RCS: DD-A&T(Q&A)823-368

AGM-88E Advanced Anti-Radiation Guided Missile (AGM-88E AARGM)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

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

AGM-88E Advanced Anti-Radiation Guided Missile (AGM-88E AARGM)

DoD Component

Navy

Joint Participants

Italian Ministry of Defense

Responsible Office

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References

SAR Baseline (Production Estimate)

Navy Acquisition Executive (NAE) Approved Acquisition Program Baseline (APB) dated January 21, 2009

Approved APB

Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN(RDA)) Approved Acquisition Program Baseline (APB) dated January 31, 2020

Mission and Description

The AGM-88E Advanced Anti-Radiation Guided Missile (AGM-88E AARGM) program fields a major system upgrade to the AGM-88 High Speed Anti-Radiation Missile (HARM) inventory. The AGM-88E AARGM provides a significant enhancement to Naval operational capability in the Offensive Counter Air/Suppression of Enemy Air Defenses (SEAD) mission area by technological upgrade to the HARM guidance system to counter enemy use of simple and cheap countermeasures and tactics such as mobility and radar shutdown. The AGM-88E AARGM is employed in the Offensive Counter Air/SEAD role in direct support of all mission areas within the objective force (e.g., Strike Warfare, Amphibious Warfare, Anti-Surface Ship Warfare, Command and Control Warfare and Information Warfare) providing a rapid, organic response to air defense threats ranging from Smaller Scale Contingencies to Major Theater War. It is employed by Naval aircraft operating from both sea and land bases.

The AGM-88E AARGM missile provides a new multi-mode guidance section and modified control section mated with existing HARM propulsion and warhead sections. The new guidance section has a passive Anti-Radiation Homing receiver and associated antennae, a Global Positioning System/Inertial Navigation System, and Millimeter Wave radar for terminal guidance capability. The AGM-88E AARGM also has the capability to transmit terminal (end game) data via a Weapon Impact Assessment transmitter to national satellites just before AGM-88E AARGM impacts its target.

The AGM-88E AARGM is the acquisition upgrade and complement to HARM, the Navy's only Defense Suppression missile. Acquisition of AGM-88E AARGM is critical to addressing the limitations and shortcomings of HARM, which include counter shutdown capability, limited lethality against advanced threat air defense units, limited captive carry life and no impact reporting capability.

The AGM-88E AARGM is fielded on the F/A-18C-F, EA-18G and the Tornado Electronic Combat/Reconnaissance (Italian Air Force).

Executive Summary

Program Highlights Since Last Report

The AGM-88E AARGM program is executing the production and sustainment phases of the program. FRP lot 6 deliveries started in February 2019 and completed January 2020. FRP lot 7 deliveries will commence February 2020. FRP lot 8 was awarded in July 2019 for the Department of the Navy (DON), an option for the Italian Air Force was awarded in September 2019 and an option for Germany was awarded in January 2020.

PB 2021 reduced AARGM procurement funding, and the associated total production quantity, in order to invest in the AARGM-Extended Range program. The change in priority aligns with the National Defense Strategy.

Since the original APB from Milestone B (2003), the AARGM program showed progressive increases in APUC and PAUC that stabilized during FRP. The resulting change in quantity in the PB 2021 coupled with prior cost growth from the original APB resulted in a significant Nunn-McCurdy breach of unit cost.

An updated APB was approved on January 31, 2020 that changed the Program of Record from 2,435 to 1,803 AARGM missiles. The DON will notify the Congressional Committees of the significant Nunn-McCurdy breach in accordance with U.S.C. §2433 after the annual SAR submittal.

Federal Republic of Germany signed a Letter of Offer and Acceptance for AARGM production on December 16, 2019.

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

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
June 2003	The AARGM AGM-88E program received Milestone B approval to enter the System Development and Demonstration (SD&D) acquisition phase.
June 2003	ATK Missile Systems Company (AMSC) was awarded the SD&D phase contract. A total of 40 development missiles were produced.
July 2003	Navy Acquisition Executive (NAE) approved the Development APB.
October 2003	The System Design Review was conducted.
April 2005	The System Preliminary Design Review was conducted.
November 2005	The Cooperative Development Memorandum of Agreement (MOA) between the U.S. and Italy was signed.
February 2006	The Critical Design Review was conducted.
May 2007	Completed Developmental Test (DT)-1 firing.
October 2007	NAE approved the Development APB Change 1.
July 2008	The AARGM Capabilities Production Document (CPD) was approved by JROC (152-08).
September 2008	The Milestone C Review was conducted. The Milestone C ADM granted LRIP authority with a not-to-exceed quantity of 187 units.
September 2008	The Operational Assessment (OA) was completed.
December 2008	The LRIP I contract was awarded.
January 2009	NAE approved the Production APB.
November 2009	A Cooperative Production, Sustainment and Follow-on Development MOA between the U.S. and Italy was signed.
April 2010	NAE approved the Production APB Change 1.
April 2010	OPNAV approved the AARGM CPD Change 1, serial number 808-88-10.
June 2010	Initiated Operation Evaluation (OPEVAL) (Initial Operational Test & Evaluation (IOT&E).
July 2010	The LRIP II contract was awarded.
November 2010	A Verification of Correction of Deficiencies (VCD) period was conducted to address anomalies identified in IOT&E.
February 2011	NAE approved the Production APB Change 2.
July 2011	The AARGM program held a successful Operational Test Readiness Review (OTRR) and received approval to continue IOT&E.
October 2011	The LRIP III contract was awarded.
November 2011	NAE approved the Production APB Change 3.
April 2012	IOT&E was completed.
June 2012	A VCD period was conducted to address anomalies identified in IOT&E.
July 2012	IOC declared effective July 2012.
August 2012	The FRP Decision Review was conducted.
September 2012	The FRP lot 1 contract was awarded.

