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Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-205



Integrated Air and Missile Defense (IAMD)

As of FY 2020 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Sensitivity Originator

Organization: PEO Missiles and Space, Integrated Air and Missile Defense Project Office
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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)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

Integrated Air and Missile Defense (IAMD)

DoD Component

Army

Responsible Office

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References

SAR Baseline (Development Estimate)

FY 2011 President's Budget dated February 1, 2010

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated October 8, 2014

Mission and Description

The Army Integrated Air and Missile Defense (IAMD) program is a direct response to the U.S. Army Air and Missile Defense (AMD) Concept and Operational and Organizational Plan for the Future Force, the Army IAMD System of Systems (SoS) CDD and the AMD Task Force Concept of Operations. The IAMD program is uniquely structured to enable the development of an overarching SoS capability with all participating Air Defense Artillery components functioning interdependently to provide total operational capabilities not achievable by the individual element systems. The IAMD program achieves this objective by establishing the IAMD architecture and developing (1) the IAMD Battle Command Systems (IBCS) Engagement Operations Center (EOC) that provides the common mission command capability, (2) the Integrated Fire Control Relay capability for fire control connectivity and distributed operations, and (3) the common Plug and Fight (P&F) Kits that network enable multiple sensor components, weapon components, and the IBCS EOC.

The IAMD program will provide advanced capabilities to the Army and the Soldier by allowing transformation to a network-centric SoS capability that integrates AMD sensors and weapons with the IBCS EOC. The IAMD SoS architecture will enable extended range and non-line-of-sight engagements, to include joint kill chain engagements across the full spectrum of aerial threats, providing fire control quality data to the most appropriate weapon to complete the mission successfully. Further, it will mitigate the coverage gaps and the single points of failure that plagued AMD design in the past. The IAMD program will provide the user with the ability to train on a single IBCS that will result in overall training savings. The IAMD program will provide the Army with the ability to procure components that interface with the Integrated Fire Control Network, alleviating the cost of procuring total system capabilities in the future.

Executive Summary

Program Highlights Since Last Report

The Integrated Air and Missile Defense (IAMD) requirement is stable and funding is adequate to meet EMD cost, schedule, and performance objectives. The Army will submit an updated Acquisition Program Baseline at Milestone C in September 2020. Risk did not increase since the 2017 SAR.

In accordance with the FY 2019 National Defense Authorization Act (NDAA), IAMD Battle Command System (IBCS), which is the Army IAMD mission command system, was selected for realignment under the pilot program to use agile or iterative development methods pursuant to section 873 of the FY 2018 NDAA. On November 5, 2018 the Army IAMD Project Office hosted an Agile Pilot Program kickoff meeting with the OSD Core Team for Agile Acquisition Pilots and Program Executive Office Missiles and Space personnel to discuss the engagement approach for pilot planning and execution, pilot timeline, current and expected challenges, and realignment plan guidance. On December 11-13, 2018 the Army IAMD Project Office and Lower Tier Project Office team members participated in Intermediate Agile classroom training. Additionally, the trainers participated with the Army IAMD Software Directorate and select members of the project office in a roadmap working session to produce functional products to initiate the transition and support the IAMD Agile Realignment Plan, which was submitted to OSD on December 21, 2018 and approved by the Army Acquisition Executive on January 17, 2019.

In September 2018, the IAMD program successfully completed five Soldier operated tests as part of Soldier Checkout Event 4.0, which included:

- PEO Demonstration
- Multi Node Distributed Test
- Live Air
- External Communication and Classification
- Identification and Discrimination Event

These Soldier operated events demonstrated increased software stability and stressed scalability, stability, and survivability that will improve system effectiveness in operational testing.

Phase 1D of the IBCS EMD Contract (W31P4Q-08-C-0418/1) was completed in February 2018. A separate contract action was definitized on May 31, 2018 under the IBCS EMD Contract (W31P4Q-08-C-0418/2) for the procurement of hardware. An EMD contract extension was awarded in September 2018 and definitized on March 8, 2019. The extension supports IBCS software version 4.5 and the integration of that software into operational test hardware with the period of performance ending in December 2019. The IBCS Adapted Launcher contract was awarded to Lockheed Martin, as an undefinitized contract action, on December 21, 2018. This SAR is the first time this contract has been reported.

The Letter of Offer and Acceptance (LOA) for Wisla Phase I of the Poland IBCS/Patriot FMS Case, PL-B-UCW, was implemented on April 12, 2018. The Wisla Poland IBCS/Patriot Phase II LOA is planned to be offered in December 2019.

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
December 2009	Army IAMD Milestone B ADM approved entry into EMD and program initiation. The Milestone B decision resulted in down-select to an IAMD Battle Command System prime contractor award to Northrop Grumman.
February 2012	Army IAMD program restructure ADM was approved. The ADM approved an Army Acquisition Objective increase from 285 to 431. The Army IAMD architecture was expanded to incorporate the brigade combat team's: Air Defense Airspace Management Cell, Air Defense Artillery Brigade, Army Air and Missile Defense Command Headquarters, Indirect Fire Protections Capability / Avenger Battalions and Componentized Patriot system. The ADM approved the program as a designated system for the Defense Exportability Feature pilot program.
November 2012	DAE approved the Army IAMD program restructure APB.
October 2014	DAE approved Army IAMD Change 2 APB. The schedule breach occurred as a result of resourcing priorities in the FY 2015 PB affecting only schedule.
December 2017	In response to a Program Deviation Report submitted for Army IAMD, the DAE approved the program re-plan in an ADM, dated December 13, 2017. The ADM validated the Army Acquisition Objective of 454, approved the program to update the APB cost and schedule at Milestone C, and approved the revision of the EMD reliability exit criteria.

