



Selected Acquisition Report (SAR)

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



Paladin Integrated Management (PIM)

As of FY 2020 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

PIM

December 2018 SAR

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)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

Paladin Integrated Management (PIM)

DoD Component

Army

Responsible Office

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Date Assigned: August 31, 2018

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. The PIM program achieved Milestone C on October 18, 2013 permitting the program to begin LRIP on October 21, 2013. Production is underway at both the York, Pennsylvania and Elgin, Oklahoma facilities. In 2018, the program's Army Acquisition Objective increased by 109 weapon systems to 689 to meet an increase in Field Artillery force structure.

~~(U//FOUO)~~ The PIM program completed Limited User Testing in October 2012. The program completed Operational Testing in March 2018 and Army Test and Evaluation Command's final report supports a conditional materiel release and the initiation of fielding for both the M109A7 and M992A3. First Unit Equipped (FUE) was achieved in August 2018. ~~(b)(3):10 USC §~~

~~(b)(3):10 USC § 130~~

~~(U//FOUO)~~ ~~(b)(3):10 USC § 130~~

(U) The PIM program experienced Procurement and O&S cost deviations during the 2018 SAR reporting period. The deviations were due to the impact of procuring additional units for the Army. Program requirements were updated and validated and funding is adequate to meet cost, schedule, and performance objectives.

~~(U//FOUO)~~ ~~(b)(3):10 USC § 130~~
~~(b)(3):10 USC § 130~~

(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 2012	Completed Limited User Testing
October 2013	Achieved Milestone C,LRIP contract awarded
September 2015	Program delegated from OSD to Secretary of Army and designated ACAT IC
March 2018	Completed Initial Operational Testing
October 2018	Achieved Initial Operational Capability

(U//FOUO) Threshold Breaches

APB Breaches

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

(U//FOUO) Explanation of Breach

(U//FOUO) Since the 2017 SAR, the program's planned production increased by 115 sets adding \$1.4B to the procurement appropriation and \$0.5B to O&S. This triggered a Procurement and O&S Cost deviation. A Program Deviation Report is in staffing for MDA approval. APUC/PAUC remain well below thresholds established in the original baseline and the current baseline.