November 2012	ASN(RD&A) approved the Production APB Change 4.
May 2013	Letter of Offer and Acceptance between the U.S. and Australia was signed.
September 2013	The FRP lot 2 contract was awarded.
April 2014	The FRP lot 3 contract was awarded.
September 2015	The FRP lot 4 contract was awarded.
February 2016	PB 2017 increased the total quantity objective from 1,879 to 2,435 AGM-88E AARGM and extended production through FY 2023.
April 2016	The FRP lot 5 contract was awarded.
June 2016	ASN(RD&A) approved the Production APB Change 5.
May 2017	Fleet release of the Block 1 Upgrade was initiated.
August 2017	The FRP lot 6 contract was awarded.
September 2017	Letter of Offer and Acceptance between the U.S. and Australia was signed.
October 2017	The FRP lot 6 contract for Italy was awarded.
January 2018	Fielding of the Block 1 Upgrade was completed.
April 2018	Integration of AARGM on the Italian Air Force's Tornado aircraft was completed with successful Operational Testing.
May 2018	The FRP lot 7 contract was awarded for U.S. and Australia.
September 2018	The FRP lot 7 contract for Italy was awarded.
January 2019	Letter of Offer and Acceptance between the U.S. and Federal Republic of Germany was signed.
July 2019	The FRP lot 8 contract was awarded.
September 2019	The FRP lot 8 contract for Italy was awarded.
September 2019	The FRP lot 9 option was established.
December 2019	Letter of Offer and Acceptance between the U.S. and Federal Republic of Germany was signed.
January 2020	ASN(RD&A) approved the Production APB Change 6.

Threshold Breaches

APB Breaches		
Schedule		☐
Performance		☐
Cost	RDT&E	☐
	Procurement	☐
	MILCON	☐
	Acq O&M	☐
O&S Cost		☐
Unit Cost	PAUC	☐
	APUC	☐

Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	Significant
	APUC	Significant

Explanation of Breach

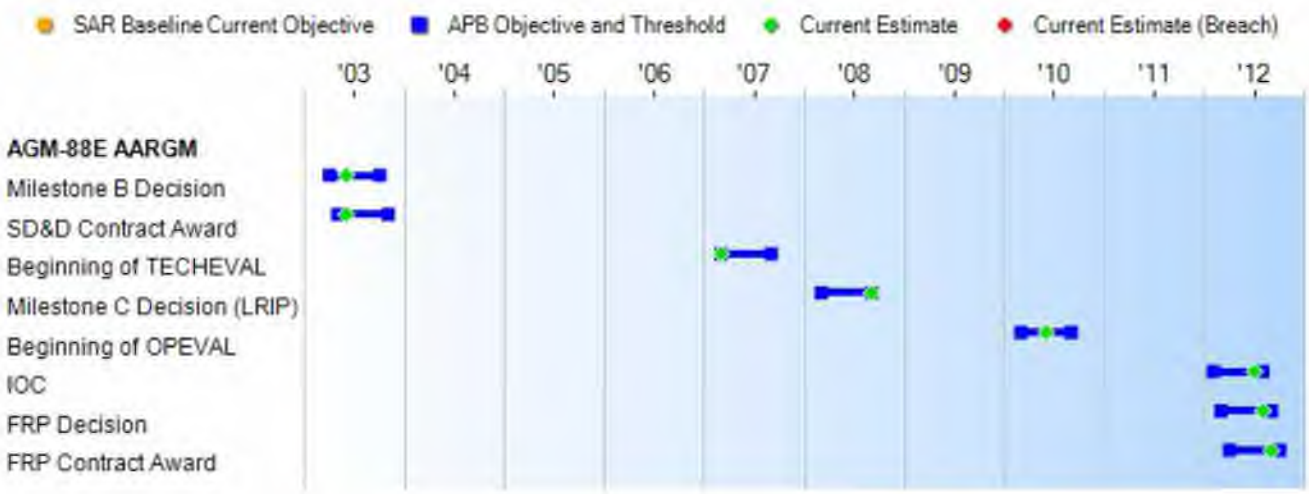
Although there are no breaches reflected here, as noted in the Executive Summary, the program has resolved a Nunn-McCurdy significant breach during this reporting period.

PB 2021 reduced AARGM procurement funding, and the associated total production quantity, in order to invest in the AARGM-Extended Range program. The change in priority aligns with the National Defense Strategy.

Since the original Acquisition Program Baseline (APB) from Milestone B (2003), the AARGM program showed progressive increases in Average Procurement Unit Cost (APUC) and Program Acquisition Unit Cost (PAUC) that stabilized during FRP. The resulting change in quantity in the PB 2021 coupled with prior cost growth from the original APB resulted in a significant Nunn-McCurdy breach of unit cost.

An updated APB was approved on January 31, 2020 that changed the Program of Record (POR) from 2,435 to 1,803 AARGM missiles. The DON will notify the Congressional Committees of the significant Nunn-McCurdy breach in accordance with U.S.C. §2433 after the annual SAR submittal.

Schedule



Schedule Events				
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate
Milestone B Decision	Apr 2003	Apr 2003	Oct 2003	Jun 2003
SD&D Contract Award	May 2003	May 2003	Nov 2003	Jun 2003
Beginning of TECHEVAL	Mar 2007	Mar 2007	Sep 2007	Mar 2007
Milestone C Decision (LRIP)	Mar 2008	Mar 2008	Sep 2008	Sep 2008
Beginning of OPEVAL	Mar 2009	Mar 2010	Sep 2010	Jun 2010
IOC	Nov 2010	Feb 2012	Aug 2012	Jul 2012
FRP Decision	Jul 2010	Mar 2012	Sep 2012	Aug 2012
FRP Contract Award	Dec 2010	Apr 2012	Oct 2012	Sep 2012

Change Explanations

None

Acronyms and Abbreviations

OPEVAL - Operational Evaluation
SD&D - System Development & Demonstration
TECHEVAL - Technical Evaluation

