Selected Acquisition Report (SAR)

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

Air and Missile Defense Radar (AMDR)

As of FY 2015 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Common Acronyms and Abbreviations

Acq O&M - Acquisition-Related Operations and Maintenance
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
BA - Budget Authority/Budget Activity
BY - Base Year
DAMIR - Defense Acquisition Management Information Retrieval
Dev Est - Development Estimate
DoD - Department of Defense
DSN - Defense Switched Network
Econ - Economic
Eng - Engineering
Est - Estimating
FMS - Foreign Military Sales
FY - Fiscal Year
IOC - Initial Operational Capability
$K - Thousands of Dollars
LRIP - Low Rate Initial Production
$M - Millions of Dollars
MILCON - Military Construction
N/A - Not Applicable
O&S - Operating and Support
Oth - Other
PAUC - Program Acquisition Unit Cost
PB - President's Budget
PE - Program Element
Proc - Procurement
Prod Est - Production Estimate
QR - Quantity Related
Qty - Quantity
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
Sch - Schedule
Spt - Support
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting

Program Information

Program Name

Air and Missile Defense Radar (AMDR)

DoD Component

Navy

Responsible Office

Responsible Office

CAPT Douglas Small
1333 Isaac Hull Ave, SE
Washington, DC 20376-7101

douglas.small@navy.mil

Phone 202-781-3422
Fax --
DSN Phone --
DSN Fax --
Date Assigned October 23, 2010

References

SAR Baseline (Development Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated October 03, 2013

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated October 3, 2013

Mission and Description

Mission: The Air and Missile Defense Radar (AMDR) suite will support maritime missions for Joint Air and Missile Defense and Joint Control Operations.

- Ballistic Missile Defense (BMD)
- Air Defense (AD)
- Surface Warfare (SuW)

Description: The AMDR suite will include:

- AMDR-S: S-band radar providing sensitivity for long range detection and engagement of advanced threats
- X-Band: X-band radar is a horizon-search radar based on existing technology
- Radar Suite Controller (RSC): RSC providing (S and X) band radar resource management, coordination and interface to combat system

Executive Summary

This is the initial SAR submission for the US Navy's AMDR program.

AMDR is the Navy's next generation radar system that will address Ballistic Missile Defense and Air Defense capability gaps identified in the Maritime Air and Missile Defense of Joint Forces (MAMDJF) Initial Capabilities Document. The AMDR suite consists of an S-band radar (AMDR-S), X-band radar, and a Radar Suite Controller (RSC). AMDR-S is a new development Integrated Air and Missile Defense radar providing sensitivity for long range detection and engagement of advanced threats. The X-band radar is a horizon-search radar based on existing technology. The RSC provides S and X band radar resource management, coordination, and interface to the combat system. AMDR will be deployed on the Guided Missile Destroyer (DDG) 51 Flight III. The timeline for AMDR-S/RSC development is designed to meet the first unit in yard need date of FY 2019.

The AMDR suite will be delivered through three separate acquisition programs. The AMDR-S/RSC portion received Milestone B approval in October 2013 and was designated an Acquisition Category ID program. For the first 12 ship sets, the X-band radar will be delivered via the AN/SPQ-9B program. For ship sets 13-22, the program office will establish a separately executed program to develop, integrate and test, and procure future X-Band radar sets.

In June of 2009, the Navy awarded three AMDR-S/RSC Concept Studies (CS) contracts to Lockheed Martin, Raytheon, and Northrop Grumman. Under these contracts, each contractor: reviewed and provided feedback on the Government's requirements documents; conducted system engineering trade studies; developed an initial system concept; and developed a draft technology prototype and demonstration plan to achieve Technology Readiness Level 6.

The Government used the results of the CS phase to refine performance requirements and identify technical risks in preparation for transition to the Technology Development (TD) phase. In September 2010, the Navy awarded TD phase contracts to Lockheed Martin, Northrop Grumman and Raytheon. Under these contracts, each contractor: demonstrated maturity of AMDR-S critical technologies; conducted system engineering efforts, including studies and analyses, to develop an initial system design to a level sufficient to conduct a Preliminary Design Review (PDR); conducted Technology Demonstration Review to present its test data and analysis of their demonstrations; conducted a Systems Requirements Review (SRR), System Functional Review (SFR), Test Readiness Review; and provided a TD prototype.