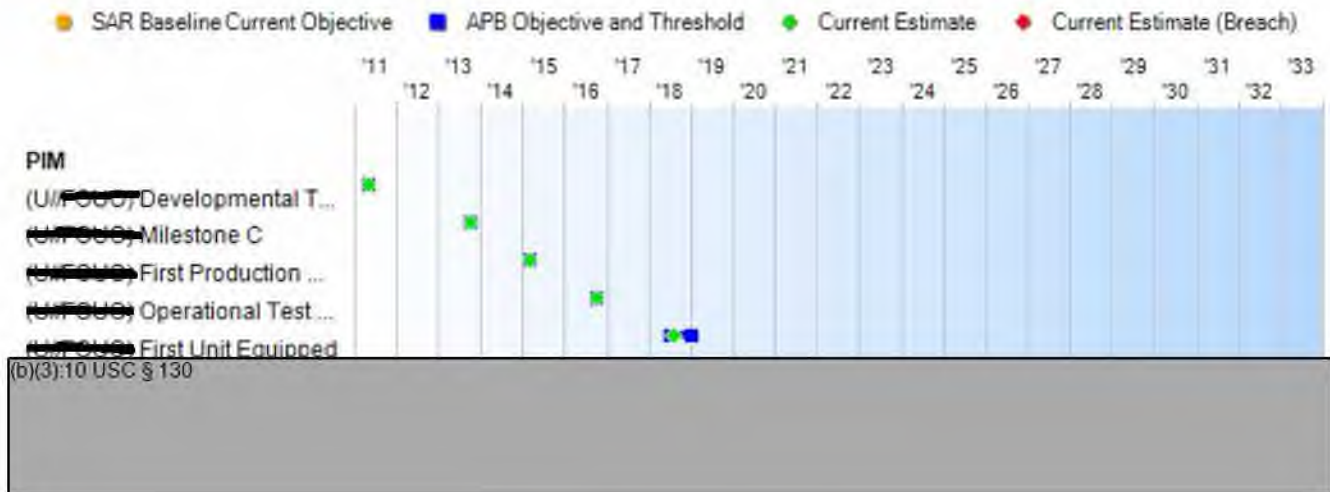
(b)(3):10 USC § 130

Nunn-McCurdy Breaches

Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

(b)(3):10 USC § 130

(U//FOUO) Schedule



(b)(3):10 USC § 130

(U//FOUO) Schedule Events				
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate
(U//FOUO) Developmental Test Start	May 2011	May 2011	May 2011	May 2011
(U//FOUO) Milestone C	Oct 2013	Oct 2013	Oct 2013	Oct 2013
(U//FOUO) First Production Delivery	Jun 2015	Mar 2015	Mar 2015	Mar 2015
(U//FOUO) Operational Test Start	Jun 2016	Oct 2016	Oct 2016	Oct 2016
(U//FOUO) First Unit Equipped	Jan 2017	Jul 2018	Jan 2019	Aug 2018 (Ch-1)
(U//FOUO) Full Rate Production	Jan 2017	Jul 2018	Jan 2019	(b)(3):10 USC § 130 (Ch-2)
(U//FOUO) IOC	Apr 2017	Sep 2018	Mar 2019	Oct 2018 (Ch-3)
(U//FOUO) FOC	Mar 2020	Mar 2020	Sep 2020	(b)(3):10 USC § 130 (Ch-4)

¹ APB Breach

(U//FOUO) Change Explanations

- (U//FOUO) (Ch-1) The FUE current estimate changed from July 2018 to August 2018 to reflect the completion date of the property transfer.
- (U//FOUO) (Ch-2) (b)(3):10 USC § 130
- (U//FOUO) (Ch-3) The IOC current estimate changed from September 2018 to October 2018 due to the FUE's National Training Center rotation.
- (U//FOUO) (Ch-4) (b)(3):10 USC § 130

Acronyms and Abbreviations

TCM - TRADOC Capability Manager

TRADOC - U.S. Army Training and Doctrine Command

~~(U//FOUO)~~ Performance

(U//FOUO) Performance Characteristics					
SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Demonstrated Performance	Current Estimate	
(U//FOUO) 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	N/A	N/A	Threshold achieved.	(b)(3):10	(b)(3):10

in the DoD Enterprise 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.

(U//FOUO) 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

(U//FOUO) KPP 5: Rate of Fire

6 rpm un-guided, 3 rpm guided

N/A

N/A

N/A - Not a KPP in CPD v5.1 approved November 30, 2016, CARDS #04028 and JROC Memorandum 150-16 dated December 6, 2016.

(b)(3) 10 USC § 130

(U//FOUO) KPP 6: Range

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

N/A

N/A

Threshold achieved.

(b)(3) 10 USC § 130

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

84 percent

N/A

N/A

N/A

(b)(3) 10 USC § 130

(U//FOUO) KPP 8: Self-Propelled Howitzer Availability (Materiel Availability/Operational Availability)

Howitzer Am 83% and Ao 95%.

N/A

N/A

N/A

(b)(3) 10 USC § 130

(U//FOUO) KPP 9: Carrier Ammunition Tracked Reliability

90 percent

N/A

N/A

N/A

(b)(3) 10 USC § 130

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

CAT Am 72% and Ao 95%.	N/A	N/A	N/A	(b)(3).10 USC § 130
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(U//FOUO) 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 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	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 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	Threshold achieved.	(b)(3).10 USC § 130
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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.

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.

(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. Combined cannon, projectile, and propellant development efforts shall increase the M109 maximum range to 70 km.

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 are based upon the current production caliber tube.

Threshold achieved.

(b)(3) 10 USC § 130

(U//FOUO) KPP 6: Howitzer Reliability

N/A	84%	Will have reliability of 75% probability of completing an 18 hour combat mission	Threshold not achieved at IOT.	(b)(3) 10 USC § 130
(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% (T), and an Ao of 78% (T).	Based on the last completed test (IOT), the threshold was achieved for Ao, with a DOT&E score of Ao 92.6% per the DOT&E Initial Operational Test and Evaluation 2 Report, July 16, 2018. DOT&E did not report an Am score as 3 years of fielding data is preferred to provide an accurate Am score.	

(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 at IOT with a DOT&E score of 97% per the DOT&E Initial Operational Test and Evaluation 2 Report, July 16, 2018.	(b)(3);10 USC § 130
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(U//FOUO) KPP 9: Carrier Ammunition Tracked Availability (Materiel Availability / Operational Availability)

N/A	CAT Am 72% and Ao 95%.	The CAT shall demonstrate a Am of 66% and an Ao of 85%.	Threshold achieved at IOT with a DOT&E score of Ao 95.6% per the DOT&E Initial Operational Test and Evaluation 2 Report, July 16, 2018. DOT&E did not report an Am score as 3 years of fielding data is preferred to provide an accurate Am score.	(b)(3);10 USC § 130
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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) The current estimates for KPP 1, 4, 6, 7, 8, 9 and 10 changed to N/A from the previous SAR to reflect the approved 2017 APB.