Performance

Performance Characteristics				
SAR Baseline Production Estimate	**Current APB Production Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Material Availability				
>=0.95	>=0.95	>=0.9	.98	.96
Net Ready				
The system 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 (1) DISR-mandated GIG IT standards and profiles identified in the TV-1; (2) DISR -man dated GIG KIPs identified in the KIP declaration table; (3) NCOW RM Enterprise Services; (4) IA requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA; and 5) Operationally effective IEs, and mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system	The system 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 (1) DISR-mandated GIG IT standards and profiles identified in the TV-1; (2) DISR -mandated GIG KIPs identified in the KIP declaration table; (3) NCOW RM Enterprise Services; (4) IA requirements including availability, integrity, authentication, confidentiality, and non-repudiation, and issuance of an ATO by the DAA; and 5) Operationally effective IEs, and mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system	The system 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 1) DISR-mandated GIG IT standards and profiles identified in the TV-1; 2) DISR-mandated GIG KIPs identified in the KIP declaration table; 3) NCOW RM Enterprise Services; 4) IA requirements including availability, integrity, authentication, confidentiality and non-repudiation, and issuance of an IATO by the DAA; and 5) Operationally effective IEs; and mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified	The system 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 1) DISR - mandated GIG IT standards and profiles indentified in the TV-1; 2) DISR-mandated GIG KIPs identified in the KIP declaration table; 3) NCOW RM Enterprise Services; 4) IA requirements including availability, integrity, authentication, confidentiality and non-repudiation, and issuance of an IATO by the DAA; and 5) Operation-ally effective IEs; and mission critical performance and IA attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated	The system 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 1) DISR - mandated GIG IT standards and profiles indentified in the TV-1; 2) DISR-mandated GIG KIPs identified in the KIP declaration table; 3) NCOW RM Enterprise Services; 4) IA requirements including availability, integrity, authentica-tion, confidentiality and non-repudiation, and issuance of an IATO by the DAA; and 5) Operation-ally effective IEs; and mission critical performance and IA attributes, data correctness, data availability, and

integrated architecture views.	integrated architecture views.	in the applicable joint and system integrated architecture views.	architecture views.	consistent data processing specified in the applicable joint and system integrated architecture views.
Probability of Correct Identification (PCID) of a Target Emitter				
>=0.99 PCID for all emitters in the AARGM CPD Appendix D	>=0.99 PCID for all emitters in the AARGM CPD Appendix D	>=0.95 PCID of available threshold emitters in the AARGM CPD Appendix D	0.95 PCID of available threshold emitters in the AARGM CPD Appendix D	0.95 PCID for all emitters in the AARGM CPD Appendix D

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

Requirements Reference

CPD dated April 1, 2010

Change Explanations

None

Acronyms and Abbreviations

ATO - Authority to Operate
BIT - Built-In Test
DAA - Designated Approval Authority
DISR - DoD IT Standards Registry
GIG - Global Information Grid
IA - Information Assurance
IATO - Interim Authority to Operate
IE - Information Exchange
IT - Information Technology
KIP - Key Interface Profile
NCOW RM - Net Centric Operations and Warfare Reference Model
TV - Technical View

Track to Budget

General Notes

The FY 2021 PB includes funding for the AARGM - Extended Range (AARGM-ER) program. AARGM-ER development funding is under the same Program Element, 0205601N, but a separate Project Unit from AARGM development funding. AARGM-ER procurement funding is included in the same Budget Line Item, 2327, beginning in FY 2021.

RDT&E

Appn	BA	PE
Navy	07	0205601N

Project	Name		
2185	AARGM	(Shared)	(Sunk)
2661	AARGM Cong Add		(Sunk)
9C58A	AARGM Cong Add		(Sunk)

Procurement

Appn	BA	PE
Navy	02	0204162N

Line Item	Name	
2327	HARM Mods	(Shared)

Appn	BA	PE
Navy	02	0206138M

Line Item	Name	
2327	HARM Mods	(Shared)

Appn	BA	PE
Navy	06	0204162N

Line Item	Name	
6120	Initial Spares	(Shared)

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2003 $M			BY 2003 $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	578.9	673.1	734.4	673.1	600.3	716.7	716.7
Procurement	949.6	1123.0	1203.3	1122.2	1261.1	1491.4	1491.3
Flyaway	--	--	--	1044.5	--	--	1388.2
Recurring	--	--	--	949.1	--	--	1263.2
Non Recurring	--	--	--	95.4	--	--	125.0
Support	--	--	--	77.7	--	--	103.1
Other Support	--	--	--	63.0	--	--	84.0
Initial Spares	--	--	--	14.7	--	--	19.1
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1528.5	1796.1	N/A	1795.3	1861.4	2208.1	2208.0

Current APB Cost Estimate Reference

Current APB Cost reflects the POE, dated December 04, 2019

Cost Notes

The program has identified obsolescence as a risk to the program. The potential impacts to the program is an increase in missile unit cost and delays in production and repair schedules. The program has developed a comprehensive and coordinated funding strategy for addressing obsolescence.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	40	40	40
Procurement	1879	1803	1803
Total	1919	1843	1843

Quantity Notes

APB Change 6 reduces the production quantity objective from 2,435 to 1,803.

Cost and Funding

Funding Summary

Appropriation Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)									
Appropriation	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
RDT&E	716.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	716.7
Procurement	1214.2	187.4	89.7	0.0	0.0	0.0	0.0	0.0	1491.3
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	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2021 Total	1930.9	187.4	89.7	0.0	0.0	0.0	0.0	0.0	2208.0
PB 2020 Total	1923.5	187.4	192.6	179.7	183.3	0.0	0.0	0.0	2666.5
Delta	7.4	0.0	-102.9	-179.7	-183.3	0.0	0.0	0.0	-458.5

Funding Notes

Weapons Procurement Navy (WPN) funding in the PB 2021 budget submission for FY 2022 and out is reflective of Marine Aviation quantities that are not part of the AARGM MDAP of Record.

Quantity Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
Development	40	0	0	0	0	0	0	0	0	40
Production	0	1457	252	94	0	0	0	0	0	1803
PB 2021 Total	40	1457	252	94	0	0	0	0	0	1843
PB 2020 Total	40	1442	245	245	249	254	0	0	0	2475
Delta	0	15	7	-151	-249	-254	0	0	0	-632

Cost and Funding

Annual Funding By Appropriation

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
		TY $M					
Fiscal Year	Quantity	End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1993	--	--	--	--	--	--	9.6
1994	--	--	--	--	--	--	12.4
1995	--	--	--	--	--	--	4.3
1996	--	--	--	--	--	--	33.0
1997	--	--	--	--	--	--	32.6
1998	--	--	--	--	--	--	32.8
1999	--	--	--	--	--	--	20.2
2000	--	--	--	--	--	--	25.0
2001	--	--	--	--	--	--	20.6
2002	--	--	--	--	--	--	18.2
2003	--	--	--	--	--	--	46.5
2004	--	--	--	--	--	--	30.2
2005	--	--	--	--	--	--	84.0
2006	--	--	--	--	--	--	76.2
2007	--	--	--	--	--	--	89.4
2008	--	--	--	--	--	--	48.8
2009	--	--	--	--	--	--	26.5
2010	--	--	--	--	--	--	15.5
2011	--	--	--	--	--	--	31.7
2012	--	--	--	--	--	--	7.5
2013	--	--	--	--	--	--	8.2
2014	--	--	--	--	--	--	12.2
2015	--	--	--	--	--	--	16.0
2016	--	--	--	--	--	--	13.2
2017	--	--	--	--	--	--	2.1
Subtotal	40	--	--	--	--	--	716.7