The AMDR program achieved Milestone B in September 2013 and received a signed an Acquisition Decision Memorandum on October 4, 2013. After a full and open competition, an Engineering and Manufacturing Development (E&MD) phase contract was awarded to Raytheon on October 10, 2013. Shortly after contract award, one of the unsuccessful offerors filed a bid protest with the Government Accountability Office that was subsequently withdrawn on January 9, 2014. The program is currently executing a 45-month E&MD contract with Raytheon. The E&MD phase is focusing on the design of the system and development of an affordable and executable manufacturing process leading to a Production Readiness Review. Additional activities during the E&MD phase will include a hardware and a software/system Critical Design Review to assess the completeness of the detailed design and how it supports the performance requirements. E&MD will include integration and test of a single-faced AMDR-S/RSC Engineering Development Model with an AN/SPQ-9B asset at the land-based test site at the Pacific Missile Range Facility in Kauai, HI. The E&MD phase will conclude in an AMDR Milestone C decision.

The FY 2014 budget included a $115M reduction due to delay in the E&MD contract award. There are currently no schedule or technical issues for the program.

The program required two waivers to Section 2366b criteria. The provision requiring a program "…. has received a

preliminary design review (PDR) and conducted a formal post-PDR assessment," was deferred until the E&MD phase. An initial PDR was conducted prior to Milestone B with each of the three TD phase solutions. However, to avoid the cost burden of completing three PDRs for the full AMDR system in a full radar suite design, the program requested and received a waiver to conduct a delta-PDR for hardware and a delta-PDR for software for the E&MD phase contractor only. Once the delta-PDRs for hardware and software are complete, the program will complete the post-PDR assessment. In addition to the PDR waiver, Under Secretary of Defense for Acquisition, Technology, and Logistics approved proceeding into E&MD without Director, Operational Test & Evaluation approval of the AMDR Test and Evaluation Master Plan.

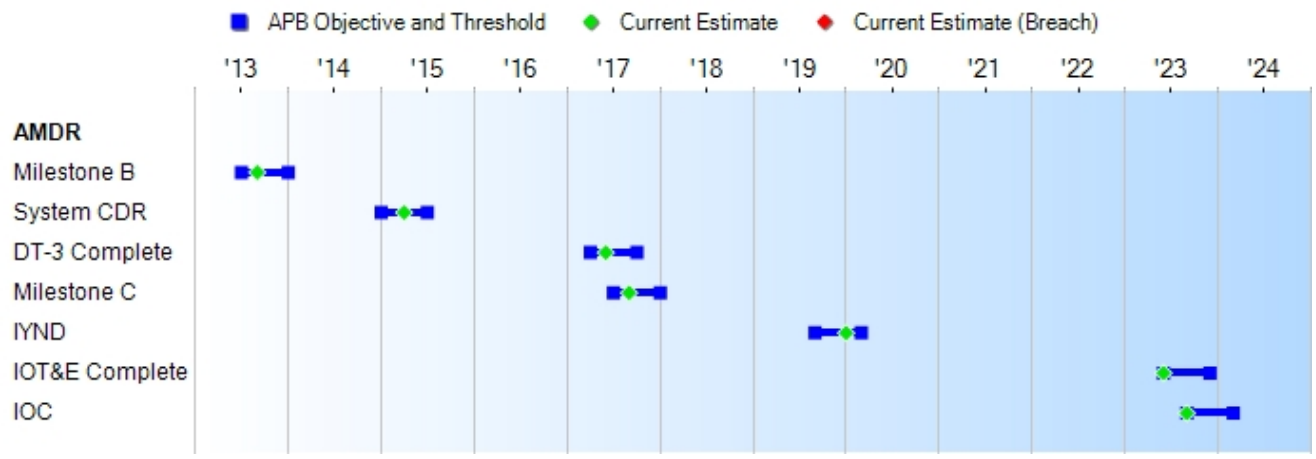
There are no software-related issues for this program at this time.

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



Milestones	SAR Baseline Dev Est	Current APB Development Objective/Threshold		Current Estimate
Milestone B	JUL 2013	JUL 2013	JAN 2014	SEP 2013
System CDR	JAN 2015	JAN 2015	JUL 2015	APR 2015
DT-3 Complete	APR 2017	APR 2017	OCT 2017	JUN 2017
Milestone C	JUL 2017	JUL 2017	JAN 2018	SEP 2017
IYND	SEP 2019	SEP 2019	MAR 2020	JAN 2020
IOT&E Complete	JUN 2023	JUN 2023	DEC 2023	JUN 2023
IOC	SEP 2023	SEP 2023	MAR 2024	SEP 2023

Change Explanations

None

Memo

1. IOT&E Complete dates reflect the planned completion date for IOT&E/Combat System Ship Qualification Test for the Guided Missile Destroyer (DDG) 51 Flight III.

2. IOC date based on the AMDR Capability Development Document. Requirements to reach IOC include: (1) successful completion of IOT&E; (2) all maintenance and training materials, including embedded maintenance training and embedded technical manuals, are available to ship's crew; and (3) logistics support is in place, including onboard spares, supply support and shore-based distance support.

