RCS: DD-A&T(Q&A)823-384

Air and Missile Defense Radar (AMDR)

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
Air and Missile Defense Radar (AMDR)

DoD Component
Navy

Responsible Office

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Date Assigned: March 15, 2019

References

SAR Baseline (Production Estimate)

Under Secretary of Defense (Acquisition, Technology & Logistics) Approved Acquisition Program Baseline (APB) dated June 30, 2017

Approved APB

Approved Acquisition Program Baseline (APB) dated February 6, 2020

Mission and Description

Developed under the Air and Missile Defense Radar (AMDR) program, the AN/SPY-6(V)1 is the Navy's next generation radar system that will address Ballistic Missile Defense (BMD) and Air Defense (AD) capability gaps identified in the Maritime Air and Missile Defense of Joint Forces (MAMDJF) Initial Capabilities Document (ICD). AN/SPY-6(V)1 is an Integrated Air and Missile Defense (IAMD) radar providing sensitivity for long range detection and engagement of advanced threats. The AN/SPY-6(V)1 is currently planned to be deployed on the Arleigh Burke Class Guided Missile Destroyer Flight III with four arrays each populated with 37 Radar Modular Assemblies (RMAs) which achieves the Capability Production Document (CPD) threshold of SPY+16dB sensitivity with margin.

Executive Summary

Program Highlights Since Last Report

After completing Concept Studies and Technology Development phase contracts with Raytheon, Northrop Grumman, and Lockheed Martin, the Air and Missile Defense Radar (AMDR) program achieved Milestone B in September 2013 and received a signed ADM on October 4, 2013. After a full and open competition, the Engineering and Manufacturing Development (EMD) contract was awarded to Raytheon on October 10, 2013.

The EMD phase included integration and test of a single-faced AN/SPY-6(V)1 Engineering Development Model with an AN/SPQ-9B asset at the land-based test site at the Pacific Missile Range Facility (PMRF) in Kauai, HI. Developmental Testing (DT)-3 live testing commenced on September 6, 2016, and included multiple live Air, Surface, Electronic Attack/Electronic Protection (EA/EP), Ballistic Missile Defense (BMD), Integrated Air and Missile Defense (IAMD), missile communications test set, satellites and sphere tracking tests. The Vigilant Janus BMD flight test analysis resulted in the March 2018 decision to close DT-3 and direction to conduct a retest. The Vigilant Nemesis retest, successfully executed in January 2019, demonstrated the AN/SPY-6(V)1 capability to detect, track and discriminate an Aegis Readiness Assessment Vehicle-CZ (ARAV-CZ) complex short-range ballistic missile target and support the design of the Aegis Baseline 10 combat system. AN/SPY-6(V)1 testing will continue at PMRF against live Air, Surface, EA/EP, BMD, satellites and sphere targets and other agency Targets of Opportunity (TOOs) through Fiscal Year (FY) 2020.

The EMD phase contract includes options for up to nine Low Rate Initial Production (LRIP) units. The program received Milestone C approval on April 27, 2017 and subsequently exercised contract options for three LRIP systems. In April 2018, the AMDR program received an ADM that authorized award of one additional FY 2018 LRIP radar system, and upon successful Vigilant Nemesis test, authorized award of up to five additional LRIP radar systems. On March 14, 2019 three additional options were exercised, and on December 20, 2019 two additional options were exercised bringing the exercised options to a total of 9 units.

The AMDR program is executing on schedule and within budget and is on track for delivery in June 2020. The program's 2019 focus was on production and test of the first unit (to be delivered to DDG 125), as well as continued integration activities with AEGIS BL10. Deliveries to the shipyard commenced in Q4 FY2019 with power and cooling equipment. Software deliveries, integration, and test continued with BL10 through 2019 to support the path to AEGIS Light-Off (ALO). AN/SPY-6(V)1 has design co-dependencies with the combat system that requires further planned software work for integration with AEGIS Baseline 10.

Additionally, FY 2020 through FY 2024 funds are included to backfit an Active Electronically-Steered Array and digital beamforming technology on a Flight IIA Guided Missile Destroyer (Flt IIA DDG) and to begin development and integration of Advanced Distributed Radar (ADR) capability into AN/SPY-6(V)1. ADR capability will enhance BMD detection performance, increase sensitivity at large scan angles, and enable AN/SPY-6(V)1 to operate in receive-only mode in cooperation with another SPY-6(V)1 radar. In addition to the BMD mission, this capability will also improve Anti-Air Warfare (AAW) warfighting capabilities and provide advanced electronic protection techniques. Funding will be used for a live demonstration of BMD Cued Search and Track, element-level testing of Receive Only Cooperative Radar functionality, and accompanying modelling simulation to ensure capabilities are robust in varying conditions. This investment will result in: 1) improved detection and tracking of medium- to long-range ballistic missiles from larger ship operating areas, and 2) improved defense of high-value assets while increasing ship survivability in the Navy's distributed maritime operations (DMO) scenarios.