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2003 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1993	--	--	--	--	--	--	10.9
1994	--	--	--	--	--	--	13.8
1995	--	--	--	--	--	--	4.7
1996	--	--	--	--	--	--	35.5
1997	--	--	--	--	--	--	34.6
1998	--	--	--	--	--	--	34.6
1999	--	--	--	--	--	--	21.0
2000	--	--	--	--	--	--	25.7
2001	--	--	--	--	--	--	20.9
2002	--	--	--	--	--	--	18.2
2003	--	--	--	--	--	--	45.9
2004	--	--	--	--	--	--	29.0
2005	--	--	--	--	--	--	78.6
2006	--	--	--	--	--	--	69.2
2007	--	--	--	--	--	--	79.2
2008	--	--	--	--	--	--	42.5
2009	--	--	--	--	--	--	22.8
2010	--	--	--	--	--	--	13.1
2011	--	--	--	--	--	--	26.2
2012	--	--	--	--	--	--	6.1
2013	--	--	--	--	--	--	6.6
2014	--	--	--	--	--	--	9.7
2015	--	--	--	--	--	--	12.5
2016	--	--	--	--	--	--	10.2
2017	--	--	--	--	--	--	1.6
Subtotal	40	--	--	--	--	--	673.1

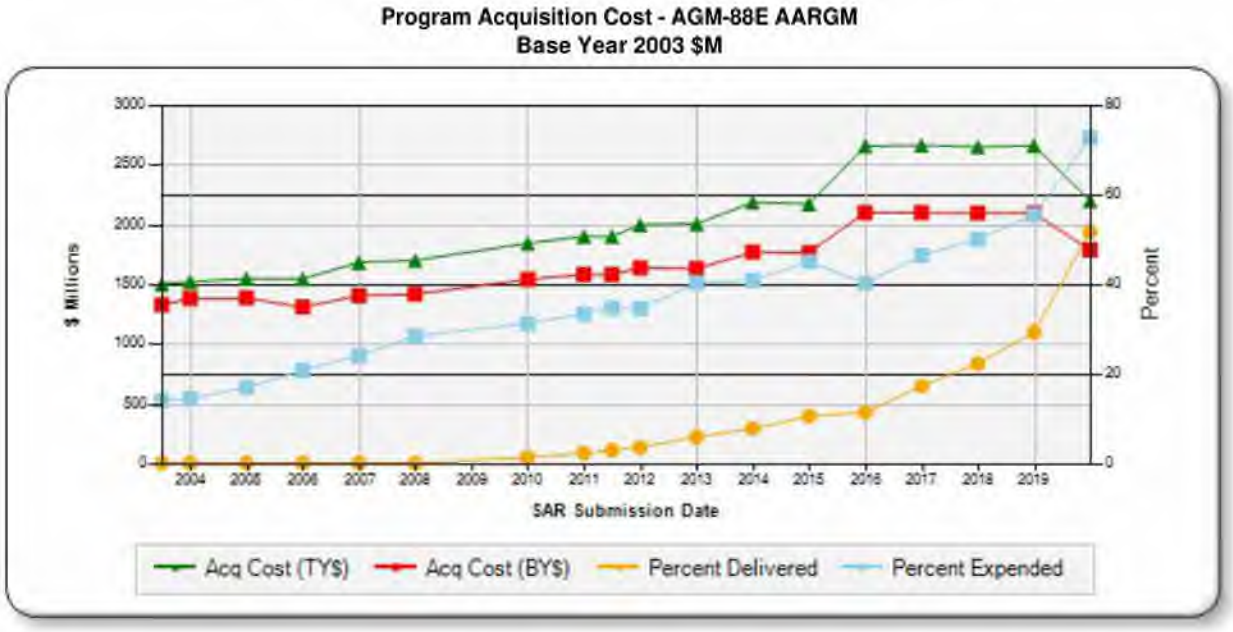
Annual Funding 1507 | Procurement | Weapons Procurement, Navy							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	21	35.3	--	6.0	41.3	2.3	43.6
2009	8	16.9	--	1.5	18.4	6.9	25.3
2010	36	41.5	--	2.0	43.5	7.2	50.7
2011	47	42.9	--	5.3	48.2	4.4	52.6
2012	82	65.3	--	10.1	75.4	9.0	84.4
2013	96	68.9	--	14.5	83.4	2.4	85.8
2014	116	83.2	--	8.8	92.0	2.7	94.7
2015	133	87.0	--	13.3	100.3	6.4	106.7
2016	143	103.7	--	15.5	119.2	3.4	122.6
2017	255	170.2	--	9.1	179.3	5.2	184.5
2018	264	159.4	--	8.2	167.6	15.8	183.4
2019	256	159.6	--	10.8	170.4	9.5	179.9
2020	252	153.7	--	10.8	164.5	22.9	187.4
2021	94	75.6	--	9.1	84.7	5.0	89.7
Subtotal	1803	1263.2	--	125.0	1388.2	103.1	1491.3

