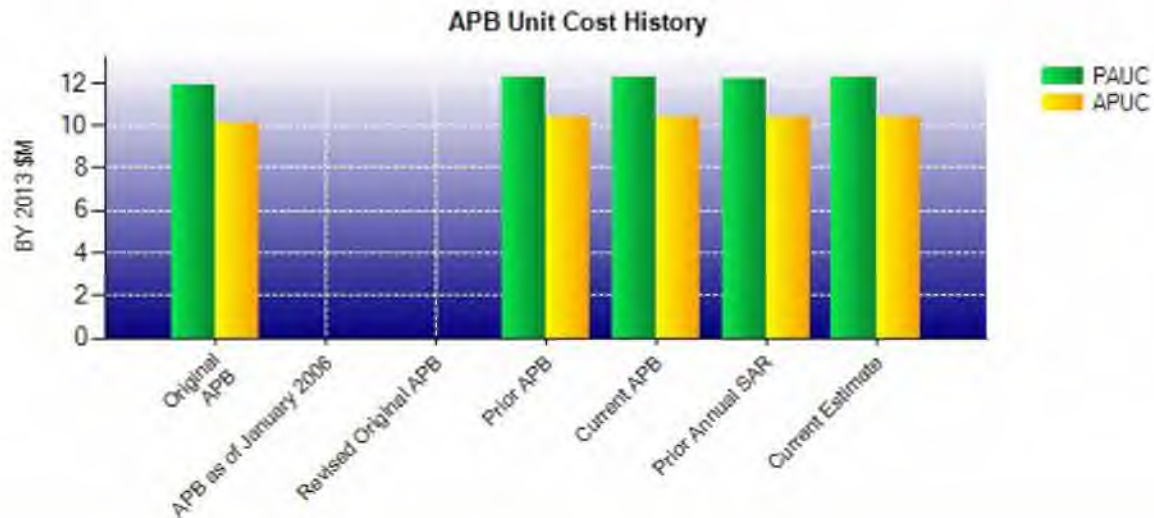
None

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2013 \$M	BY 2013 \$M	% Change
	Current UCR Baseline (Nov 2017 APB)	Current Estimate (Dec 2017 SAR)	
Program Acquisition Unit Cost			
Cost	6843.6	7080.5	
Quantity	558	576	
Unit Cost	12.265	12.293	+0.23
Average Procurement Unit Cost			
Cost	5759.3	5974.5	
Quantity	556	574	
Unit Cost	10.358	10.409	+0.49
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2013 \$M	BY 2013 \$M	% Change
	Original UCR Baseline (Mar 2012 APB)	Current Estimate (Dec 2017 SAR)	
Program Acquisition Unit Cost			
Cost	6902.6	7080.5	
Quantity	582	576	
Unit Cost	11.860	12.293	+3.65
Average Procurement Unit Cost			
Cost	5862.3	5974.5	
Quantity	580	574	
Unit Cost	10.107	10.409	+2.99



APB Unit Cost History					
Item	Date	BY 2013 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Mar 2012	11.860	10.107	13.449	11.699
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Mar 2014	12.265	10.358	14.252	12.321
Current APB	Nov 2017	12.265	10.358	14.252	12.321
Prior Annual SAR	Dec 2016	12.194	10.344	14.027	12.165
Current Estimate	Dec 2017	12.293	10.409	14.072	12.167

SAR Unit Cost History

Initial SAR Baseline to Current SAR Baseline (TY \$M)									
Initial PAUC Development Estimate	Changes								PAUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
13.449	0.365	0.238	0.027	0.000	-0.085	0.000	0.258	0.803	14.252

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
14.252	-0.261	-0.185	-0.005	0.000	0.431	0.000	-0.160	-0.180	14.072

Initial SAR Baseline to Current SAR Baseline (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
11.699	0.343	0.163	0.027	0.000	-0.169	0.000	0.258	0.622	12.321

Current SAR Baseline to Current Estimate (TY \$M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
12.321	-0.249	-0.124	-0.005	0.000	0.385	0.000	-0.161	-0.154	12.167

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	Jun 2013	Oct 2013	Oct 2013
IOC	N/A	Apr 2017	Apr 2017	Sep 2018
Total Cost (TY \$M)	N/A	7827.1	7952.5	8105.6
Total Quantity	N/A	582	558	576
PAUC	N/A	13.449	14.252	14.072