History of Significant Developments Since Program Initiation

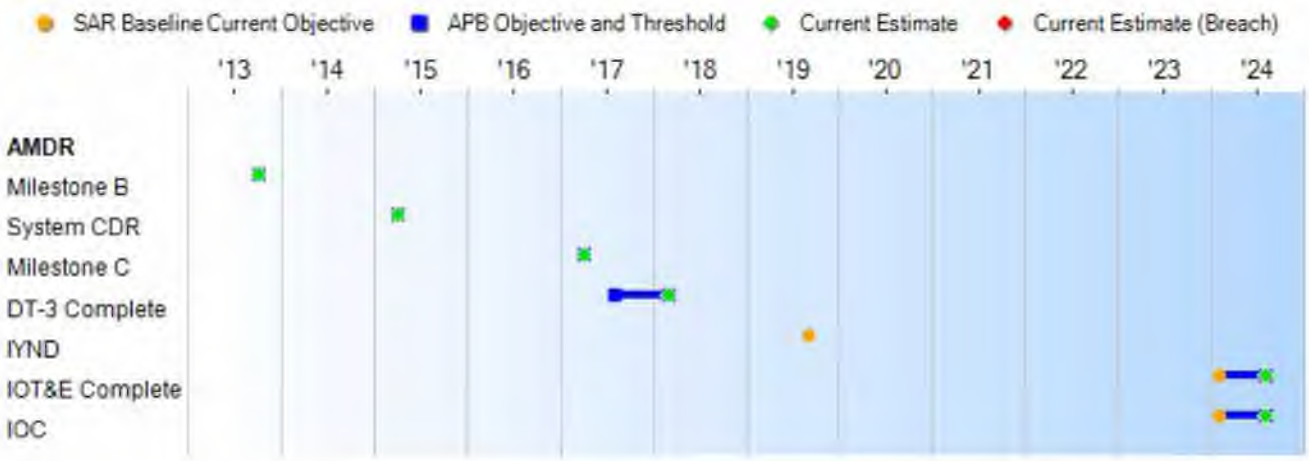
History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
June 2009	Awarded three 6-month Concept Studies contracts to Raytheon, Lockheed Martin, and Northrop Grumman
September 2010	Milestone A Acquisition Decision Memorandum
September 2010	Awarded three 24-month Technology Development contracts to Raytheon, Lockheed Martin, and Northrop Grumman
May 2012	Pre-Engineering and Manufacturing Development Defense Acquisition Board Review
October 2013	Milestone B Acquisition Decision Memorandum
October 2013	Awarded one 48-month Engineering and Manufacturing Development contract to Raytheon
August 2014	System Preliminary Design Review
April 2015	System Critical Design Review
September 2016	Start of Developmental Test 3 (DT-3)
December 2016	Exercised Long Lead Material contract option for first Low Rate Initial Production unit
March 2017	Vigilant Hunter flight test
April 2017	Milestone C Acquisition Decision Memorandum
May 2017	Exercised contract options for first three Low Rate Initial Production units
July 2017	Vigilant Titan flight test
September 2017	Vigilant Talon flight test
December 2017	Combined Systems Engineering Technical Review (Transition Critical Design Review, System Verification Review/Functional Configuration Audit, and Production Readiness Review)
March 2018	Vigilant Janus flight test
April 2018	Exercised contract option for a fourth Low Rate Initial Production unit
December 2018	Awarded Integration and Production Support contract to Raytheon
January 2019	Vigilant Nemesis flight test
April 2019	Exercised contract options for three more Low Rate Initial Production units bringing the until total to seven.
December 2019	Exercised contract options for two more Low Rate Initial Production units bringing the unit total to nine

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	None
	APUC	None

Schedule



Schedule Events					
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	
Milestone B	Oct 2013	Oct 2013	Oct 2013	Oct 2013	(Ch-1)
System CDR	Apr 2015	Apr 2015	Apr 2015	Apr 2015	
Milestone C	Apr 2017	Apr 2017	Apr 2017	Apr 2017	
DT-3 Complete	Aug 2017	Aug 2017	Mar 2018	Mar 2018	(Ch-2)
IYND	Sep 2019	N/A	N/A	N/A	(Ch-3)
IOT&E Complete	Feb 2024	Feb 2024	Aug 2024	Aug 2024	
IOC	Feb 2024	Feb 2024	Aug 2024	Aug 2024	

Change Explanations

(Ch-1) The Current Estimate for Milestone B changed from Sep 2013 to October 2013 to reflect the actual completion date.
(Ch-2) The date was updated to reflect the actual completion of DT-3.
(Ch-3) Per guidance from the AMDR Gate 6 Review, deleted the In-yard Need Date schedule event to be consistent with standard APBs.

Acronyms and Abbreviations

CDR - Critical Design Review
DT - Developmental Testing
IOC - Initial Operational Capability
IOT&E - Initial Operational Test and Evaluation

Performance

Performance Characteristics				
SAR Baseline Production Estimate	**Current APB Production Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Availability				
Ao ≥0.99	Ao ≥0.98	(T=O) Ao ≥0.98	TBD	Ao>=0.99
System Training				
Maintenance technicians correctly perform ≥ 99% of critical tasks and ≥ 99% of non-critical tasks as defined in the TTL.	Ships Force performs>= 99% of corrective and preventative maintenance procedures, as defined in the maintenance manual, within the Time to Repair (TTR) specified to achieve the AN/SPY-6(V)1 Ao KPP.	(T=O) Ships Force performs>= 99% of corrective and preventative maintenance procedures, as defined in the maintenance manual, within the Time to Repair (TTR) specified to achieve the AN/SPY-6(V)1 Ao KPP.	TBD	Maintenance technicians correctly perform >= 99% of critical tasks and >= 80% of non-critical tasks as defined in the TTL.
Net Ready				
Will satisfy applicable Net Ready KPP elements for all operational activities and information exchanges.	Exemption: Net Ready KPP is not applicable to AN/SPY-6(V)1 due to the lack of Joint Interfaces and Joint Information Exchanges.	(T=O) Exemption: Net Ready KPP is not applicable to AN/SPY-6 (V)1 due to the lack of Joint Interfaces and Joint Information Exchanges.	Compliant with Applicable elements from CPD.	Will satisfy applicable Net Ready KPP elements for joint critical operational activities and information exchanges.
Energy Efficiency				
Two reduced power states for AMDR-S, when commanded by the platform CMS: State 1 consumes no more than 1100 kW total prime power; State 2 consumes no more than 850 kW total prime power	Two reduced power states to minimize platform fuel consumption: State 1 consumes no more than 1100 kW total prime power; State 2 consumes no more than 850 kW total prime power.	(T=O) Two reduced power states to minimize platform fuel consumption: State 1 consumes no more than 1100 kW total prime power; State 2 consumes no more than 850 kW total prime power.	TBD	Reduced Power Substate 1 consumes 1110kW total power; Reduced Power Substate 2 consumes 860kW total power
Survivability				
(Objective = Threshold) Exemption - AMDR will be integrated into the DDG 51 hull with no	Exemption - AN/SPY-6 (V)1 will be integrated into the DDG 51 Flt III with no decrease in survivability of the hull	(T=O) Exemption - AN/SPY-6(V)1 will be integrated into the DDG 51 Flt III with no decrease in	N/A - Exempt	Exemption - AMDR will be integrated into the DDG 51 hull with no decrease in survivability of the

decrease in survivability of the hull based on DDG 51 live fire equivalent testing (DDG 81 shock trial)	based on DDG 51 live fire equivalent testing (DDG 81 shock trial)	survivability of the hull based on DDG 51 live fire equivalent testing (DDG 81 shock trial)		hull based on DDG 51 live fire equivalent testing (DDG 81 shock trial)
Force Protection				
(Objective = Threshold) Exemption - Will support host platform requirement	Exemption - AN/SPY-6 (V)1 will support host platform requirement	(T=O) Exemption - AN/SPY-6(V)1 will support host platform requirement	N/A - Exempt	Exemption - Will support host platform requirement

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

Requirements Reference

The AMDR CPD was approved by the JROC on 26 March 2018 (JROCM 025-18). The CPD reflects lessons learned from the AMDR EMD Phase and includes updates relative to the AMDR CDD. The AMDR CDD was approved by the JROC on June 27, 2013 (JROCM 123-13). Specific KPP values have been established in the CDD/CPD and those requirements have been flowed down to the AMDR System Requirements Document and the contractor's A-Specification.