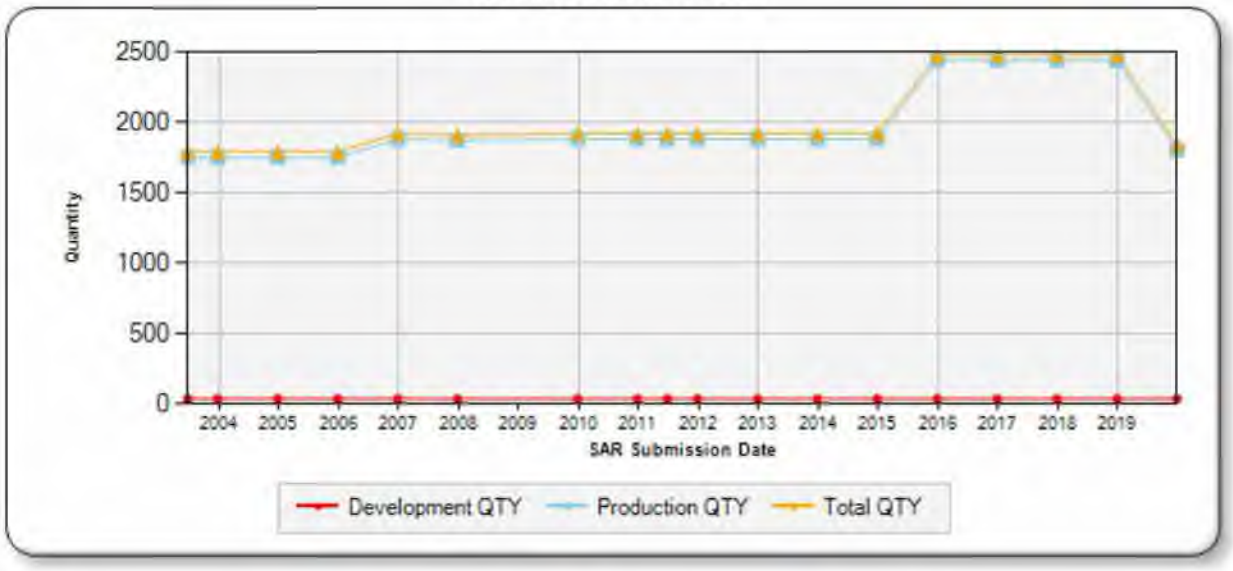
Annual Funding 1507 | Procurement | Weapons Procurement, Navy							
Fiscal Year	Quantity	BY 2003 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	21	30.4	--	5.2	35.6	2.0	37.6
2009	8	14.4	--	1.3	15.7	5.8	21.5
2010	36	34.7	--	1.7	36.4	5.9	42.3
2011	47	35.1	--	4.4	39.5	3.6	43.1
2012	82	52.7	--	8.2	60.9	7.2	68.1
2013	96	54.8	--	11.6	66.4	1.9	68.3
2014	116	65.3	--	6.9	72.2	2.1	74.3
2015	133	67.2	--	10.2	77.4	5.0	82.4
2016	143	78.7	--	11.7	90.4	2.6	93.0
2017	255	126.6	--	6.8	133.4	3.9	137.3
2018	264	116.0	--	6.0	122.0	11.4	133.4
2019	256	113.9	--	7.6	121.5	6.8	128.3
2020	252	107.5	--	7.6	115.1	16.0	131.1
2021	94	51.8	--	6.2	58.0	3.5	61.5
Subtotal	1803	949.1	--	95.4	1044.5	77.7	1122.2

APB Change 6 reduces the production quantity objective from 2,435 to 1,803.

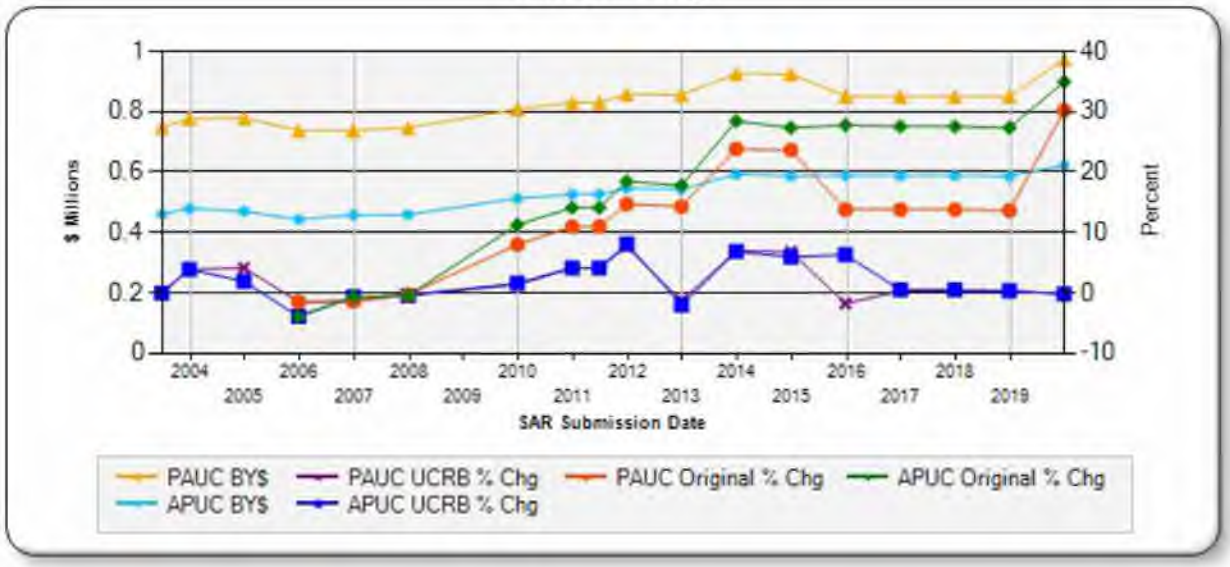
Charts

AGM-88E AARGM first began SAR reporting in June 2003





Unit Cost - AGM-88E AARGM
Base Year 2003 $M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Milestone B (June 2003)	
1.	Technical: Millimeter Wave (MMW)
Milestone C (September 2008)	
1.	Schedule: Test Schedule
The FRP Decision (August 2012)	
1.	Cost, Schedule and Technical: Block 1 Upgrade
Current Estimate (December 2019)	
1.	Cost and Schedule: Obsolescence Management

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (January 2020)	
1.	TY$M = 1491.4, BY03$M = 1123, Quantity = 1803
Original Baseline Estimate (July 2003)	
1.	TY$M = 972.9, BY03$M = 806.5, Quantity = 1750
Revised Original Estimate (N/A)	
1.	None
Current Procurement Cost (December 2019)	
1.	TY$M = 1491.3, BY03$M = 1122.2, Quantity = 1803

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	9/30/2008	1/18/2011
Approved Quantity	187	112
Reference	Milestone C ADM	Gate 6 Sufficiency Review
Start Year	2008	2008
End Year	2010	2011

Notes

Milestone C ADM of September 30, 2008 originally granted LRIP authority utilizing FY 2008 - FY 2010 funding, with a not-to-exceed quantity of 187 units. Deliveries for Phase I of LRIP, utilizing FY 2008 and FY 2009 funding, completed in October 2011. Deliveries for LRIP II, a Firm-Fixed-Price (FFP) contract utilizing FY 2010 funding, completed in November 2012. Due to delays in Initial Operational Test & Evaluation, and to avoid a production line break, the incorporation of a third LRIP into the AGM-88E AARGM Acquisition Strategy, utilizing FY 2011 funding, was approved on January 18, 2011 by the Assistant Secretary of the Navy (Research, Development, and Acquisition) at the Gate 6 Sufficiency Review. The total LRIP quantity remained under the not-to-exceed quantity of 187 units, which does not exceed the 10% guideline. The LRIP III FFP contract was awarded on October 31, 2011 at the Government's cost goal. Deliveries for LRIP III began in December 2012 and completed in December 2013.

Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost $M	Description
Germany	12/16/2019	99	93.4	Letter of Offer and Acceptance between the United States and Federal Republic of Germany was signed on December 16, 2019 establishing FMS Case W7-P-AAA for the procurement of AGM-88E AARGM All Up Rounds, Captive Air Training Missiles and support. The missiles are expected to deliver in FYs 2023 and 2024.
Germany	1/31/2019		2.0	Letter of Offer and Acceptance between the United States and Federal Republic of Germany was signed on January 31, 2019 establishing FMS Case GY-P-ALB for the procurement of integration assets to support German Block 1 software development on the German Tornado aircraft.
Australia	9/20/2017		6.7	Letter of Offer and Acceptance between the United States and Australia was signed on September 2017 establishing FMS Case AT-P-AQP for the procurement of AGM-88E AARGM Captive Air Training Missiles, spares and support. The missiles are expected to deliver in FY 2020.
Australia	7/23/2015		12.0	Letter of Offer and Acceptance between the United States and Australia was amended on July 23, 2015 for the procurement of additional AGM-88E AARGM All Up Rounds and spares under FMS Case AT-P-AZN. The missiles were delivered in FY 2017.
Australia	5/31/2013		10.4	Letter of Offer and Acceptance between the United States and Australia was signed on May 31, 2013 establishing FMS Case AT-P-AZN for the procurement of AGM-88E AARGM Captive Air Training Missiles, spares and support. The missiles and spares were delivered in FY 2015 with support continuing through FY 2018.
Italy	11/15/2005	160	137.5	Cooperative Development Memorandum of Agreement (MOA) between Italy and the United States was signed on November 15, 2005. Cooperative Production, Sustainment and Follow-on Development MOA between Italy and the United States was signed on November 18, 2009. The quantity of 160 represents the total estimated number of missiles that Italy is expected to receive through Full Rate Production.

Notes

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2003 $M Current UCR Baseline (Jan 2020 APB)	BY 2003 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1796.1	1795.3	
Quantity	1843	1843	
Unit Cost	0.975	0.974	-0.10
Average Procurement Unit Cost			
Cost	1123.0	1122.2	
Quantity	1803	1803	
Unit Cost	0.623	0.622	-0.16

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2003 $M Original UCR Baseline (Jul 2003 APB)	BY 2003 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1339.8	1795.3	
Quantity	1790	1843	
Unit Cost	0.748	0.974	+30.21[1]
Average Procurement Unit Cost			
Cost	806.5	1122.2	
Quantity	1750	1803	
Unit Cost	0.461	0.622	+34.92[1]

Current UCR Baseline and Current Estimate (Then-Year Dollars)			
Item	TY $M Current UCR Baseline (Jan 2020 APB)	TY $M Current Estimate (Dec 2019 SAR)	TY % Change
Program Acquisition Unit Cost (PAUC)			
Cost	2208.1	2208.0	
Unit Cost	1.198	1.198	+0.00
Average Procurement Unit Cost (APUC)			
Cost	1491.4	1491.3	
Unit Cost	0.827	0.827	+0.00

Original UCR Baseline and Current Estimate (Then-Year Dollars)			
Item	TY $M		TY % Change
	Original UCR Baseline (Jul 2003 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost (PAUC)			
Cost	1510.9	2208.0	
Unit Cost	0.844	1.198	+41.94
Average Procurement Unit Cost (APUC)			
Cost	972.9	1491.3	
Unit Cost	0.556	0.827	+48.74

[1] *Nunn-McCurdy Breach*

Unit Cost Breach Data		
Changes From Previous SAR	$M/Qty.	Percent
PAUC (BY $M)	0.124	+14.59
APUC (BY $M)	0.035	+5.96
PAUC Quantity	-632	0.00
PAUC (TY $M)	0.121	+11.23
APUC (TY $M)	0.026	+3.25

Initial SAR Information		
Initial SAR Information	BY $M	TY $M
Program Acquisition Cost		

Unit Cost PAUC Changes

Since the original Acquisition Program Baseline (APB) from Milestone B (2003), the AARGM program showed progressive increases in APUC and PAUC that stabilized during FRP. The resulting change in quantity in the PB 2021 coupled with prior cost growth from the original APB resulted in a significant Nunn-McCurdy breach of unit cost.

Unit Cost APUC Changes

Since the original Acquisition Program Baseline (APB) from Milestone B (2003), the AARGM program showed progressive increases in APUC and PAUC that stabilized during FRP. The resulting change in quantity in the PB 2021 coupled with prior cost growth from the original APB resulted in a significant Nunn-McCurdy breach of unit cost.

Impact of Performance or Schedule Changes

Not applicable. The program is meeting all other APB metrics.

Program Management or Control

An updated Acquisition Program Baseline was approved January 31, 2020 that changed the Program of Record (POR) from 2,435 to 1,803 AARGM missiles.

Cost Control Actions

An updated Acquisition Program Baseline was approved January 31, 2020 that changed the POR from 2,435 to 1,803 AARGM missiles.