Threshold Breaches

APB Breaches

Schedule		<input checked="" type="checkbox"/>
Performance		<input type="checkbox"/>
Cost	RDT&E	<input checked="" type="checkbox"/>
	Procurement	<input 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"/>

Explanation of Breach

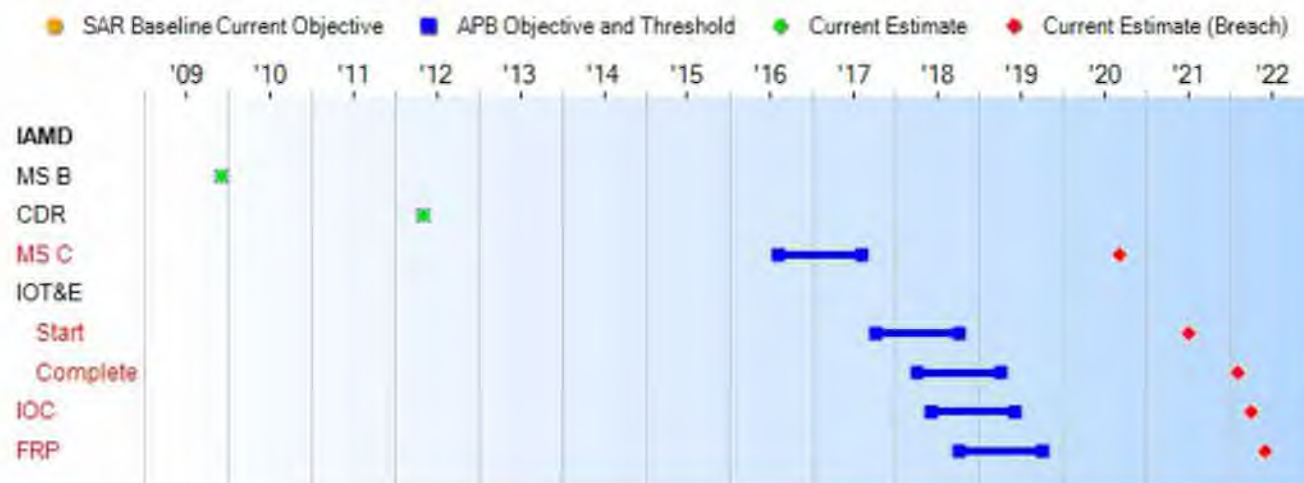
The Schedule, RDT&E, and O&S Cost deviations were previously reported in the December 2017 SAR.

Per the December 13, 2017 DAE approved IAMD ADM, the program will revise APB cost and schedule at Milestone C.

Nunn-McCurdy Breaches

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

Schedule



Schedule Events				
Events	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate
MS B	Dec 2009	Dec 2009	Dec 2009	Dec 2009
CDR	Aug 2011	May 2012	May 2012	May 2012
MS C	Dec 2014	Aug 2016	Aug 2017	Sep 2020¹
IOT&E				
Start	Jan 2016	Oct 2017	Oct 2018	Jul 2021¹
Complete	Jul 2016	Apr 2018	Apr 2019	Feb 2022¹
IOC	Aug 2016	Jun 2018	Jun 2019	Apr 2022¹
FRP	May 2017	Oct 2018	Oct 2019	Jun 2022¹

¹ APB Breach

Change Explanations

None

Notes

The IAMD ADM, approved by the DAE on December 13, 2017, directed the program to update the APB at Milestone C. Therefore, the program will continue to report the above deviations, previously identified in the December 2017 SAR, until a revised APB is approved.

Acronyms and Abbreviations

CDR - Critical Design Review

IOT&E - Initial Operational Test and Evaluation

MS - Milestone

Performance

Performance Characteristics				
SAR Baseline Development Estimate	Current APB Development Objective/Threshold	Demonstrated Performance	Current Estimate	
Net Ready				
<p>The Army IAMD SoS must fully support execution of joint critical operational activities identified in the applicable joint- and system-integrated architectures, and the system must satisfy the technical requirements for transition to Net-Centric military operations to include the following: DISR mandated GIG IT standards and profiles identified in the TV-1 •DISR mandated GIG KIPs identified in the KIP declaration table NCOW RM Enterprise Services •Information assurance requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA •Operationally effective information exchanges •Mission critical performance and information assurance attributes, data correctness, data availability, and consistent data processing specified in the applicable joint- and system-integrated architecture views.</p>	<p>The Army IAMD SoS must fully support execution of all operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for Net-Centric military operations to include the following: DISR mandated GIG IT standards and profiles identified in the TV-1 DISR mandated GIG KIPs identified in the KIP declaration table NCOW RM Enterprise Services IA requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA Operationally effective information exchanges Mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views.</p>	<p>The Army IAMD SoS must fully support execution of joint critical operational activities identified in the applicable joint- and system-integrated architectures, and the system must satisfy the technical requirements for transition to Net-Centric military operations to include the following: DISR mandated GIG IT standards and profiles identified in the TV-1 DISR mandated GIG KIPs identified in the KIP declaration table NCOW RM Enterprise Services IA requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA Operationally effective information exchanges Mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint- and system-integrated architecture views.</p>	TBD	<p>The Army IAMD SoS must fully support execution of joint critical operational activities identified in the applicable Joint- and system-integrated architectures, and the system must satisfy the technical requirements for transition to Net-Centric military operations to include the following: DISR mandated GIG IT standards and profiles identified in the TV-1. DISR mandated GIG KIPs identified in the KIP declaration table. NCOW RM Enterprise Services. Information assurance requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA. Operationally effective information exchanges. Mission critical performance and information assurance attributes, data correctness, data availability, and consistent data</p>