The Pre-EMD DAB's ADM, dated May 21, 2012, directed a change to the program structure so that it includes only the AMDR S-band system. This APB represents only the S-band radar capabilities from the AMDR CDD/CPD. The X-band capabilities in the AMDR CDD will be addressed in a separate future Program of Record.

Change Explanations

None

Acronyms and Abbreviations

AMDR - Air and Missile Defense Radar
Ao - Operational Availability
CPD - Capability Production Document
DDG - Guided Missile Destroyer
KPP - Key Performance Parameters
kW - Kilowatt
N/A - Not applicable
TBD - To be determined
TTL - Training Task List

Track to Budget

RDT&E

Appn	BA	PE
Navy	04	0603513N

Project	Name	
4019	Shipboard System Component Development - Radar Upgrades	(Shared) (Sunk)

Notes: Applies to FY 2006-FY 2007

Appn	BA	PE
Navy	05	0604307N

Project	Name	
3044	AEGIS Combat System Engineering - Solid State SPY Radar	(Shared) (Sunk)

Notes: Applies to FY 2006-FY 2007

Appn	BA	PE
Navy	05	0604501N

Project	Name	
3186	Advanced Above Water Sensors - Air and Missile Defense Radar	(Shared) (Sunk)

Notes: Applies to FY 2008-FY 2014

Appn	BA	PE
Navy	05	0604522N

Project	Name
3186	Air and Missile Defense Radar (AMDR) System - Air and Missile Defense Radar

Notes: Applies to FY 2015-FY 2024 (program transitioned from PE0604501N to PE0604522N starting in FY 2015)

Procurement

Appn	BA	PE
Navy	02	0204222N

Line Item	Name	
2122	DDG 51	(Shared)

Notes: Applies to FY 2016-FY 2027

MILCON

Appn	BA	PE
Navy	01	0805376N

Project	Name

P422	Advanced Radar Detection Laboratory	(Sunk)

Notes: Applies to FY 2009

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2013 $M			BY 2013 $M	TY $M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	1986.6	1920.7	2185.3	1968.4	2061.0	2000.0	2063.6
Procurement	3278.3	3270.0	3606.1	3250.4	4075.2	4046.8	4036.3
Flyaway	--	--	--	2515.8	--	--	3115.7
Recurring	--	--	--	2498.4	--	--	3095.7
Non Recurring	--	--	--	17.4	--	--	20.0
Support	--	--	--	734.6	--	--	920.6
Other Support	--	--	--	642.1	--	--	802.2
Initial Spares	--	--	--	92.5	--	--	118.4
MILCON	28.6	28.6	31.5	28.6	27.5	27.5	27.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	5293.5	5219.3	N/A	5247.4	6163.7	6074.3	6127.4

Current APB Cost Estimate Reference

The cost data in this APB represents the AN/SPY-6 AMDR PB20 Budget. dated March 11, 2019

Cost Notes

1) Total Acquisition Cost includes RDT&E, Procurement, and Military Construction (MILCON).
2) Procurement funding for AMDR is also included in the DDG 51 SAR under Program Element: 0204222N. AMDR ship-set procured with FY 2016 funds will be used for an FY 2018 FLT III.
3) CAPE Cost Risks: No cost estimate for the program has been completed in the previous year.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	0	0	0
Procurement	22	22	20
Total	22	22	20

Quantity Notes

Updated procurement quantity to align with the DDG 51 Flight III shipbuilding profile which reduced the total quantity of AN/SPY-6(V)1 systems from 22 to 20.

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	1617.5	38.3	78.3	87.9	80.4	79.8	81.4	0.0	2063.6
Procurement	1332.4	540.0	431.7	412.3	225.2	428.0	229.3	437.4	4036.3
MILCON	27.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2021 Total	2977.4	578.3	510.0	500.2	305.6	507.8	310.7	437.4	6127.4
PB 2020 Total	2957.4	553.0	439.7	454.3	638.5	647.1	384.3	0.0	6074.3
Delta	20.0	25.3	70.3	45.9	-332.9	-139.3	-73.6	437.4	53.1

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	0	0	0	0	0	0	0	0	0	0
Production	0	7	3	2	2	1	2	1	2	20
PB 2021 Total	0	7	3	2	2	1	2	1	2	20
PB 2020 Total	0	7	3	2	2	3	3	2	0	22
Delta	0	0	0	0	0	-2	-1	-1	2	-2

Cost and Funding

Annual Funding By Appropriation

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2006	--	--	--	--	--	--	10.9
2007	--	--	--	--	--	--	35.3
2008	--	--	--	--	--	--	92.9
2009	--	--	--	--	--	--	92.5
2010	--	--	--	--	--	--	164.9
2011	--	--	--	--	--	--	204.2
2012	--	--	--	--	--	--	138.8
2013	--	--	--	--	--	--	194.0
2014	--	--	--	--	--	--	112.7
2015	--	--	--	--	--	--	126.3
2016	--	--	--	--	--	--	227.0
2017	--	--	--	--	--	--	142.3
2018	--	--	--	--	--	--	49.6
2019	--	--	--	--	--	--	26.1
2020	--	--	--	--	--	--	38.3
2021	--	--	--	--	--	--	78.3
2022	--	--	--	--	--	--	87.9
2023	--	--	--	--	--	--	80.4
2024	--	--	--	--	--	--	79.8
2025	--	--	--	--	--	--	81.4
Subtotal	--	--	--	--	--	--	2063.6

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2013 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2006	--	--	--	--	--	--	12.1
2007	--	--	--	--	--	--	38.4
2008	--	--	--	--	--	--	99.1
2009	--	--	--	--	--	--	97.4
2010	--	--	--	--	--	--	171.2
2011	--	--	--	--	--	--	207.0
2012	--	--	--	--	--	--	138.4
2013	--	--	--	--	--	--	191.4
2014	--	--	--	--	--	--	109.6
2015	--	--	--	--	--	--	121.4
2016	--	--	--	--	--	--	214.3
2017	--	--	--	--	--	--	131.9
2018	--	--	--	--	--	--	44.9
2019	--	--	--	--	--	--	23.2
2020	--	--	--	--	--	--	33.3
2021	--	--	--	--	--	--	66.8
2022	--	--	--	--	--	--	73.6
2023	--	--	--	--	--	--	66.0
2024	--	--	--	--	--	--	64.2
2025	--	--	--	--	--	--	64.2
Subtotal	--	--	--	--	--	--	1968.4

1) Total Acquisition Cost includes RDT&E, Procurement, and Military Construction (MILCON). Numbers reflect PB21.