(U//FOUO) (Ch-2) The current estimate for Rate of Fire changed from the previous SAR to reflect that it was removed as a KPP in the November 2016 CPD.

(U//FOUO) (Ch-3) The current estimates for KPP 1, 5, 6, 7, 8 and 9 changed from the previous SAR to reflect completion of IOT.

(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
DOT&E - Director, Operational Test and Evaluation
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
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
TRADOC - U.S. Army Training and Doctrine Command
TV - Technical View

Track to Budget

RDT&E

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

(U//~~FOUO~~) Cost and Funding**(U//~~FOUO~~) 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	1075.1	1102.0	1102.0	1085.6
Procurement	5759.3	5759.3	6335.2	7312.6¹	6850.5	6850.5	8981.5
Flyaway	--	--	--	6962.8	--	--	8553.8
Recurring	--	--	--	6943.0	--	--	8533.3
Non Recurring	--	--	--	19.8	--	--	20.5
Support	--	--	--	349.8	--	--	427.7
Other Support	--	--	--	256.1	--	--	314.2
Initial Spares	--	--	--	93.7	--	--	113.5
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	--	18.8	0.0	0.0	23.2
Total	6843.6	6843.6	N/A	8406.5	7952.5	7952.5	10090.3

¹ APB Breach**(U//~~FOUO~~) Cost Notes**

(b)(3):10 USC § 130

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	2	2	2
Procurement	556	556	689
Total	558	558	691

Quantity Notes

The procurement quantity represents 689 PIM weapon systems which accommodates the changes in the Echelons Above Brigade Army National Guard Field Artillery Battalions requiring an additional six systems in each unit, an increase in Army Pre-positioned Stocks, and the addition of the 16th Armored Brigade Combat Team.

(U//~~FOUO~~) Cost and Funding**(U//~~FOUO~~) Funding Summary**

Appropriation Summary									
(U//FOUO) FY 2020 President's Budget / December 2018 SAR (TY\$ M)									
Appropriation	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
RDT&E	1085.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1085.6
Procurement	2224.8	525.9	553.4	506.7	512.5	593.0	620.2	3445.0	8981.5
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	2.0	2.0	2.1	2.1	2.2	2.2	10.6	23.2
PB 2020 Total	3310.4	527.9	555.4	508.8	514.6	595.2	622.4	3455.6	10090.3
PB 2019 Total	3309.7	423.2	644.1	665.3	649.8	663.9	774.6	975.0	8105.6
Delta	0.7	104.7	-88.7	-156.5	-135.2	-68.7	-152.2	2480.6	1984.7

Quantity Summary										
(U//FOUO) FY 2020 President's Budget / December 2018 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Development	2	0	0	0	0	0	0	0	0	2
Production	0	187	51	53	37	35	43	45	238	689
PB 2020 Total	2	187	51	53	37	35	43	45	238	691
PB 2019 Total	2	184	36	60	60	60	55	60	59	576
Delta	0	3	15	-7	-23	-25	-12	-15	179	115

(U//~~FOUO~~) Cost and Funding**(U//~~FOUO~~) 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	--	--	--	--	--	--	116.9
2015	--	--	--	--	--	--	73.2
2016	--	--	--	--	--	--	133.6
2017	--	--	--	--	--	--	38.2
2018	--	--	--	--	--	--	5.5
Subtotal	2	--	--	--	--	--	1075.1

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	247.0	12.6	3.3	262.9	11.7	274.6
2017	49	507.2	72.4	--	579.6	4.5	584.1
2018	73	630.9	122.0	--	752.9	19.2	772.1
2019	51	387.5	107.8	--	495.3	30.6	525.9
2020	53	417.6	108.0	--	525.6	27.8	553.4
2021	37	368.0	98.6	--	466.6	40.1	506.7
2022	35	358.3	113.5	--	471.8	40.7	512.5
2023	43	441.8	115.6	--	557.4	35.6	593.0
2024	45	462.1	121.1	--	583.2	37.0	620.2
2025	38	384.7	114.6	--	499.3	23.6	522.9
2026	36	352.8	118.0	--	470.8	28.3	499.1
2027	35	359.4	115.1	--	474.5	25.4	499.9
2028	39	407.7	114.0	--	521.7	22.9	544.6
2029	36	383.5	107.4	--	490.9	24.8	515.7
2030	37	401.6	108.8	--	510.4	6.3	516.7
2031	17	177.9	79.7	--	257.6	3.6	261.2
2032	--	0.4	37.8	--	38.2	6.1	44.3
2033	--	1.1	38.7	--	39.8	0.8	40.6
Subtotal	689	6668.7	1864.6	20.5	8553.8	427.7	8981.5