				processing specified in the applicable Joint - and system-integrated architecture views.
Integrated Defense Effectiveness				
<p>To support attainment of a command-er's defense effectiveness objectives, which would normally range from 0.50% to 0.99%, the Army IAMD SoS shall provide flexible interceptor selection and firing doctrine within the Task Force. The Army IAMD SoS-integrated defenses shall enable defeat of non-ballistic and ballistic platforms at times and locations not otherwise available to the commander without an integrated operations capability by exploiting fused organic and non-organic sensor data to execute engage-ments up to the operationally effective range of selected missile kinematics. The Army IAMD SoS shall be capable of allowing greater defense effectiveness for high-priority assets while increasing defense effectiveness to full 360-degree coverage against attacking non-ballistic threats. The Army IAMD SoS defense effectiveness levels shall not degrade and be equal to or greater than the effectiveness levels of fielded TBM and CM/ABT defense systems.</p>	<p>To support attainment of a commander's defense effectiveness objectives, which would normally range from 0.5 to 0.99, the Army IAMD SoS shall provide flexible interceptor selection and firing doctrine within the Task Force. The Army IAMD SoS-integrated defenses shall enable defeat of non-ballistic and ballistic platforms at times and locations not otherwise available to the commander without an integrated operations capability by exploiting fused organic and non-organic sensor data to execute engagements up to the operationally effective range of selected missile kinematics. The Army IAMD SoS shall be capable of allowing greater defense effectiveness for high-priority assets while increasing defense effectiveness to full 360-degree coverage against attacking non-ballistic threats. The Army IAMD SoS defense effectiveness levels shall not degrade and be equal to or greater than the effectiveness levels of fielded TBM and CM/ABT defense systems.</p>	<p>To support attainment of a commander's defense effectiveness objectives, which would normally range from 0.5 to 0.99, the Army IAMD SoS shall provide flexible interceptor selection and firing doctrine within the Task Force. The Army IAMD SoS-integrated defenses shall enable defeat of non-ballistic and ballistic platforms at times and locations not otherwise available to the commander without an integrated operations capability by exploiting fused organic and non-organic sensor data to execute engagements up to the operationally effective range of selected missile kinematics. The Army IAMD SoS shall be capable of allowing greater defense effectiveness for high-priority assets while increasing defense effectiveness to full 360-degree coverage against attacking non-ballistic threats. The Army IAMD SoS defense effectiveness levels shall not degrade and be equal to or greater than the effectiveness levels of fielded TBM and CM/ABT defense systems.</p>	TBD	<p>To support attainment of a commander's defense effectiveness objectives, which would normally range from 0.50% to 0.99%, the Army IAMD SoS shall provide flexible interceptor selection and firing doctrine within the Task Force. The Army IAMD SoS-integrated defenses shall enable defeat of non-ballistic and ballistic platforms at times and locations not otherwise available to the commander without an integrated operations capability by exploiting fused organic and non-organic sensor data to execute engagements up to the operationally effective range of selected missile kinematics. The Army IAMD SoS shall be capable of allowing greater defense effectiveness for high-priority assets while increasing defense effectiveness to full 360-degree coverage against attacking non-ballistic threats. The Army IAMD SoS defense effectiveness levels</p>

				shall not degrade and be equal to or greater than the effectiveness levels of fielded TBM and CM/ABT defense systems.
Common Command and Control				
The Army IAMD SoS common C2 components (Battalion and below) shall incorporate common functionality that includes: defense planning, defense design, warfighter-machine interface, battle monitor and control, network interface and management, track management, engagement planning, engagement decision, engagement monitoring, and staff functions. The Army IAMD SoS shall provide backward compatibility to enable integration and common functionality (as defined above) of a current force Patriot Battery/SLAMRAAM Platoon with the Increment 2 equipped Task Force.	The Army IAMD SoS common C2 components (Battalion and below) shall incorporate common functionality that includes: defense planning, defense design, warfighter-machine interface, battle monitor and control, network interface and management, track management, engagement planning, engagement decision, engagement monitoring, and staff functions. The Army IAMD SoS shall provide backward compatibility to enable integration and common functionality (as defined above) of a current force Patriot Battery/SLAMRAAM Platoon with the Increment 2 equipped Task Force.	The Army IAMD SoS common C2 components (Battalion and below) shall incorporate common functionality that includes: defense planning, defense design, warfighter-machine interface, battle monitor and control, network interface and management, track management, engagement planning, engagement decision, engagement monitoring, and staff functions. The Army IAMD SoS shall provide backward compatibility to enable integration and common functionality (as defined above) of a current force Patriot Battery/SLAMRAAM Platoon with the Increment 2 equipped Task Force.	TBD	The Army IAMD SoS common C2 components (Battalion and below) shall incorporate common functionality that includes: defense planning, defense design, warfighter-machine interface, battle monitor and control, network interface and management, track management, engagement planning, engagement decision, engagement monitoring, and staff functions. The Army IAMD SoS shall provide backward compatibility to enable integration and common functionality (as defined above) of a current force PATRIOT Battery/SLAMRAAM Platoon with the Increment 2 equipped Task Force.
Material Availability				
The Army IAMD SoS C2 shall achieve an Operational Availability (Ao) of at least 95%.	The Army IAMD SoS common C2 shall achieve an Ao 99%.	The Army IAMD SoS common C2 shall achieve an Ao of at least 95%.	TBD	The Army IAMD SoS C2 shall achieve an Ao of at least 95%.
Force Protection and Survivability				
The Army IAMD SoS common C2 equipment shall be designed to be	All Army IAMD SoS common C2 vehicle cabs and manned	The Army IAMD SoS common C2 equipment shall be designed to be	TBD	The Army IAMD SoS common C2 equipment shall be