2) Procurement funding for AMDR is included in the DDG 51 SAR under Program Element: 0204222N and reflects a change from 22 to 20 radars. This corresponds with the reduction in ship sets reflected in the DDG51 Flt III BES21 profile change. AMDR ship-set procured with FY16 funds will be used for an FY18 FLT III.

Annual Funding 1611 | Procurement | Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	1	142.1	--	--	142.1	103.2	245.3
2017	2	328.5	--	20.0	348.5	20.1	368.6
2018	1	153.2	--	--	153.2	44.9	198.1
2019	3	451.7	--	--	451.7	68.7	520.4
2020	3	468.7	--	--	468.7	71.3	540.0
2021	2	311.3	--	--	311.3	120.4	431.7
2022	2	291.4	--	--	291.4	120.9	412.3
2023	1	161.9	--	--	161.9	63.3	225.2
2024	2	303.1	--	--	303.1	124.9	428.0
2025	1	168.5	--	--	168.5	60.8	229.3
2026	2	315.3	--	--	315.3	122.1	437.4
Subtotal	20	3095.7	--	20.0	3115.7	920.6	4036.3

Annual Funding 1611 | Procurement | Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	BY 2013 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2016	1	126.5	--	--	126.5	91.9	218.4
2017	2	286.5	--	17.4	303.9	17.6	321.5
2018	1	130.9	--	--	130.9	38.4	169.3
2019	3	378.4	--	--	378.4	57.6	436.0
2020	3	384.9	--	--	384.9	58.6	443.5
2021	2	250.7	--	--	250.7	96.9	347.6
2022	2	230.0	--	--	230.0	95.5	325.5
2023	1	125.3	--	--	125.3	49.0	174.3
2024	2	230.0	--	--	230.0	94.7	324.7
2025	1	125.3	--	--	125.3	45.3	170.6
2026	2	229.9	--	--	229.9	89.1	319.0
Subtotal	20	2498.4	--	17.4	2515.8	734.6	3250.4

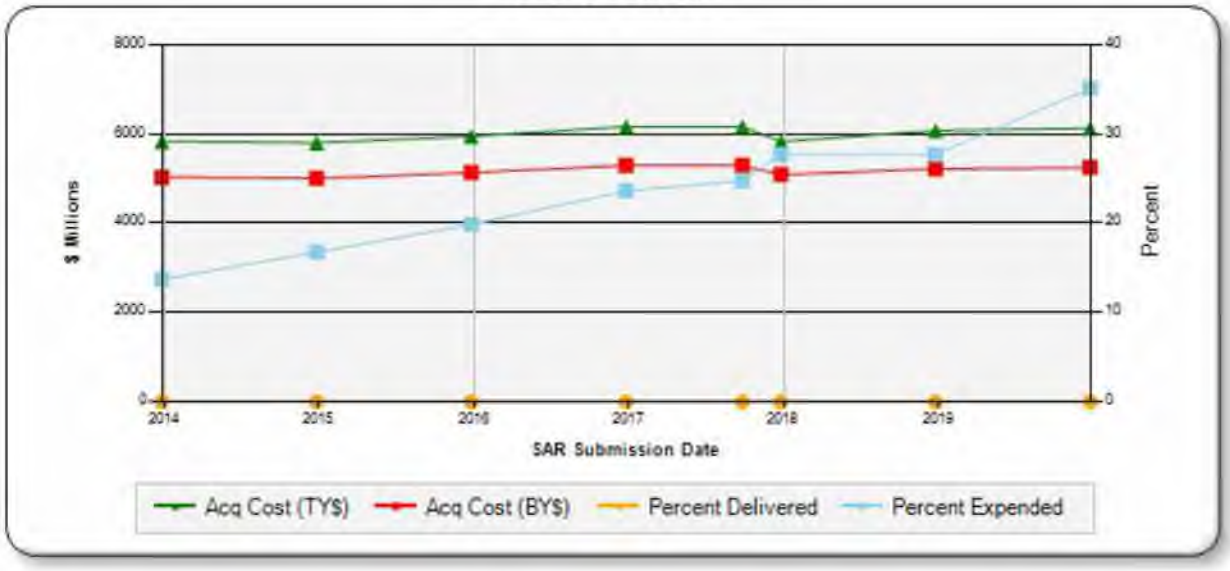
Annual Funding 1205 | MILCON | Military Construction, Navy and Marine Corps	
Fiscal Year	**TY $M** **Total Program**
2009	27.5
Subtotal	27.5

Annual Funding 1205 | MILCON | Military Construction, Navy and Marine Corps	
Fiscal Year	**BY 2013 $M** **Total Program**
2009	28.6
Subtotal	28.6