Acronyms and Abbreviations

CDR - Critical Design Review
CSSQT - Combat System Ship Qualification Test
DT - Development Test
IYND - In Yard Need Date

Performance

Characteristics	SAR Baseline Dev Est	Current APB Development Objective/Threshold		Demonstrated Performance	Current Estimate
Availability	Ao ≥0.99	Ao ≥0.99	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.	Maintenance technicians correctly perform ≥ 99% of critical tasks and ≥ 99% of non-critical tasks as defined in the TTL.	Maintenance technicians correctly perform ≥ 99% of critical tasks and ≥ 80% of non-critical tasks as defined in the TTL.	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.	Will satisfy applicable Net Ready KPP elements for all operational activities and information exchanges.	Will satisfy applicable Net Ready KPP elements for joint critical operational activities and information exchanges.	TBD	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 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 for AMDR-S, when commanded by the platform CMS: State 1 consumes no more than 1230 kW total prime power; State 2 consumes no more than 950 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 decrease in survivability of the hull based on DDG 51 live fire equivalent testing (DDG 81 shock trial)	(Objective = Threshold) Exemption - AMDR will be integrated into the DDG 51 hull with no decrease in survivability of the hull based on DDG 51 live fire equivalent testing (DDG 81 shock trial)	Exemption - AMDR will be integrated into the DDG 51 hull with no decrease in survivability of the hull based on DDG 51 live fire equivalent testing (DDG 81 shock trial)	TBD	Exemption - AMDR will be integrated into the DDG 51 hull with no decrease in survivability of the hull based on DDG 51 live fire equivalent testing (DDG 81 shock trial)
Force Protection	(Objective = Threshold) Exemption - Will support host platform requirement	(Objective = Threshold) Exemption - Will support host platform requirement	Exemption - Will support host platform requirement	TBD	Exemption - Will support host platform requirement

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

Requirements Source

The AMDR Capability Development Document (CDD) was signed by the Chief of Naval Operations on April 20, 2013 (Joint Requirements Oversight Council Memo (JROCM) signed June 27, 2013). Specific Key Performance Parameter (KPP) values have been established in the CDD and those requirements have been flowed down to the Top Level Radar Performance (TLRP) and Top Level Requirements (TLR) documents developed by the program. AMDR capability will be codified in a Capability Production Document (CPD) in support of MS C.

The Pre-EMD DAB's Acquisition Decision Memorandum (ADM), dated May 21, 2012, directed a change to the program structure so that it includes only the AMDR S-band array and the Radar Suite Controller (RSC). This APB represents only the S-band and RSC capabilities from the AMDR CDD. The X-band capabilities in the AMDR CDD will be addressed in a separate future Program of Record.

Change Explanations

None

Acronyms and Abbreviations

Ao - Operational Availability
BMD - Ballistic Missile Defense
CMS - Combat Management System
DAB - Defense Acquisition Board
dBsm - Decibels Relative to a Square Meter
DDG - Guided Missile Destroyer
Km - Kilometer
KPP - Key Performance Parameter
kW - kilowatt
MS - Milestone
RCS - Radar Cross Section
TTL - Training Task List

Track to Budget

RDT&E

Appn		BA	PE		
Navy	1319	04	0603513N		
	Project		**Name**		
	4019		Shipboard System Component Development - Radar Upgrades	(Shared)	(Sunk)
	Notes:		Applies to FY 2006 - 2007		
Navy	1319	05	0604307N		
	Project		**Name**		
	3044		AEGIS Combat System Engineering - Solid State SPY Radar	(Shared)	(Sunk)
	Notes:		Applies to FY 2006 - 2007		
Navy	1319	05	0604501N		
	Project		**Name**		
	3186		Advanced Above Water Sensors - Air and Missile Defense Radar	(Shared)	(Sunk)
	Notes:		Applies to FY 2008 - 2014		
Navy	1319	05	0604522N		
	Project		**Name**		
	3186		Advanced Above Water Sensors - Air and Missile Defense Radar		
	Notes:		Applies to FY 2015 - 2023 (program transitions from PE0604501N to PE0604522N in FY 2015).		