operated by Soldiers wearing body armor and equipped with appropriate weapons; shall have situational awareness and understanding commensurate with the supported force; will report the position and ID of all Army IAMD SoS system into the COP and BFT nets; shall be operable by Soldiers in MOPP 4; and shall survive decontamination procedures in such a manner that it can quickly return (within 30 minutes) to full operational capability. All Army IAMD SoS common C2 vehicle cabs shall be capable of adding up-armor protection sufficient to repel enemy small arms as developed by the PM, FMTV. Manned rigid wall shelters incorporated into the Army IAMD SoS shall provide an active overpressure system to prevent contamination during a CBRNE event that is sustainable through decontamination.

shelters shall be capable of adding up-armor protection sufficient to repel enemy small arms as developed by the PM, FMTV. All equipment manned during transport or operations shall mitigate the effects of 7.62mm rounds and below.

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Requirements Reference

CDD dated May 17, 2010

Change Explanations

None

Notes

The Common Command and Control KPP no longer includes SLAMRAAM backward compatibility. This change will be reflected in the approved requirements documentation supporting Milestone C.

Acronyms and Abbreviations

ABT - Air Breathing Threat
Ao - Operational Availability
ATO - Approval to Operate
BFT - Blue Force Tracking
C2 - Command and Control
CBRNE - Chemical, Biological, Radiological, Nuclear and High Yield Explosives
CM - Cruise Missile
COP - Common Operating Picture
DAA - Designated Approval Authority
DISR - DoD Information Technology Standards Registry
FMTV - Family of Medium Tactical Vehicles
GIG - Global Information Grid
IA - Information Assurance
ID - Identification
IT - Information Technology
KIP - Key Information Profile
min - minute
mm - millimeter
MOPP - Mission Oriented Protective Posture
NCOW RM - Net-Centric Operations and Warfare Reference Model
SLAMRAAM - Surface-Launched Advanced Medium Range Air-to-Air Missile
SoS - System of Systems
TBM - Tactical Ballistic Missile
TV - Technical View, Standards Profile

Track to Budget

RDT&E

Appn	BA	PE	
Army	2040	04	0603327A
	Project	Name	
	S34	AMD System of Systems Engineering and Integration (Sunk)	
Army	2040	05	0605457A
	Project	Name	
	DU4	Advanced Electronic Protection Enhancements (Sunk)	
	S40	Army Integrated Air and Missile Defense	

Procurement

Appn	BA	PE	
Army	2035	02	0214400A
	Line Item	Name	
	BZ5075	IAMD Battle Command System	

Acq O&M

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

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2009 \$M			BY 2009 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	1540.6	2199.5	2419.5	2966.3 ¹	1627.5	2402.6	3337.2
Procurement	3316.0	3174.8	3492.3	3125.8	4164.1	3939.2	4312.0
Flyaway	--	--	--	2663.5	--	--	3662.3
Recurring	--	--	--	2625.6	--	--	3612.6
Non Recurring	--	--	--	37.9	--	--	49.7
Support	--	--	--	462.3	--	--	649.7
Other Support	--	--	--	392.3	--	--	550.7
Initial Spares	--	--	--	70.0	--	--	99.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	--	40.7	0.0	0.0	53.3
Total	4856.6	5374.3	N/A	6132.8	5791.6	6341.8	7702.5

¹ APB Breach

Current APB Cost Estimate Reference

CAPE ICE dated June 07, 2012

Cost Notes

No additional programmatic risks were identified in the latest POE.

Total Quantity			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	11	16	25
Procurement	285	431	454
Total	296	447	479

Quantity Notes

The IAMD unit of measure is defined as 25 fully-configured prototype RDT&E-funded units and 454 IAMD Battle Command System Engagement Operation Center procurement quantities which enable system of systems operation of Air and Missile Defense units.

Cost and Funding

Funding Summary

Appropriation Summary									
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	2483.4	322.3	208.9	130.9	63.7	33.2	94.8	0.0	3337.2
Procurement	20.9	0.0	29.6	254.8	353.9	417.4	413.8	2821.6	4312.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	5.0	4.7	4.7	4.9	5.0	5.1	23.9	53.3
PB 2020 Total	2504.3	327.3	243.2	390.4	422.5	455.6	513.7	2845.5	7702.5
PB 2019 Total	2501.6	282.6	277.7	459.8	497.6	536.6	465.3	2769.7	7790.9
Delta	2.7	44.7	-34.5	-69.4	-75.1	-81.0	48.4	75.8	-88.4

Quantity Summary										
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	25	0	0	0	0	0	0	0	0	25
Production	0	0	0	6	18	29	39	41	321	454
PB 2020 Total	25	0	0	6	18	29	39	41	321	479
PB 2019 Total	25	0	0	11	22	45	50	50	276	479
Delta	0	0	0	-5	-4	-16	-11	-9	45	0