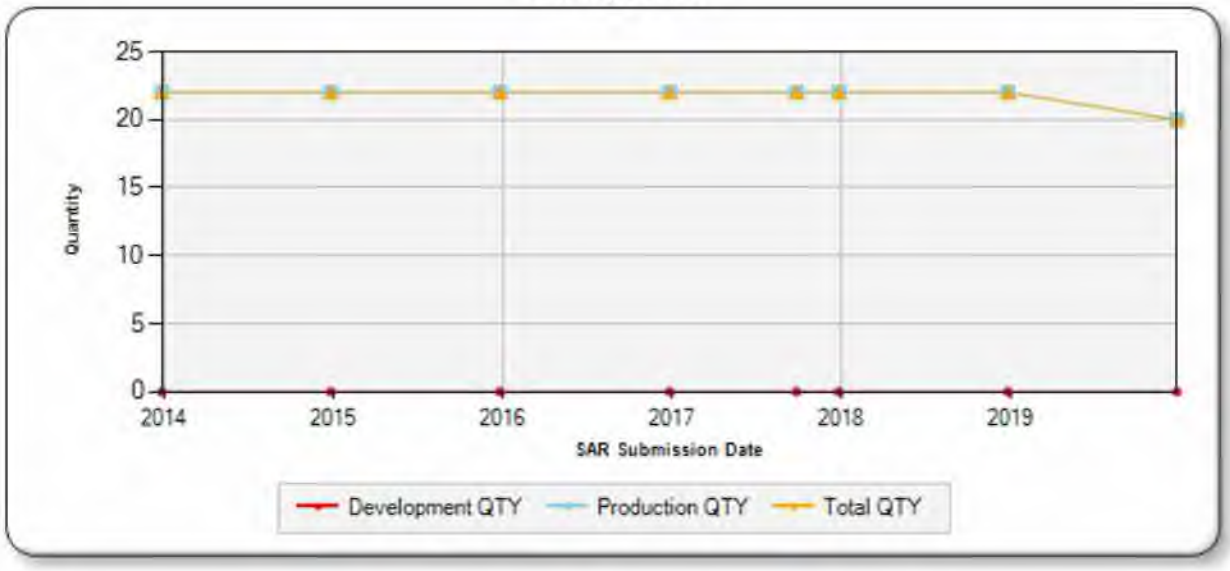
Charts

AMDR first began SAR reporting in December 2013

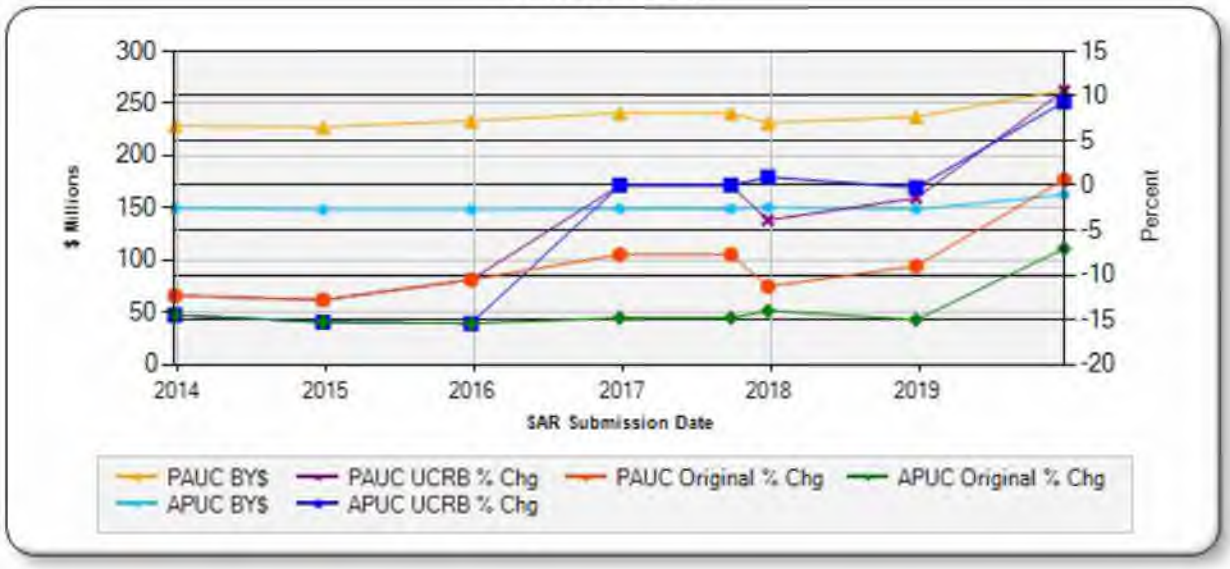
Program Acquisition Cost - AMDR
Base Year 2013 $M



Quantity - AMDR



Unit Cost - AMDR
Base Year 2013 $M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Milestone A (September 2010)	
1.	High Power Amplifiers, Transmit Receive Modules, and Power Supplies with the potential to meet the power requirements for AMDR full functionality and capability.
2.	Active Array Physical Architectures and Scalability to achieve requirements to accommodate larger or smaller radar systems as specific requirements dictate.
3.	Distributed Receiver Exciters required to meet tactical design requirements with tactically representative waveforms.
4.	Large Aperture Digital Beam Forming and Calibration development to accomplish 1000 element, 40 channel unit showing calibration and digital beam forming.
Milestone B (October 2013)	
1.	High Power Amplifiers, Transmit Receive Modules, and Power Supplies with the potential to meet the power requirements for AMDR full functionality and capability.
2.	Distributed Receiver Exciters required to meet tactical design requirements with tactically representative waveforms.
3.	Large Aperture Digital Beam Forming and Calibration development to accomplish 1000 element, 40 channel unit showing calibration and digital beam forming.
4.	Multi-Mission Scheduling and Discrimination Software concerned with all aspects of Ballistic Missile Defense discrimination and radar resource management, including determination of resource needs across mission areas and functions within those missions, prioritization of those resources, and the scheduling of the associated radar pulse trains.
Milestone C (April 2017)	
1.	Ship Integration to conform to allowable size, weight, power, and/or cooling constraints.
2.	AMDR Integration to align with Aegis Advanced Capability Build 20 functional allocations and capabilities requirements and development plan.
3.	Software and Architecture to support EMD phase Developmental Testing activities and Agile software development and testing to support critical System Engineering Technical Reviews and test events leading up to Interim Program Review in Q2 FY2018.
Current Estimate (December 2019)	
1.	There are other RF systems on board each of the AMDR supported ship classes (DDG FLT II, Backfit DDG 51), that operate concurrently. If sufficient electromagnetic isolation between AMDR and other electromagnetic dependent systems on the ship's topside and off board environments cannot be achieved, then electromagnetic CONOPS may be required to successfully integrate AMDR with other collocated equipment and/or topside design changes may be needed to the various ship classes.
2.	If a well-tested initial deceptive Electronic Protection (EP) architecture and capability is not delivered as part of Baseline (BL) 10.0, THEN the Flight III combat system will be vulnerable to deceptive Electronic Attack (EA) threats, negatively impacting Developmental and Operational Testing (DT/OT).

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (February 2020)	
1.	AMDR (BY13$M): Total Acquisition Cost - $5,219.3 (Qty 20); PAUC - $237.2; APUC - $148.6
2.	In the Milestone C ICE, CAPE identified the risk of production approval absent the completion of planned Developmental Testing (DT)-3 activities. There is a risk of discovering issues during testing that could result in the need for design changes. Note: The ICE prepared for Milestone C is the most recent ICE. An ICE was not prepared for the current baseline.
Original Baseline Estimate (October 2013)	
1.	AMDR (BY13$M): Total Acquisition Cost - $5,735.7 (Qty 22); PAUC - $260.7; APUC - $174.9 Risk and Sensitivity analysis - AMDR full and open competition (EMD and 9 LRIP Options) - AMDR EMD phase aggressive software schedule
2.	In the Milestone B ICE, CAPE assessed technical risk as modest for a new development program of AMDR's scale. Software development was identified as the primary concern, particularly with regard to its potential schedule impacts (i.e., completion of development testing, authority to begin LRIP, and delivery of the first production radar). AMDR system weight was identified as an additional concern (i.e., increased weight of AMDR compared to AN/SPY-1D(V) could affect the ship's center of gravity and the service life).
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (December 2019)	
1.	AMDR (BY13$M): Total Procurement Cost - $3,250.4; APUC - $162.5 Risk and Sensitivity analysis - AMDR procurement cost for non-negotiated AMDR units
2.	In the Milestone C ICE, CAPE identified the risk of production approval absent the completion of planned Developmental Testing (DT)-3 activities. There is a risk of discovering issues during testing that could result in the need for design changes. Note: The ICE prepared for Milestone C is the most recent ICE. An ICE was not prepared for the current estimate.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	10/4/2013	10/4/2013
Approved Quantity	16	16
Reference	Milestone B ADM	Milestone B ADM
Start Year	2016	2016
End Year	2024	2024

The Current Total LRIP Quantity is more than 10% of the total production quantity due to timing of Initial Operational Test and Evaluation, IOC, and the need to meet the shipbuilding plan. The Milestone B ADM dated October 4, 2013 included approval for a planned LRIP quantity not to exceed 16 units.