Cost Variance

Summary TY \$M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Production Estimate)	1102.0	6850.5	--	--	7952.5
Previous Changes					
Economic	-6.7	-90.0	--	--	-96.7
Quantity	--	+100.9	--	--	+100.9
Schedule	--	-8.4	--	--	-8.4
Engineering	--	--	--	--	--
Estimating	-9.7	+148.9	--	--	+139.2
Other	--	--	--	--	--
Support	--	-91.9	--	--	-91.9
Subtotal	-16.4	+59.5	--	--	+43.1
Current Changes					
Economic	-0.8	-53.1	--	--	-53.9
Quantity	--	+50.2	--	--	+50.2
Schedule	--	+5.4	--	--	+5.4
Engineering	--	--	--	--	--
Estimating	+0.8	+72.1	--	+35.9	+108.8
Other	--	--	--	--	--
Support	--	-0.5	--	--	-0.5
Subtotal	--	+74.1	--	+35.9	+110.0
Total Changes	-16.4	+133.6	--	+35.9	+153.1
CE - Cost Variance	1085.6	6984.1	--	35.9	8105.6
CE - Cost & Funding	1085.6	6984.1	--	35.9	8105.6

Summary BY 2013 \$M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Production Estimate)	1084.3	5759.3	--	--	6843.6
Previous Changes					
Economic	--	--	--	--	--
Quantity	--	+78.4	--	--	+78.4
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	-9.2	+115.5	--	--	+106.3
Other	--	--	--	--	--
Support	--	-77.8	--	--	-77.8
Subtotal	-9.2	+116.1	--	--	+106.9
Current Changes					
Economic	--	--	--	--	--
Quantity	--	+39.3	--	--	+39.3
Schedule	--	-0.1	--	--	-0.1
Engineering	--	--	--	--	--
Estimating	+0.8	+61.2	--	+30.1	+92.1
Other	--	--	--	--	--
Support	--	-1.3	--	--	-1.3
Subtotal	+0.8	+99.1	--	+30.1	+130.0
Total Changes	-8.4	+215.2	--	+30.1	+236.9
CE - Cost Variance	1075.9	5974.5	--	30.1	7080.5
CE - Cost & Funding	1075.9	5974.5	--	30.1	7080.5

Previous Estimate: December 2016

RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-0.8
Adjustment for current and prior escalation. (Estimating)	+0.8	+0.8
RDT&E Subtotal	+0.8	0.0

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-53.1
Total Quantity variance resulting from an increase of 6 PIM systems from 568 to 574. (Subtotal)	+41.2	+52.6
Quantity variance resulting from an increase of 6 PIM systems from 568 to 574. (Quantity)	(+39.3)	(+50.2)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(-0.1)	(-0.1)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(+2.0)	(+2.5)
Stretch-out of procurement buy profile for FY 2019 through FY 2025. (Schedule) (QR)	0.0	+5.5
Revised estimate to reflect the Army's realignment of direct civilian pay costs from RDT&E and Procurement investment accounts to O&M to provide additional transparency and auditability. (Estimating)	-29.6	-35.9
Revised estimate to align with FY 2019 PB. (Estimating)	+14.5	+17.7
Adjustment for current and prior escalation. (Estimating)	+10.4	+11.3
Revised estimate to reflect application of out year escalation indices. (Estimating)	+63.9	+76.5
Adjustment for current and prior escalation. (Support)	+0.7	+0.8
Increase in Other Support to align with FY 2019 PB. (Support)	+0.9	+2.0
Decrease in Initial Spares to align with FY 2019 PB. (Support)	-2.9	-3.3
Procurement Subtotal	+99.1	+74.1

(QR) Quantity Related

Acq O&M	\$M	
Current Change Explanations	Base Year	Then Year
Revised estimate to reflect the Army's realignment of direct civilian pay costs from RDT&E and Procurement investment accounts to O&M to provide additional transparency and auditability. (Estimating)	+30.1	+35.9
Acq O&M Subtotal	+30.1	+35.9

Contracts

Contract Identification

Appropriation: RDT&E
Contract Name: Comprehensive Contract Modification (CCM)
Contractor: BAE Systems Land & Armaments L.P.
Contractor Location: 1100 Bairs Road
 York, PA 17408
Contract Number: W56HZV-09-C-0550/38
Contract Type: Cost Plus Incentive Fee (CPIF)
Award Date: January 06, 2012
Definitization Date: January 06, 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
311.6	N/A	N/A	445.7	N/A	N/A	421.6	421.6

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to award of the EMD extension contract and extended Initial Operational Test.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (CPIF) contract.

General Contract Variance Explanation

Cost and schedule variances are not reported for this contract, because earned value management reporting is no longer provided by the contractor. The contract is 97% complete with a green cost and schedule position.

Notes

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

Contract Identification

Appropriation: Procurement
Contract Name: PIM-LRIP BASE
Contractor: BAE Systems Land & Armaments L.P.
Contractor Location: 1100 Bairs Road
 York, PA 17408
Contract Number: W56HZV-14-C-0002
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: October 30, 2013
Definitization Date: October 30, 2013

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
217.5	197.5	19	631.1	597.6	133	656.6	656.6

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to awarding the LRIP Option 1 and LRIP Option 2 contracts.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FPIF) contract.