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
2006	--	--	--	--	--	--	23.7
2007	--	--	--	--	--	--	36.3
2008	--	--	--	--	--	--	48.0
2009	--	--	--	--	--	--	114.7
2010	--	--	--	--	--	--	164.7
2011	--	--	--	--	--	--	246.7
2012	--	--	--	--	--	--	262.0
2013	--	--	--	--	--	--	247.4
2014	--	--	--	--	--	--	358.2
2015	--	--	--	--	--	--	147.3
2016	--	--	--	--	--	--	222.1
2017	--	--	--	--	--	--	273.2
2018	--	--	--	--	--	--	339.1
2019	--	--	--	--	--	--	322.3
2020	--	--	--	--	--	--	208.9
2021	--	--	--	--	--	--	130.9
2022	--	--	--	--	--	--	63.7
2023	--	--	--	--	--	--	33.2
2024	--	--	--	--	--	--	94.8
Subtotal	25	--	--	--	--	--	3337.2

Annual Funding							
2040 RDT&E Research, Development, Test, and Evaluation, Army							
Fiscal Year	Quantity	BY 2009 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2006	--	--	--	--	--	--	24.8
2007	--	--	--	--	--	--	37.1
2008	--	--	--	--	--	--	48.1
2009	--	--	--	--	--	--	113.4
2010	--	--	--	--	--	--	160.5
2011	--	--	--	--	--	--	235.7
2012	--	--	--	--	--	--	246.5
2013	--	--	--	--	--	--	228.9
2014	--	--	--	--	--	--	324.9
2015	--	--	--	--	--	--	131.4
2016	--	--	--	--	--	--	196.1
2017	--	--	--	--	--	--	236.4
2018	--	--	--	--	--	--	288.4
2019	--	--	--	--	--	--	270.0
2020	--	--	--	--	--	--	171.3
2021	--	--	--	--	--	--	105.2
2022	--	--	--	--	--	--	50.2
2023	--	--	--	--	--	--	25.6
2024	--	--	--	--	--	--	71.8
Subtotal	25	--	--	--	--	--	2966.3

Annual Funding							
2035 Procurement Other Procurement, Army							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	--	16.3	--	4.6	20.9	--	20.9
2017	--	--	--	--	--	--	--
2018	--	--	--	--	--	--	--
2019	--	--	--	--	--	--	--
2020	6	27.0	--	2.1	29.1	0.5	29.6
2021	18	217.3	--	15.8	233.1	21.7	254.8
2022	29	318.0	--	2.6	320.6	33.3	353.9
2023	39	356.6	--	2.9	359.5	57.9	417.4
2024	41	358.3	--	2.8	361.1	52.7	413.8
2025	52	428.8	--	3.5	432.3	64.1	496.4
2026	51	424.7	--	3.4	428.1	68.0	496.1
2027	46	421.6	--	3.3	424.9	69.8	494.7
2028	54	352.7	--	2.8	355.5	71.2	426.7
2029	59	376.8	--	3.2	380.0	73.0	453.0
2030	59	295.0	--	2.7	297.7	76.4	374.1
2031	--	19.5	--	--	19.5	61.1	80.6
Subtotal	454	3612.6	--	49.7	3662.3	649.7	4312.0

Annual Funding							
2035 Procurement Other Procurement, Army							
Fiscal Year	Quantity	BY 2009 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	--	14.3	--	4.1	18.4	--	18.4
2017	--	--	--	--	--	--	--
2018	--	--	--	--	--	--	--
2019	--	--	--	--	--	--	--
2020	6	21.9	--	1.7	23.6	0.4	24.0
2021	18	172.8	--	12.6	185.4	17.2	202.6
2022	29	247.9	--	2.0	249.9	26.0	275.9
2023	39	272.6	--	2.2	274.8	44.3	319.1
2024	41	268.5	--	2.1	270.6	39.5	310.1
2025	52	315.0	--	2.6	317.6	47.1	364.7
2026	51	305.9	--	2.4	308.3	49.0	357.3
2027	46	297.7	--	2.3	300.0	49.3	349.3
2028	54	244.2	--	1.9	246.1	49.3	295.4
2029	59	255.8	--	2.2	258.0	49.5	307.5
2030	59	196.3	--	1.8	198.1	50.8	248.9
2031	--	12.7	--	--	12.7	39.9	52.6
Subtotal	454	2625.6	--	37.9	2663.5	462.3	3125.8

Cost Quantity Information		
2035 Procurement Other Procurement, Army		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2009 \$M
2016	--	--
2017	--	--
2018	--	--
2019	--	--
2020	6	36.2
2021	18	172.8
2022	29	247.9
2023	39	272.6
2024	41	268.5
2025	52	315.0
2026	51	305.9
2027	46	297.7
2028	54	244.2
2029	59	255.8
2030	59	209.0
2031	--	--
Subtotal	454	2625.6

Annual Funding 2020 Acq O&M Operation and Maintenance, Army		
Fiscal Year	TY \$M	
	Total Program	
2019	5.0	
2020	4.7	
2021	4.7	
2022	4.9	
2023	5.0	
2024	5.1	
2025	4.1	
2026	4.2	
2027	4.3	
2028	4.4	
2029	3.6	
2030	2.7	
2031	0.6	
Subtotal	53.3	

Annual Funding 2020 Acq O&M Operation and Maintenance, Army	
Fiscal Year	BY 2009 \$M
	Total Program
2019	4.2
2020	3.9
2021	3.8
2022	3.9
2023	3.9
2024	3.9
2025	3.1
2026	3.1
2027	3.1
2028	3.1
2029	2.5
2030	1.8
2031	0.4
Subtotal	40.7

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	12/23/2009	12/13/2017
Approved Quantity	27	33
Reference	Milestone B ADM	IAMD ADM
Start Year	2015	2020
End Year	2016	2021

The December 2017 ADM approved an LRIP quantity of 33 for FY 2020 and FY 2021. As a result of budget reductions in the FY 2020 PB, the LRIP quantity decreased from 33 to 24. The total procurement quantity remains 454.