Foreign Military Sales

Notes

It is anticipated there will be foreign demand for AMDR among partners who currently operate the AEGIS Weapon System as well other Nations who have a requirement for Air Defense. As such, Defense Exportability Features (DEF) are included as part of the baseline AMDR design. AMDR is a DEF Pilot program and is investigating specific tasking that can be accomplished to take full advantage of the extensive exportability features incorporated in the baseline AMDR design. Prior to and during Concept Studies and Technology Development phases, AMDR conducted several risk reduction efforts with foreign partners including the Advanced Radar Technology Integrated System Testbed (ARTIST) with the United Kingdom, the Japan/US Radar Research (JUSRR) project, and the recently concluded Australia-U.S. Phased Array Radar (AUSPAR) research project. These were conceived with AMDR subcomponent technology risk reduction and future advanced radar cooperative opportunities specifically in mind. Follow-on cooperative risk reduction programs for AMDR are not likely at this time. Currently, there are no AMDR-related Memorandum Of Agreement (MOAs) in place. No US contracts are in place for AUSPAR. The Australian Government contracted with CEA Technologies on behalf of the US Government for AUSPAR execution. AUSPAR concluded on 31 Mar 2015. There are no active International Cooperation efforts in place for AMDR at this time. Follow-on cooperative development, production, and support is being explored with Japan. Spain has also expressed interest in AMDR development. Specific timelines for potential cooperation or sales are still under discussion. The AMDR Technology and Security Assistance Review Board (TTSARB) was signed in October, 2016.

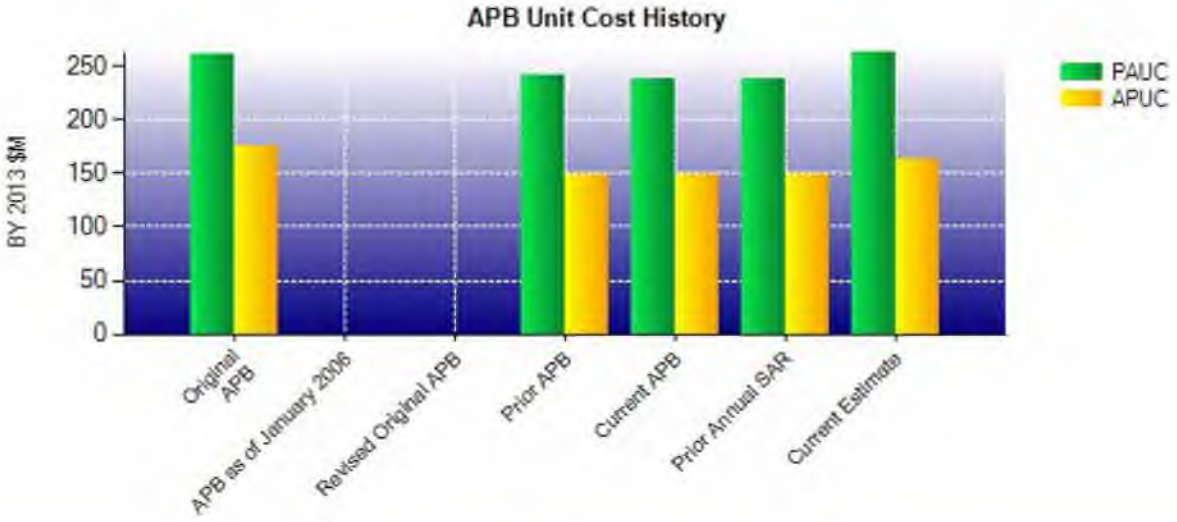
Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2013 $M Current UCR Baseline (Feb 2020 APB)	BY 2013 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	5219.3	5247.4	
Quantity	22	20	
Unit Cost	237.241	262.370	+10.59
Average Procurement Unit Cost			
Cost	3270.0	3250.4	
Quantity	22	20	
Unit Cost	148.636	162.520	+9.34

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2013 $M Original UCR Baseline (Oct 2013 APB)	BY 2013 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	5735.7	5247.4	
Quantity	22	20	
Unit Cost	260.714	262.370	+0.64
Average Procurement Unit Cost			
Cost	3846.9	3250.4	
Quantity	22	20	
Unit Cost	174.859	162.520	-7.06



APB Unit Cost History					
Item	Date	BY 2013 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Oct 2013	260.714	174.859	302.845	214.727
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	Jun 2017	240.614	149.014	280.168	185.236
Current APB	Feb 2020	237.241	148.636	276.105	183.945
Prior Annual SAR	Dec 2018	237.241	148.636	276.105	183.945
Current Estimate	Dec 2019	262.370	162.520	306.370	201.815

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	
302.845	0.750	0.000	0.677	15.214	-5.305	0.000	-34.013	-22.677	280.168

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
280.168	1.510	0.000	-12.940	-3.560	-2.120	0.000	43.312	26.202	306.370

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	
214.727	1.418	0.000	0.677	0.000	2.427	0.000	-34.013	-29.491	185.236

Current SAR Baseline to Current Estimate (TY $M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
185.236	1.525	0.000	-12.940	0.000	-5.825	0.000	15.295	-1.945	201.815

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	Jul 2013	Oct 2013	Oct 2013
Milestone C	N/A	Jul 2017	Apr 2017	Apr 2017
IOC	N/A	Sep 2023	Feb 2024	Aug 2024
Total Cost (TY $M)	N/A	6662.6	6163.7	6127.4
Total Quantity	N/A	22	22	20
PAUC	N/A	302.845	280.168	306.370

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	2061.0	4075.2	27.5	6163.7
Previous Changes				
Economic	-1.2	+24.4	--	+23.2
Quantity	--	--	--	--
Schedule	--	+11.3	--	+11.3
Engineering	-135.7	--	--	-135.7
Estimating	+75.9	-188.0	--	-112.1
Other	--	--	--	--
Support	--	+123.9	--	+123.9
Subtotal	-61.0	-28.4	--	-89.4
Current Changes				
Economic	+0.9	+6.1	--	+7.0
Quantity	--	--	--	--
Schedule	--	-270.1	--	-270.1
Engineering	+64.5	--	--	+64.5
Estimating	-1.8	+71.5	--	+69.7
Other	--	--	--	--
Support	--	+182.0	--	+182.0
Subtotal	+63.6	-10.5	--	+53.1
Total Changes	+2.6	-38.9	--	-36.3
Current Estimate	2063.6	4036.3	27.5	6127.4