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	--	119.8	28.1	16.7	164.6	18.4	183.0
2014	17	96.7	56.3	--	153.0	6.0	159.0
2015	18	146.7	67.6	--	214.3	12.7	227.0
2016	30	228.9	11.5	3.1	243.5	10.9	254.4
2017	49	460.6	65.7	--	526.3	4.1	530.4
2018	73	561.7	108.7	--	670.4	17.1	687.5
2019	51	338.3	94.0	--	432.3	26.8	459.1
2020	53	357.4	92.4	--	449.8	23.8	473.6
2021	37	308.8	82.6	--	391.4	33.7	425.1
2022	35	294.7	93.5	--	388.2	33.4	421.6
2023	43	356.3	93.2	--	449.5	28.7	478.2
2024	45	365.3	95.7	--	461.0	29.3	490.3
2025	38	298.2	88.8	--	387.0	18.3	405.3
2026	36	268.1	89.7	--	357.8	21.5	379.3
2027	35	267.8	85.7	--	353.5	18.9	372.4
2028	39	297.8	83.2	--	381.0	16.8	397.8
2029	36	274.6	76.9	--	351.5	17.8	369.3
2030	37	281.9	76.3	--	358.2	4.5	362.7
2031	17	122.4	54.9	--	177.3	2.5	179.8
2032	--	0.3	25.5	--	25.8	4.1	29.9
2033	--	0.7	25.7	--	26.4	0.5	26.9
Subtotal	689	5447.0	1496.0	19.8	6962.8	349.8	7312.6

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	49	445.6
2018	73	561.7
2019	51	338.3
2020	53	357.4
2021	37	308.8
2022	35	294.7
2023	43	356.3
2024	45	365.3
2025	38	298.2
2026	36	268.1
2027	35	267.8
2028	39	297.8
2029	36	274.6
2030	37	281.9
2031	17	123.4
2032	--	--
2033	--	--
Subtotal	689	5447.0

Annual Funding 2020 Acq O&M Operation and Maintenance, Army		
Fiscal Year	TY \$M	
	Total Program	
2019	2.0	
2020	2.0	
2021	2.1	
2022	2.1	
2023	2.2	
2024	2.2	
2025	2.3	
2026	2.3	
2027	2.4	
2028	1.8	
2029	1.2	
2030	0.6	
Subtotal	23.2	

Annual Funding 2020 Acq O&M Operation and Maintenance, Army	
Fiscal Year	BY 2013 \$M
	Total Program
2019	1.8
2020	1.8
2021	1.8
2022	1.8
2023	1.8
2024	1.8
2025	1.8
2026	1.8
2027	1.8
2028	1.3
2029	0.9
2030	0.4
Subtotal	18.8

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	10/21/2013	9/27/2018
Approved Quantity	67	175
Reference	Milestone C ADM	Extended LRIP ADM
Start Year	2014	2014
End Year	2017	2019

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

The Current Total LRIP Approved Quantity buy of 175 PIM systems includes two RDT&E-funded LRIP systems procured in FY 2014 for Full Up System Live Fire Testing and 173 Procurement-funded PIM systems.