Foreign Military Sales

Notes

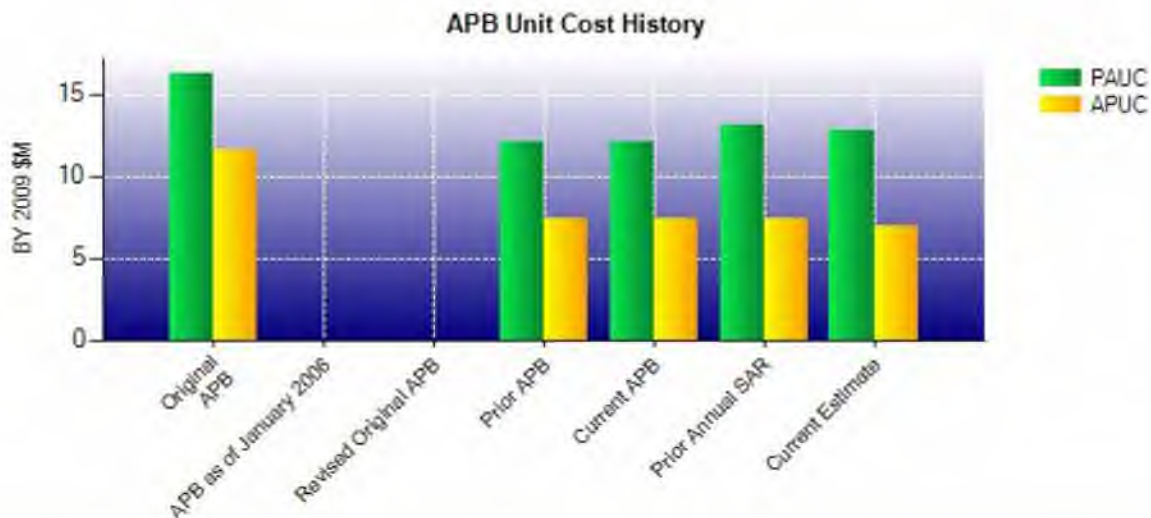
The IAMD program office received a Letter of Request (LOR) for Letter of Offer and Acceptance (LOA) from Poland for IAMD Battle Command System (IBCS). The LOR is for a two-phase approach with Phase I the U.S. baseline IAMD program with Patriot components and Phase II the re-hosting of IBCS in Polish shelters, integration of Polish sensors, an active electronically scanned array radar, a low-cost interceptor, and integration of the Polish short range air defense system. The LOA for Phase I was implemented on April 12, 2018. Phase I contract was awarded on March 13, 2019, which includes the purchase of six Engagement Operation Centers. The LOA for Phase II is planned to be offered in December 2019. The formal response to an LOR for Price and Availability from Japan was provided in May 2018. A Yockey Waiver was approved for India and Pricing and Availability data was provided. Other countries expressing interest are Australia, Sweden, the Netherlands, Taiwan, the Republic of Korea, and the Kingdom of Saudi Arabia.

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2009 \$M	BY 2009 \$M	% Change
	Current UCR Baseline (Oct 2014 APB)	Current Estimate (Dec 2018 SAR)	
Program Acquisition Unit Cost			
Cost	5374.3	6132.8	
Quantity	447	479	
Unit Cost	12.023	12.803	+6.49
Average Procurement Unit Cost			
Cost	3174.8	3125.8	
Quantity	431	454	
Unit Cost	7.366	6.885	-6.53
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2009 \$M	BY 2009 \$M	% Change
	Original UCR Baseline (Jun 2010 APB)	Current Estimate (Dec 2018 SAR)	
Program Acquisition Unit Cost			
Cost	4806.8	6132.8	
Quantity	296	479	
Unit Cost	16.239	12.803	-21.16
Average Procurement Unit Cost			
Cost	3316.0	3125.8	
Quantity	285	454	
Unit Cost	11.635	6.885	-40.83



APB Unit Cost History					
Item	Date	BY 2009 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Jun 2010	16.239	11.635	19.382	14.611
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	Nov 2012	12.023	7.366	14.187	9.140
Current APB	Oct 2014	12.023	7.366	14.187	9.140
Prior Annual SAR	Dec 2017	13.056	7.358	16.265	9.983
Current Estimate	Dec 2018	12.803	6.885	16.080	9.498

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
19.566	0.194	-2.175	0.668	0.356	-1.464	0.000	-1.065	-3.486	16.080

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
14.611	0.202	-0.081	0.496	0.000	-4.607	0.000	-1.123	-5.113	9.498

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	Dec 2009	N/A	Dec 2009
Milestone C	N/A	Dec 2014	N/A	Sep 2020
IOC	N/A	Aug 2016	N/A	Apr 2022
Total Cost (TY \$M)	N/A	5791.6	N/A	7702.5
Total Quantity	N/A	296	N/A	479
PAUC	N/A	19.566	N/A	16.080