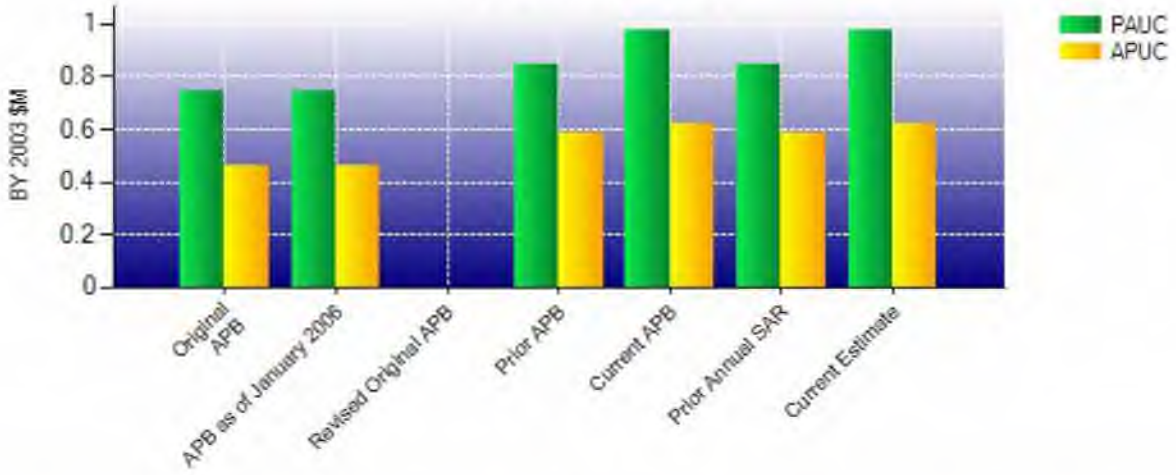
Nunn-McCurdy Comments

PB 2021 reduced AARGM procurement funding, and the associated total production quantity, in order to invest in the AARGM-Extended Range program. The change in priority aligns with the National Defense Strategy.

Since the original Acquisition Program Baseline (APB) from Milestone B (2003), the AARGM program showed progressive increases in APUC and PAUC that stabilized during FRP. The resulting change in quantity in the PB 2021 coupled with prior cost growth from the original APB resulted in a significant Nunn-McCurdy breach of unit cost.

An updated APB was approved on January 31, 2020 that changed the POR from 2,435 to 1,803 AARGM missiles. The DON will notify the Congressional Committees of the significant Nunn-McCurdy breach in accordance with U.S.C. §2433 after the annual SAR submittal.

APB Unit Cost History



APB Unit Cost History					
Item	Date	BY 2003 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Jul 2003	0.748	0.461	0.844	0.556
APB as of January 2006	Jul 2003	0.748	0.461	0.844	0.556
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Jun 2016	0.848	0.585	1.076	0.800
Current APB	Jan 2020	0.975	0.623	1.198	0.827
Prior Annual SAR	Dec 2018	0.850	0.587	1.077	0.801
Current Estimate	Dec 2019	0.974	0.622	1.198	0.827

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	
0.844	0.039	-0.026	0.028	0.010	0.053	0.000	0.022	0.126	0.970

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.970	-0.016	0.078	0.037	0.043	0.095	0.000	-0.009	0.228	1.198

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	
0.556	0.033	-0.006	0.026	0.000	0.039	0.000	0.023	0.115	0.671

Current SAR Baseline to Current Estimate (TY $M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
0.671	-0.016	0.066	0.037	0.000	0.078	0.000	-0.009	0.156	0.827

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	Apr 2003	Apr 2003	Jun 2003
Milestone C	N/A	Mar 2008	Mar 2008	Sep 2008
IOC	N/A	May 2010	Nov 2010	Jul 2012
Total Cost (TY $M)	N/A	1510.9	1861.4	2208.0
Total Quantity	N/A	1790	1919	1843
PAUC	N/A	0.844	0.970	1.198

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	600.3	1261.1	--	1861.4
Previous Changes				
Economic	+0.1	-30.8	--	-30.7
Quantity	--	+407.5	--	+407.5
Schedule	+2.4	+126.2	--	+128.6
Engineering	+79.5	--	--	+79.5
Estimating	+34.7	+147.8	--	+182.5
Other	--	--	--	--
Support	--	+37.7	--	+37.7
Subtotal	+116.7	+688.4	--	+805.1
Current Changes				
Economic	--	+1.8	--	+1.8
Quantity	--	-338.4	--	-338.4
Schedule	--	-60.0	--	-60.0
Engineering	--	--	--	--
Estimating	-0.3	-6.9	--	-7.2
Other	--	--	--	--
Support	--	-54.7	--	-54.7
Subtotal	-0.3	-458.2	--	-458.5
Total Changes	+116.4	+230.2	--	+346.6
Current Estimate	716.7	1491.3	--	2208.0

Summary BY 2003 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	578.9	949.6	--	1528.5
Previous Changes				
Economic	--	--	--	--
Quantity	--	+274.7	--	+274.7
Schedule	+1.9	+71.7	--	+73.6
Engineering	+64.2	--	--	+64.2
Estimating	+28.3	+108.4	--	+136.7
Other	--	--	--	--
Support	--	+25.1	--	+25.1
Subtotal	+94.4	+479.9	--	+574.3
Current Changes				
Economic	--	--	--	--
Quantity	--	-226.6	--	-226.6
Schedule	--	-40.6	--	-40.6
Engineering	--	--	--	--
Estimating	-0.2	-1.6	--	-1.8
Other	--	--	--	--
Support	--	-38.5	--	-38.5
Subtotal	-0.2	-307.3	--	-307.5
Total Changes	+94.2	+172.6	--	+266.8
Current Estimate	673.1	1122.2	--	1795.3

Previous Estimate: December 2018

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Incorporation of historical Below Threshold Reprogramming (BTRs). (Estimating)	-0.2	-0.3
RDT&E Subtotal	-0.2	-0.3

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+1.8
Total Quantity variance resulting from a decrease of 632 AARGMs from 2,435 to 1,803. (Subtotal)	-245.6	-366.7
Quantity variance resulting from a decrease of 632 AARGMs from 2,435 to 1,803. (Quantity)	(-226.6)	(-338.4)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(-8.7)	(-13.0)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(-10.3)	(-15.3)
Incorporated negotiated quantities, which slipped units into FY 2020-2021. (Schedule)	0.0	+1.0
Alignment to National Defense Strategy results in Department of Navy procurement ending in FY 2021. (Schedule)	-31.9	-48.0
Adjustment for current and prior escalation. (Estimating)	-0.3	-0.9
Inclusion of historical BTRs. (Estimating)	+5.9	+7.7
Updating for contract actuals. (Estimating)	+8.2	+9.5
Updating for Contract Negotiations (Estimating)	+8.8	+12.2
Decrease associated with ramp down in AARGM quantities. (Estimating)	-17.7	-25.6
Inclusion of additional Special Test Equipment associated with Engineering Change Proposals. (Estimating)	+3.8	+5.5
Adjustment for current and prior escalation. (Support)	-0.3	0.0
Decrease in Other Support. Ramp down in FY 2021. (Support)	-31.5	-44.5
Decrease in Initial Spares. Ramp down in FY 2021. (Support)	-6.7	-10.2
Procurement Subtotal	-307.3	-458.2