PIM

December 2018 SAR

Foreign Military Sales

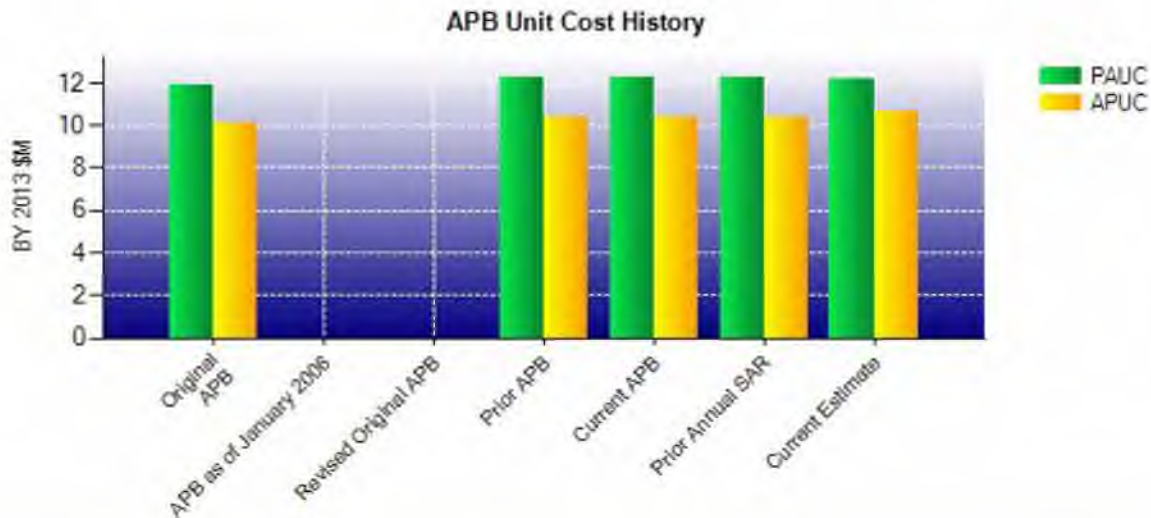
None

Nuclear Costs

None

~~(U//FOUO)~~ 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 2018 SAR)	
Program Acquisition Unit Cost			
Cost	6843.6	8406.5	
Quantity	558	691	
Unit Cost	12.265	12.166	-0.81
Average Procurement Unit Cost			
Cost	5759.3	7312.6	
Quantity	556	689	
Unit Cost	10.358	10.613	+2.46
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 2018 SAR)	
Program Acquisition Unit Cost			
Cost	6902.6	8406.5	
Quantity	582	691	
Unit Cost	11.860	12.166	+2.58
Average Procurement Unit Cost			
Cost	5862.3	7312.6	
Quantity	580	689	
Unit Cost	10.107	10.613	+5.01



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 2017	12.293	10.409	14.072	12.167
Current Estimate	Dec 2018	12.166	10.613	14.602	13.036

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	-0.129	-1.016	0.067	0.000	1.703	0.000	-0.275	0.350	14.602

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	-0.120	-0.645	0.067	0.000	1.688	0.000	-0.275	0.715	13.036

(U//FOUO) 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			Jun 2013	Oct 2013	Oct 2013
IOC			Apr 2017	Apr 2017	Oct 2018
Total Cost (TY \$M)			7827.1	7952.5	10090.3
Total Quantity			582	558	691
PAUC			13.449	14.252	14.602

~~(U//FOUO)~~ 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	-7.5	-143.1	--	--	-150.6
Quantity	--	+151.1	--	--	+151.1
Schedule	--	-3.0	--	--	-3.0
Engineering	--	--	--	--	--
Estimating	-8.9	+221.0	--	+35.9	+248.0
Other	--	--	--	--	--
Support	--	-92.4	--	--	-92.4
Subtotal	-16.4	+133.6	--	+35.9	+153.1
Current Changes					
Economic	+0.8	+60.4	--	+0.1	+61.3
Quantity	--	+1042.8	--	--	+1042.8
Schedule	--	+49.4	--	--	+49.4
Engineering	--	--	--	--	--
Estimating	-0.8	+942.1	--	-12.8	+928.5
Other	--	--	--	--	--
Support	--	-97.3	--	--	-97.3
Subtotal	--	+1997.4	--	-12.7	+1984.7
Total Changes	-16.4	+2131.0	--	+23.2	+2137.8
CE - Cost Variance	1085.6	8981.5	--	23.2	10090.3
CE - Cost & Funding	1085.6	8981.5	--	23.2	10090.3

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	--	+117.7	--	--	+117.7
Schedule	--	-0.1	--	--	-0.1
Engineering	--	--	--	--	--
Estimating	-8.4	+176.7	--	+30.1	+198.4
Other	--	--	--	--	--
Support	--	-79.1	--	--	-79.1
Subtotal	-8.4	+215.2	--	+30.1	+236.9
Current Changes					
Economic	--	--	--	--	--
Quantity	--	+740.8	--	--	+740.8
Schedule	--	-0.9	--	--	-0.9
Engineering	--	--	--	--	--
Estimating	-0.8	+688.4	--	-11.3	+676.3
Other	--	--	--	--	--
Support	--	-90.2	--	--	-90.2
Subtotal	-0.8	+1338.1	--	-11.3	+1326.0
Total Changes	-9.2	+1553.3	--	+18.8	+1562.9
CE - Cost Variance	1075.1	7312.6	--	18.8	8406.5
CE - Cost & Funding	1075.1	7312.6	--	18.8	8406.5