Cost Variance

Summary TY \$M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Development Estimate)	1627.5	4164.1	--	--	5791.6
Previous Changes					
Economic	-12.0	+47.4	--	--	+35.4
Quantity	+105.9	+2432.3	--	--	+2538.2
Schedule	--	+176.7	--	--	+176.7
Engineering	+170.6	--	--	--	+170.6
Estimating	+1294.4	-1265.3	--	+72.4	+101.5
Other	--	--	--	--	--
Support	--	-1023.1	--	--	-1023.1
Subtotal	+1558.9	+368.0	--	+72.4	+1999.3
Current Changes					
Economic	+13.3	+44.4	--	--	+57.7
Quantity	--	--	--	--	--
Schedule	+94.8	+48.5	--	--	+143.3
Engineering	--	--	--	--	--
Estimating	+42.7	-826.2	--	-19.1	-802.6
Other	--	--	--	--	--
Support	--	+513.2	--	--	+513.2
Subtotal	+150.8	-220.1	--	-19.1	-88.4
Total Changes	+1709.7	+147.9	--	+53.3	+1910.9
CE - Cost Variance	3337.2	4312.0	--	53.3	7702.5
CE - Cost & Funding	3337.2	4312.0	--	53.3	7702.5

Summary BY 2009 \$M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Development Estimate)	1540.6	3316.0	--	--	4856.6
Previous Changes					
Economic	--	--	--	--	--
Quantity	+89.1	+1723.6	--	--	+1812.7
Schedule	--	-2.7	--	--	-2.7
Engineering	+148.7	--	--	--	+148.7
Estimating	+1080.4	-899.6	--	+54.2	+235.0
Other	--	--	--	--	--
Support	--	-796.7	--	--	-796.7
Subtotal	+1318.2	+24.6	--	+54.2	+1397.0
Current Changes					
Economic	--	--	--	--	--
Quantity	--	--	--	--	--
Schedule	+71.8	--	--	--	+71.8
Engineering	--	--	--	--	--
Estimating	+35.7	-578.2	--	-13.5	-556.0
Other	--	--	--	--	--
Support	--	+363.4	--	--	+363.4
Subtotal	+107.5	-214.8	--	-13.5	-120.8
Total Changes	+1425.7	-190.2	--	+40.7	+1276.2
CE - Cost Variance	2966.3	3125.8	--	40.7	6132.8
CE - Cost & Funding	2966.3	3125.8	--	40.7	6132.8

Previous Estimate: December 2017

RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+13.3
Revised estimate to reflect the Army's increase in funding in FY 2024 for continued requirements definition, software development, and test to support future IAMD capabilities. (Schedule)	+71.8	+94.8
Adjustment for current and prior escalation. (Estimating)	-7.2	-8.3
Revised estimate to reflect updated cost methodologies based on the approved IAMD re-plan. (Estimating)	+5.4	+6.3
Revised estimate to reflect FY 2019 Congressional adds for accelerated integration to counter emerging threats and cyber security research. (Estimating)	+37.5	+44.7
RDT&E Subtotal	+107.5	+150.8

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+44.4
Re-phasing of procurement quantities FY 2020 - FY 2030 to reflect the FY 2020 PB. (Schedule)	0.0	+48.5
Revised estimate to reflect updated cost methodologies, to include re-characterization of some Flyaway Cost to Support, based on the approved IAMD re-plan. (Estimating)	-578.2	-826.2
Decrease in Initial Spares for hardware. (Support)	-28.9	-37.5
Increase in Other Support to reflect updated cost methodologies based on the approved IAMD re-plan and re-categorized cost from Flyaway to Support. (Support)	+392.3	+550.7
Procurement Subtotal	-214.8	-220.1

Acq O&M	\$M	
Current Change Explanations	Base Year	Then Year
Revised estimate to reflect changes related to core program office staffing assumptions. (Estimating)	-13.5	-19.1
Acq O&M Subtotal	-13.5	-19.1

Contracts

Contract Identification

Appropriation: RDT&E
Contract Name: IBCS EMD Bridge
Contractor: Northrop Grumman
Contractor Location: Huntsville, AL 35806
Contract Number: W31P4Q-08-C-0418/1
Contract Type: Cost Plus Incentive Fee (CPIF)
Award Date: April 03, 2017
Definitization Date: April 03, 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
48.1	N/A	11	92.9	N/A	11	88.6	88.6

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a modification to extend the IAMD Battle Command System (IBCS) contract period of performance from October 2017 to February 2018 and added scope for the remainder of the v4.5 software requirements development/allocation.

Contract Variance

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2017)	-1.8	-3.6
Previous Cumulative Variances	-1.8	-3.6
Net Change	+0.0	+0.0

Cost and Schedule Variance Explanations

None

Notes

Phase 1D of the IBCS EMD Bridge Contract Task was completed on February 28, 2018.

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

Contract Identification

Appropriation: RDT&E
Contract Name: IBCS EMD Bridge - 2
Contractor: Northrop Grumman
Contractor Location: Huntsville, AL 35806
Contract Number: W31P4Q-08-C-0418/2
Contract Type: Cost Plus Incentive Fee (CPIF), Fixed Price Incentive(Firm Target) (FPIF)
Award Date: October 31, 2017
Definitization Date: March 08, 2019

Contract Price								
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)		
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager	
76.0	N/A	11	362.9	N/A	11	362.9	362.9	

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to definitization of the not-to-exceed hardware modification at \$73.6M (reduced target price by \$2.4M) and addition of the EMD contract extension, definitized on March 8, 2019, in the amount of \$289.3M.

Contract Variance			
Item	Cost Variance		Schedule Variance
Cumulative Variances To Date (12/31/2018)	-5.3		-8.2
Previous Cumulative Variances	--		--
Net Change	-5.3		-8.2

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to a self-reported material tax that is currently under consideration for an equitable adjustment and for additional material requirements.