Summary BY 2013 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	1986.6	3278.3	28.6	5293.5
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	+38.8	--	+38.8
Engineering	-128.7	--	--	-128.7
Estimating	+62.8	-147.3	--	-84.5
Other	--	--	--	--
Support	--	+100.2	--	+100.2
Subtotal	-65.9	-8.3	--	-74.2
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	-216.4	--	-216.4
Engineering	+49.5	--	--	+49.5
Estimating	-1.8	+58.0	--	+56.2
Other	--	--	--	--
Support	--	+138.8	--	+138.8
Subtotal	+47.7	-19.6	--	+28.1
Total Changes	-18.2	-27.9	--	-46.1
Current Estimate	1968.4	3250.4	28.6	5247.4

Previous Estimate: December 2018

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+0.9
Reduction due to congressional marks related to Advanced Distributed Radar development early to need / integration concurrency. (Engineering)	-14.8	-17.0
Additional funding for continued development including other enhanced capabilities (Engineering)	+64.3	+81.5
Adjustment for current and prior escalation. (Estimating)	-0.4	-0.4
Realignment of funds to match latest program estimate (Estimating)	-1.4	-1.4
RDT&E Subtotal	+47.7	+63.6

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+6.1
Update procurement buy profile to align with the DDG 51 Flight III shipbuilding profile. This includes a total quantity decrease of 2 AN/SPY-6(V)1 systems from 22 to 20, and a stretch-out of the procurement buy profile from FY 2025 to FY 2026. (Schedule)	-216.4	-270.1
Adjustment for current and prior escalation. (Estimating)	-2.1	-1.9
Increase associated with less favorable hardware pricing due to procuring more than 2 units per year under existing contract. Updated estimate for follow-on production contract. (Estimating)	+73.1	+88.9
Refined estimate for Contract Field Services and moved waterfront test efforts out of End Item Recurring Flyaway and consolidate under the 'Other Support' category. (Estimating)	-13.0	-15.5
Adjustment for current and prior escalation. (Support)	0.0	-0.5
Increase in Other Support related to increased Waterfront Testing and Onboard Test and Evaluation efforts. Additionally, all support efforts were extended by 1 year to align with the DDG 51 Flight III shipbuilding profile. (Support)	+140.2	+181.7
Decrease in Initial Spares reflects changes to align with the DDG 51 Flight III shipbuilding profile. (Support)	-1.4	+0.8
Procurement Subtotal	-19.6	-10.5

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate Initial Production (CLIN 0201)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752-3770
Contract Number: N00024-14-C-5315/2
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: December 13, 2016
Definitization Date: December 13, 2016

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
182.2	202.5	1	182.2	202.5	1	202.5	202.5

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2019)	-36.0	-13.8
Previous Cumulative Variances	-25.6	-28.4
Net Change	-10.4	+14.6

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to continued high labor costs for added complexity of Digital Receiver Exciter (DREX) and Digital Beamforming (DBF) test setup efforts and higher material costs due to having to procure material not part of original design.

The favorable net change in the schedule variance is due to recovery for mechanical structure modeling as well as schedule recovery on touch work and support.

Notes

1. Earned Value Management (EVM) table based on IPMR delivered January 21, 2020 and reflects performance through December 31, 2019.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate Initial Production (CLIN 0303AA)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752-3770
Contract Number: N00024-14-C-5315/3
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: May 01, 2017
Definitization Date: May 01, 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
128.5	142.8	1	128.5	142.8	1	142.8	142.8

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2019)	-19.0	-22.6
Previous Cumulative Variances	-9.5	-1.0
Net Change	-9.5	-21.6

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to higher material costs, first time design/build issues, and updated pricing of components.

The unfavorable net change in the schedule variance is due to delays in schedule tasks, material delivery, and labor.

Notes

1. Earned Value Management (EVM) table based on IPMR delivered January 21, 2020 and reflects performance through December 31, 2019.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate Initial Production (CLIN 0303AB)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752-3770
Contract Number: N00024-14-C-5315/4
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: May 01, 2017
Definitization Date: May 01, 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
126.5	140.6	1	126.5	140.6	1	140.6	140.6

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2019)	-11.9	-33.9
Previous Cumulative Variances	-7.1	+1.2
Net Change	-4.8	-35.1

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to touch and support were higher than planned, and material higher than planned.

The unfavorable net change in the schedule variance is due to hardware and material delivery delays.

Notes

1 Earned Value Management (EVM) table based on IPMR delivered January 21, 2020 and reflects performance through December 31, 2019.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate initial Production (CLIN 0401)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752
Contract Number: N00024-14-C-5315/5
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: April 19, 2018
Definitization Date: April 19, 2018

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
136.5	151.7	1	136.5	151.7	1	143.6	150.6

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2019)	-4.4	-32.5
Previous Cumulative Variances	-1.0	-10.4
Net Change	-3.4	-22.1

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to engineering required to resolve issues during the build of product line TRIMMs and pricing for TRIMM Material.

The unfavorable net change in the schedule variance is due to late receipt of material and reductions in rate to improve yields.

Notes

1. Earned Value Management (EVM) table based on IPMR delivered January 21, 2020 and reflects performance through December 31, 2019.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Integration and Production Support (I&PS)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752
Contract Number: N00024-19-C-5501/6
Contract Type: Cost Plus Fixed Fee (CPFF)
Award Date: December 08, 2018
Definitization Date: December 18, 2018

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
100.5	N/A	0	100.5	N/A	0	100.5	100.5

Cost and Schedule Variance Explanations

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

Notes

Cost and Schedule Variance reporting is not required on this CPFF contract. This contract includes both RDT&E and Procurement related Engineering Services.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate Initial Production (CLIN 0503AA)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752
Contract Number: N00024-14-C-5315/7
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: March 11, 2019
Definitization Date: March 11, 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
123.3	137.0	1	123.3	137.0	1	133.7	134.7

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2019)	-2.6	+3.2
Previous Cumulative Variances	--	--
Net Change	-2.6	+3.2

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to labor transfer of hours.

The favorable cumulative schedule variance is due to early receipt of hardware.

Notes

1. Earned Value Management (EVM) table based on IPMR delivered January 21, 2020 and reflects performance through December 31, 2019.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate Initial Production (CLIN 0503AB)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752-3770
Contract Number: N00024-14-C-5315/8
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: March 11, 2019
Definitization Date: March 11, 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
122.7	136.3	1	122.7	136.3	1	134.0	134.5

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2019)	-0.7	+0.2
Previous Cumulative Variances	--	--
Net Change	-0.7	+0.2

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to minor anomalies in the very early stages of construction that have no impact on production.