Notes

The Target Price includes data for all exercised FPIF and Cost Plus Fixed Fee Contract Line Items (CLIN), however, the contract Ceiling Price represents only FPIF CLINs.

Earned Value Management is not reported on this contract. The EVM reporting waiver was approved on December 6, 2015 since this contract is in mature production.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	2	2	2	100.00%
Production	46	36	574	6.27%
Total Program Quantity Delivered	48	38	576	6.60%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	8105.6	Years Appropriated	12
Expended to Date	1652.9	Percent Years Appropriated	57.14%
Percent Expended	20.39%	Appropriated to Date	3309.7
Total Funding Years	21	Percent Appropriated	40.83%

The above data is current as of February 12, 2018.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	October 19, 2017
Source of Estimate:	POE
Quantity to Sustain:	574
Unit of Measure:	System
Service Life per Unit:	26.00 Years
Fiscal Years in Service:	FY 2015 - FY 2053

A system is defined as a PIM weapon system or vehicle set, comprised of one Self-Propelled Howitzer and one Carrier Ammunition Tracked.

A quantity of two PIM systems are RDT&E-funded and will not be sustained. One and one-half PIM systems are RDT&E-funded LRIP which were procured in FY 2014 for Full Up System Live Fire Testing. The remaining one-half system represents a prototype Self-Propelled Howitzer 5A considered to be production representative for PAUC calculation purposes.

Sustainment Strategy

The PIM product support concept will consist of Operational/Field and Sustainment support. Operational/Field support will be through the use of Brigade Support Battalions (BSB) which use the Fires Forward Support Company and the Supply Support Activity. Maintainers from BSB will requisition spares using the Army Supply System. Outside the Continental U.S. support includes Army Pre-positioned Stock (APS), which are primarily static sets, in various locations in conjunction with Combat Support Agencies.

During LRIP, product support is expected to be via Contractor Logistics Support. During FRP and Sustainment, product support is expected to transition to organic support to the extent possible.

Maintenance support will consist of the Army two-level maintenance strategy; Field maintenance will include forward unit repair and component replacement; Depot support is expected to begin in FY 2023.

Supply Support will consist of rear supply (Army Retail Supply System) along with Depot and National Maintenance certified repair facilities developed in accordance with National Maintenance Work Requirements.

Software sustainment and support will be managed through the prime contractor and the Armament Research, Development and Engineering Center at Picatinny Arsenal, which is a software Center of Excellence.

Antecedent Information

The Antecedent System is the M109A6 Paladin / M992A2 Field Artillery Ammunition Support Vehicle (FAASV). O&S costs for the M109A6 Paladin / M992A2 FAASV are based on various sources including the O&S Management Information System, the Army Manpower Allocation Requirements Criteria Database and historical actuals from the program office. Operational Tempos are based on the Army's Forces Command model. The antecedent system estimate assumes 556 systems and Economic Useful Life (EUL) of 26 years.

Annual O&S Costs BY2013 \$K		
Cost Element	PIM Average Annual Cost Per System	M109A6 Paladin / M992A2 FAASV (Antecedent) Average Annual Cost Per System
Unit-Level Manpower	614.000	639.000
Unit Operations	126.000	133.000
Maintenance	125.000	98.000
Sustaining Support	104.000	109.000
Continuing System Improvements	80.000	56.000
Indirect Support	239.000	250.000
Other	0.000	0.000
Total	1288.000	1285.000

Item	Total O&S Cost \$M		
	PIM		M109A6 Paladin / M992A2 FAASV (Antecedent)
	Current Production APB Objective/Threshold	Current Estimate	
Base Year	19911.1	21902.2	19224.1
Then Year	30867.8	N/A	29425.3

Equation to Translate Annual Cost to Total Cost

PIM Total O&S Cost = Average Annual O&S Cost Per System x Number of Systems x EUL = \$1288.134K x 574 systems x 26 years = \$19224.1M (BY 2013 \$M)

Paladin/FAASV Total O&S Cost = Average Annual O&S Cost Per System x Number of Systems x EUL = \$1285.290K x 556 systems x 26 years = \$18580.2M (BY 2013 \$M)

O&S Cost Variance		
Category	BY 2013 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2016 SAR	19195.4	
Programmatic/Planning Factors	28.7	Sustainment of additional six PIM systems.
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	28.7	
Current Estimate	19224.1	

Disposal Estimate Details

Date of Estimate:	October 19, 2017
Source of Estimate:	POE
Disposal/Demilitarization Total Cost (BY 2013 \$M):	Total costs for disposal of all System are 64.8