The unfavorable cumulative schedule variance is due to late purchase orders and suppliers not delivering on time.

Notes

This is the first time this contract is being reported.

A CPIF modification was definitized on May 31, 2018 under the IAMD Battle Command System EMD Contract (W31P4Q-08-C-0418/2) for the procurement of hardware. A separate hybrid CPIF/FPIF EMD contract extension modification was definitized on March 8, 2019. The extension supports IAMD Battle Command System software version 4.5 and the integration of that software into operational test hardware with the period of performance ending in December 2019. The cumulative cost and schedule variances include the hardware procurement effort and EMD contract extension.

Contract Identification

Appropriation: RDT&E
Contract Name: IBCS Adapted Launcher
Contractor: Lockheed Martin
Contractor Location: 1701 West Marshall Drive
 Grand Prairie, TX 75051
Contract Number: W31P4Q-19-D-0016
Contract Type: Cost Plus Fixed Fee (CPFF)
Award Date: December 21, 2018
Definitization Date:

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
28.0	N/A	N/A	28.0	N/A	N/A	28.0	28.0

Cost and Schedule Variance Explanations

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

General Contract Variance Explanation

Cost and Schedule Variances are not reported for this contract, because EVM reporting has not commenced due to data delivery requirements to provide sufficient time to establish a baseline and begin EVM reporting after contract award. The first Integrated Program Management Report is scheduled for delivery in April 2019. This report will include Cost and Schedule data.

Notes

This is the first time this contract is being reported.

The IAMD Battle Command System Adapted Launcher Indefinite Delivery Indefinite Quantity (IDIQ) contract was awarded as an undefinitized contract action on December 21, 2018. The estimated price at completion is based on the first task order and does not reflect the total IDIQ contract value. This task order provides for Launcher Interface Network Kit boxes, software development/maintenance, and EMD support services.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	16	16	25	64.00%
Production	0	0	454	0.00%
Total Program Quantity Delivered	16	16	479	3.34%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	7702.5	Years Appropriated	14
Expended to Date	2383.1	Percent Years Appropriated	53.85%
Percent Expended	30.94%	Appropriated to Date	2831.6
Total Funding Years	26	Percent Appropriated	36.76%

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

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	January 09, 2019
Source of Estimate:	POE
Quantity to Sustain:	454
Unit of Measure:	IAMD Battle Command System Engagement Operation Center
Service Life per Unit:	20.00 Years
Fiscal Years in Service:	FY 2021 - FY 2051

The 479 quantity is comprised of 454 sustainment quantity and 25 RDT&E-funded prototypes. Six RDT&E-funded prototypes will be refreshed in LRIP I and are included in the 454 sustainment quantity. The cost to sustain these six units is contained in the current O&S estimate beginning in FY 2021.

Sustainment Strategy

IAMD will be supported by a combination of Army organic and contractor-provided resources through a Performance Based Logistics (PBL) Product Support Strategy (PSS) (includes field and sustainment/depot). Under PBL sustainment constructs, the IAMD Project Office will utilize performance based sustainment methods and performance metrics which will include a Public-Private Partnership. This PSS is documented in the June 2012 Life Cycle Sustainment Plan (LCSP). The IAMD PBL PSS provides a sustainment level product support decision that will provide the human interface, tools, and resources needed to sustain the IAMD equipment throughout its life cycle. The PSS will be updated in the LCSP to support Milestone C.

Antecedent Information

No Antecedent

Cost Element	Annual O&S Costs BY2009 \$K	
	IAMD Average Annual Cost Per IAMD Battle Command System Engagement Operation Center	No Antecedent System (Antecedent)
Unit-Level Manpower	--	--
Unit Operations	16.323	--
Maintenance	107.486	--
Sustaining Support	9.962	--
Continuing System Improvements	167.396	--
Indirect Support	1.572	--
Other	0.000	--
Total	302.739	--

Military Pay is not a cost that is borne directly by the Army IAMD program. The Army IAMD program is not increasing Army force structure. Other Army programs (e.g., Patriot, Sentinel, Avenger, and Stinger) have military pay accounted for in their program lines. Therefore, military pay is not included in the Army IAMD O&S cost.

Item	Total O&S Cost \$M			
	IAMD		Current Estimate	No Antecedent System (Antecedent)
	Current Development APB Objective/Threshold			
Base Year	2235.9	2459.5	2748.9¹	N/A
Then Year	3333.3	N/A	4639.0	N/A

¹ APB O&S Cost Breach

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

The O&S cost deviation reflects Army IAMD hardware architecture changes, quantity increases to support the Indirect Fire Protection Capability Increment 2 - Intercept Block 1 program and an update of the Army IAMD PSS.

Equation to Translate Annual Cost to Total Cost

Average annual cost per unit is based on 454 units x 20-years of O&S. (Total Cost = Average Annual Cost per unit (\$302.739K) x number of units (454) x life per unit (20-years) = \$2748.9M (BY\$ 2009)

O&S Cost Variance		
Category	BY 2009 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2017 SAR	3467.0	
Programmatic/Planning Factors	-752.5	Revised planning factors for replenishment spares and petroleum, oil, and lubricant.
Cost Estimating Methodology	34.4	Revised estimate to reflect updated cost methodologies based on the approved IAMD re-plan.
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	-718.1	
Current Estimate	2748.9	

Disposal Estimate Details

Date of Estimate:	January 09, 2019
Source of Estimate:	POE
Disposal/DEMilitarization Total Cost (BY 2009 \$M):	15.1