The favorable cumulative schedule variance is due to minor anomalies in the very early stages of construction that have no impact on production schedule.

Notes

1. Earned Value Management (EVM) table based on IPMR delivered January 21, 2020 and reflects performance through December 31, 2019.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate Initial Production (CLIN 0503AC)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752-3770
Contract Number: N00024-14-C-5315/9
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: March 11, 2019
Definitization Date: March 11, 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
156.7	174.1	1	156.7	174.1	1	150.3	153.6

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2019)	-0.2	+3.0
Previous Cumulative Variances	--	--
Net Change	-0.2	+3.0

Cost and Schedule Variance Explanations

The unfavorable cumulative cost variance is due to minor anomalies in the very early stages of construction that have no impact on production.

The favorable cumulative schedule variance is due to minor anomalies in the very early stages of construction that have no impact on production schedule.

Notes

1. Earned Value Management (EVM) table based on IPMR delivered January 21, 2020 and reflects performance through December 31, 2019.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate Initial Production (CLIN 0602AA)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752-3770
Contract Number: N00024-14-C-5315/10
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: December 20, 2019
Definitization Date: December 20, 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
125.2	139.1	1	125.2	139.1	1	125.2	125.2

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 earned value management reporting has not yet commenced due to just exercising the option in Dec 2019. We will begin EV reporting starting Q4FY2020.

Notes

1. On December 20, 2019 AMDR exercised contract options for two LRIP units and associated non-recurring engineering. Would expect to see EV reporting starting FY20 Q4.

Contract Identification

Appropriation: Procurement
Contract Name: AMDR Low Rate Initial Production (CLIN 0602AB)
Contractor: Raytheon Company
Contractor Location: 1001 Boston Post Rd East
Marlborough, MA 01752-3770
Contract Number: N00024-14-C-5315/11
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: December 20, 2019
Definitization Date: December 20, 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
124.8	138.6	1	124.8	138.6	1	124.8	124.8

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 earned value management reporting has not yet commenced due to just exercising the option in Dec 2019. We will begin EV reporting starting Q4FY2020.

Notes

1. On December 20, 2019 AMDR exercised contract options for two LRIP units and associated non-recurring engineering. Would expect to see EV reporting starting FY20 Q4.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	20	0.00%
Total Program Quantity Delivered	0	0	20	0.00%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	6127.4	Years Appropriated	15
Expended to Date	2149.8	Percent Years Appropriated	71.43%
Percent Expended	35.09%	Appropriated to Date	3555.7
Total Funding Years	21	Percent Appropriated	58.03%

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

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	January 31, 2020
Source of Estimate:	POE
Quantity to Sustain:	20
Unit of Measure:	System
Service Life per Unit:	40.00 Years
Fiscal Years in Service:	FY 2021 - FY 2072

Each AMDR System includes four fully populated AMDR-S array faces and a Radar Suite Controller.

Sustainment Strategy

In order to meet Operational Availability (Ao) KPP and O&S Cost Key System Attribute requirements AMDR will implement a performance-based product support strategy involving Naval Surface Warfare Center (NSWC) Crane Division, NSWC Port Hueneme Division, and NSWC Dahlgren Division, Defense Logistics Agency, Naval Supply Systems Command, and Center for Surface Combat Systems Dahlgren.

The AMDR system employs a two level maintenance philosophy (organizational to depot) with onboard maintenance performed by the ship's crew. The ship's operational tempo is assumed to be 180 days on station. Maintenance (preventative and corrective) can occur anytime during the 180 days on station as long as the system is not degraded by the maintenance activity. Commercial Off The Shelf (COTS) processing equipment refresh and upgrades will be implemented using a 'refresh by attrition' approach combined with an eight year refresh cycle. The planned software sustainment strategy for AMDR includes post-delivery routine software maintenance and software updates every two years to address new threats and other emergent capability requirements.

Antecedent Information

The antecedent system is AN/SPY-1D(V). AN/SPY-1D(V) has fielded 32 systems, each with a planned service life of 35 years. The source of the cost estimate is the Naval Sea Systems Command Systems Engineering Directorate - Cost Engineering and Industrial Analysis Division AN/SPY-1D(V) FRP ICE dated November 14, 2011 with the following adjustment: incorporated same forward pricing rate recommendation (FPRR) escalation rate as AMDR and added hardware modification costs based on percentage allocation of Aegis weapon system MK-7 hardware modification cost. The AN/SPY-1D(V) Sustaining Support cost element does not include costs for Operating Equipment Replacement, whereas AMDR does.

Annual O&S Costs BY2013 $M		
Cost Element	**AMDR Average Annual Cost Per System**	**AN/SPY-1D(V) (Antecedent) Average Annual Cost Per System**
Unit-Level Manpower	--	--
Unit Operations	--	--
Maintenance	1.833	2.542
Sustaining Support	2.486	1.489
Continuing System Improvements	0.615	1.417
Indirect Support	--	--
Other	--	--
Total	4.934	5.448

For AMDR, Unit-Level Manpower, Unit Operations, and Indirect Support are not reported because these costs are considered Ship Level costs.

Item	Total O&S Cost $M			
	AMDR			AN/SPY-1D(V) (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	3821.0	4203.1	3947.4	6410.8
Then Year	7227.6	N/A	7788.4	N/A

Current Estimate includes System Operations and Maintenance, Navy (OMN) (TY $7,486.9M, BY 2013 $3,794.7M) and Fleet OMN (TY $301.6M, BY 2013 $152.7M).

Equation to Translate Annual Cost to Total Cost

Total System O&S [BY 2013 $3,947.4M] = unitized cost [BY 2013 $4.934M] * number of systems [20] * service life per system [40].

O&S Cost Variance		
Category	**BY 2013 $M**	**Change Explanations**
Prior SAR Total O&S Estimates - Dec 2018 SAR	3821.0	
Programmatic/Planning Factors	-157.0	Profile change: 22 to 20 ship sets
Cost Estimating Methodology	0.0	
Cost Data Update	-158.3	Updated spares, repairs and tech refresh costs based on current vendor pricing
Labor Rate	122.0	Updated Warfare Center and contractor labor rates
Energy Rate	0.0	

Technical Input	330.6	Increase in Sustaining/Maintenance Engineering and Software Maintenance including extending the last Fiscal Year in service from FY 2071 to FY 2072.
Other	-10.9	Inflation indices updated to PB21
Total Changes	126.4	
Current Estimate	3947.4	

Disposal Estimate Details

Date of Estimate: January 31, 2020

Source of Estimate: POE

Disposal/Demilitarization Total Cost (BY 2013 $M): 20.7