(QR) Quantity Related

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: AARGM FRP 8/9
Contractor: Alliant TechSystems Operations, LLC
Contractor Location: 9401 Corbin Avenue
Northridge, CA 91324
Contract Number: N00019-19-C-0049
Contract Type: Firm Fixed Price (FFP)
Award Date: July 29, 2019
Definitization Date: July 29, 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
167.3	N/A	263	182.0	N/A	288	182.0	182.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the subsequent exercise of the FRP 8 Options for the United States Navy, Italian Air Force and Republic of Germany (USN/ITAF/Germany) and the procurement of additional All Up Rounds (AURs) and Captive Air Training Missiles (CATMs) for the USN.

Cost and Schedule Variance Explanations

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

Notes

The contract value of $182.04M includes USN, ITAF and Germany requirements for AURs, CATMs and contractor production support.

Contract Identification

Appropriation: Procurement
Contract Name: AARGM FRP 6/7
Contractor: Alliant TechSystems Operations, LLC
Contractor Location: 9401 Corbin Avenue
Northridge, CA 91324
Contract Number: N00019-17-C-0005
Contract Type: Firm Fixed Price (FFP)
Award Date: August 31, 2017
Definitization Date: August 31, 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
156.8	N/A	236	369.9	N/A	567	369.9	369.9

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the subsequent procurement of German Guidance and Control Section integration assets, additional Captive Air Training Missile for the United States Navy (USN) and components to mitigate obsolescence for USN, Royal Australian Air Force (RAAF) and Italian Air Force (ITAF).

Cost and Schedule Variance Explanations

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

Notes

The contract value of $369.9M includes USN, ITAF and RAAF requirements for All Up Rounds and contractor production support.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	40	40	40	100.00%
Production	1803	918	1803	50.92%
Total Program Quantity Delivered	1843	958	1843	51.98%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	2208.0	Years Appropriated	28
Expended to Date	1608.0	Percent Years Appropriated	96.55%
Percent Expended	72.83%	Appropriated to Date	2118.3
Total Funding Years	29	Percent Appropriated	95.94%

The above data is current as of February 10, 2020.

Notes

The 40 assets procured under the development phase are not fleet representative assets, and are not reflected in the AARGM sustainment strategy. Production "Planned to Date" quantities adjusted to align with PB 2021 quantities (from 2,435 to 1,803).

Operating and Support Cost

Cost Estimate Details

Date of Estimate: December 04, 2019
Source of Estimate: POE
Quantity to Sustain: 1803
Unit of Measure: Total Quantity
Service Life per Unit: 15.00 Years
Fiscal Years in Service: FY 2012 - FY 2038

The estimate concentrates on the costs for AGM-88E AARGM unique components. The estimate does not include any costs related to the High Speed Anti-Radiation Missile (HARM) Government Furnished Hardware (rocket motor and warhead). AGM-88E AARGM has a 60 month Serviceable In-Service Time Maintenance and Reliability Monitoring Program. The 1803 quantity to sustain does not include 40 developmental assets that are not maintained.

Sustainment Strategy

The AGM-88E AARGM sustainment approach is leveraged off of the existing HARM maintenance structure. The system is supported via a modified three level maintenance concept utilizing Organizational (O), Intermediate (I), Depot levels and a Designated Overhaul Point (DOP) for the AGM-88E AARGM unique components (guidance and control sections). The Original Equipment Manufacturer is the DOP for guidance and control section repair based on the completed Joint Depot Source of Repair Decision process. There are no changes to the manpower requirements or manning levels at activities that will operate and provide support to AGM-88E AARGM as O-level and I-level; capabilities are consistent with the HARM operations.

Antecedent Information

The Antecedent System is the HARM. Data is based on a HARM period of performance of FY 1990 - FY 2009 (20 years), vice FY 2012 - FY 2038 (26 years) for AARGM. Historical O&S costs were collected from the Naval Visibility & Management of Operating and Support Costs database. Antecedent costs are not normalized to the AGM-88E AARGM parameters.

Annual O&S Costs BY2003 $M		
Cost Element	**AGM-88E AARGM Average Annual Cost Per Total Quantity**	**AGM-88 HARM (Antecedent) Average Annual Cost Per Total Quantity**
Unit-Level Manpower	0.000	0.000
Unit Operations	0.037	0.000
Maintenance	1.153	1.800
Sustaining Support	2.480	1.700
Continuing System Improvements	1.145	1.600
Indirect Support	0.000	0.000
Other	0.000	0.000
Total	4.815	5.100

Item	Total O&S Cost $M			
	AGM-88E AARGM			AGM-88 HARM (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	125.2	137.7	125.2	101.3
Then Year	197.7	N/A	197.7	N/A

Equation to Translate Annual Cost to Total Cost

Total Cost / Total Years of Service = Annual Cost

$125.2M / 26 years = $4.8M per year

O&S Cost Variance		
Category	**BY 2003 $M**	**Change Explanations**
Prior SAR Total O&S Estimates - Dec 2018 SAR	162.6	
Programmatic/Planning Factors	-20.2	Reduction in procurement quantities and schedule drives a reduction in Depot Maintenance and SEPM Costs.
Cost Estimating Methodology	-1.0	Updated System Engineering Program Management (SEPM) labor assumptions due to overlap with AARGM-Extended Range (AARGM-ER) O&S.
Cost Data Update	-16.2	Model updated for actuals; no OMN funded software updates have occurred.
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	-37.4	
Current Estimate	125.2	

Disposal Estimate Details

Date of Estimate: December 04, 2019
Source of Estimate: POE
Disposal/Demilitarization Total Cost (BY 2003 $M): 6.4

Total costs for disposal of all 1803 units is $6.4M (BY$03).