Previous Estimate: December 2017

RDT&E	\$M	
	Base Year	Then Year
Current Change Explanations		
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

(U//FOUO) Procurement	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+60.4
(U//FOUO) Total Quantity variance resulting from an increase of 115 PIM systems from 574 to 689. (Subtotal)	+799.6	+1125.6
(U//FOUO) Quantity variance resulting from an increase of 115 PIM systems from 574 to 689. (Quantity)	(+740.8)	(+1042.8)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(-0.9)	(-1.2)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(+59.7)	(+84.0)
(U//FOUO) Stretch-out of procurement buy profile from FY 2027 to FY 2033 to align with the Army Cost Position (ACP) dated November 28, 2018. (Schedule)	0.0	+50.6
Revised estimate to align with FY 2020 PB. (Estimating)	+643.7	+874.6
Adjustment for current and prior escalation. (Estimating)	-15.0	-16.5
Adjustment for current and prior escalation. (Support)	-0.8	-1.1
Decrease in Other Support FY 2017 to FY 2018 to align with FY 2020 PB. (Support)	-55.5	-60.3
Decrease in Initial Spares FY 2017 - FY 2018 to align with FY 2020 PB. (Support)	-33.9	-35.9
Procurement Subtotal	+1338.1	+1997.4

(QR) Quantity Related

Acq O&M	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+0.1
Revised estimate to align with November 28, 2018 ACP. (Estimating)	-11.2	-12.7
Adjustment for current and prior escalation. (Estimating)	-0.1	-0.1
Acq O&M Subtotal	-11.3	-12.7

Contracts

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	701.5	701.5

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.

General Contract Variance Explanation

Cost and schedule variances are not reported for this contract, because an EVM waiver was granted by the Assistant Secretary of the Army, on December 24, 2015.

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.

Contract Identification

Appropriation: Procurement
Contract Name: PIM FY17-20 Production
Contractor: BAE Systems Land & Armaments L.P.
Contractor Location: 1100 Bairs Road
 York, PA 17408
Contract Number: W56HZV-17-C-0001
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: December 21, 2017
Definitization Date: December 21, 2017

Contract Price

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
557.3	585.4	48	770.5	742.0	108	542.1	542.1

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to Award of FY18 Production Oct 2018 (planned 60 sets).

Cost and Schedule Variance Explanations

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

General Contract Variance Explanation

Cost and schedule variances are not reported for this contract, because an EVM waiver was granted by the Assistant Secretary of Defense for Acquisition on October 20, 2016.

Notes

This is the first time this contract is being reported.

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.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	2	2	2	100.00%
Production	68	59	689	8.56%
Total Program Quantity Delivered	70	61	691	8.83%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	10090.3	Years Appropriated	13
Expended to Date	2025.3	Percent Years Appropriated	48.15%
Percent Expended	20.07%	Appropriated to Date	3838.3
Total Funding Years	27	Percent Appropriated	38.04%

The above data is current as of March 11, 2019.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	November 28, 2018
Source of Estimate:	POE
Quantity to Sustain:	689
Unit of Measure:	System
Service Life per Unit:	26.00 Years
Fiscal Years in Service:	FY 2015 - FY 2059

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.

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 \$M		
Cost Element	PIM Average Annual Cost Per System	M109A6 Paladin / M992A2 FAASV (Antecedent) Average Annual Cost Per System
Unit-Level Manpower	0.544	0.639
Unit Operations	0.083	0.133
Maintenance	0.146	0.098
Sustaining Support	0.138	0.109
Continuing System Improvements	0.067	0.056
Indirect Support	0.271	0.250
Other	0.000	0.000
Total	1.249	1.285

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	22375.4¹	18580.2
Then Year	30867.8	N/A	38657.6	N/A

¹ APB O&S Cost Breach

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 = \$1249.045K x 689 systems x 26 years = \$22,375.4M (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 2017 SAR	19224.1	
Programmatic/Planning Factors	3151.3	Sustainment of additional 115 PIM weapon 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	3151.3	
Current Estimate	22375.4	

Disposal Estimate Details

Date of Estimate:	November 28, 2018
Source of Estimate:	POE
Disposal/Demilitarization Total Cost (BY 2013 \$M):	3.9