Procurement

Appn		BA	PE	
Navy	1611	02	0204222N	
	Line Item		**Name**	
	2122		DDG 51 Class Destroyers	(Shared)

MILCON

Appn		BA	PE
Navy	1205	01	0805376N
	Project		**Name**

P422	Advanced Radar Detection Laboratory	(Sunk)

Cost and Funding

Cost Summary

Total Acquisition Cost and Quantity

Appropriation	BY2013 $M			BY2013 $M	TY $M		
	SAR Baseline Dev Est	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Dev Est	Current APB Development Objective	Current Estimate
RDT&E	1860.0	1860.0	2046.0	1711.2	1911.1	1911.1	1761.4
Procurement	3846.9	3846.9	4231.6	3290.8	4724.0	4724.0	4043.8
Flyaway	--	--	--	2672.0	--	--	3286.2
Recurring	--	--	--	2654.0	--	--	3266.2
Non Recurring	--	--	--	18.0	--	--	20.0
Support	--	--	--	618.8	--	--	757.6
Other Support	--	--	--	521.9	--	--	638.3
Initial Spares	--	--	--	96.9	--	--	119.3
MILCON	28.8	28.8	31.7	28.6	27.5	27.5	27.5
Acq O&M	0.0	0.0	--	0.0	0.0	0.0	0.0
Total	5735.7	5735.7	N/A	5030.6	6662.6	6662.6	5832.7

Confidence Level for Current APB Cost 50% -

Based on the AMDR Independent Cost Estimate (ICE) prepared for the Milestone B Defense Acquisition Board (DAB) review (memo dated May 29, 2013), it is about equally likely that the estimate will prove too low or too high.

Quantity	SAR Baseline Dev Est	Current APB Development	Current Estimate
RDT&E	0	0	0
Procurement	22	22	22
Total	22	22	22

Cost and Funding

Funding Summary

Appropriation and Quantity Summary
FY2015 President's Budget / December 2013 SAR (TY$ M)

Appropriation	Prior	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	To Complete	Total
RDT&E	933.4	125.1	144.7	247.3	100.4	43.1	41.3	126.1	1761.4
Procurement	0.0	0.0	0.0	270.2	356.7	345.5	343.3	2728.1	4043.8
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 2015 Total	960.9	125.1	144.7	517.5	457.1	388.6	384.6	2854.2	5832.7
	--	--	--	--	--	--	--	--	--

Quantity	Undistributed	Prior	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	0	0	0	1	2	2	2	15	22
PB 2015 Total	0	0	0	0	1	2	2	2	15	22
	--	--	--	--	--	--	--	--	--	--

Cost and Funding

Annual Funding By Appropriation

Annual Funding TY$
1319 | RDT&E | Research, Development, Test, and Evaluation, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway TY $M	Non End Item Recurring Flyaway TY $M	Non Recurring Flyaway TY $M	Total Flyaway TY $M	Total Support TY $M	Total Program TY $M
2006	--	--	--	--	--	--	10.9
2007	--	--	--	--	--	--	35.3
2008	--	--	--	--	--	--	92.9
2009	--	--	--	--	--	--	92.5
2010	--	--	--	--	--	--	164.9
2011	--	--	--	--	--	--	204.2
2012	--	--	--	--	--	--	138.8
2013	--	--	--	--	--	--	193.9
2014	--	--	--	--	--	--	125.1
2015	--	--	--	--	--	--	144.7
2016	--	--	--	--	--	--	247.3
2017	--	--	--	--	--	--	100.4
2018	--	--	--	--	--	--	43.1
2019	--	--	--	--	--	--	41.3
2020	--	--	--	--	--	--	32.3
2021	--	--	--	--	--	--	30.5
2022	--	--	--	--	--	--	32.9
2023	--	--	--	--	--	--	30.4
Subtotal	**--**	**--**	**--**	**--**	**--**	**--**	**1761.4**

Annual Funding BY$
1319 | RDT&E | Research, Development, Test, and Evaluation, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway BY 2013 $M	Non End Item Recurring Flyaway BY 2013 $M	Non Recurring Flyaway BY 2013 $M	Total Flyaway BY 2013 $M	Total Support BY 2013 $M	Total Program BY 2013 $M
2006	--	--	--	--	--	--	12.1
2007	--	--	--	--	--	--	38.4
2008	--	--	--	--	--	--	99.1
2009	--	--	--	--	--	--	97.4
2010	--	--	--	--	--	--	171.2
2011	--	--	--	--	--	--	206.9
2012	--	--	--	--	--	--	138.2
2013	--	--	--	--	--	--	190.1
2014	--	--	--	--	--	--	120.6
2015	--	--	--	--	--	--	136.9
2016	--	--	--	--	--	--	229.5
2017	--	--	--	--	--	--	91.3
2018	--	--	--	--	--	--	38.4
2019	--	--	--	--	--	--	36.1
2020	--	--	--	--	--	--	27.7
2021	--	--	--	--	--	--	25.6
2022	--	--	--	--	--	--	27.1
2023	--	--	--	--	--	--	24.6
Subtotal	**--**	**--**	**--**	**--**	**--**	**--**	**1711.2**

Annual Funding TY$
1611 | Procurement | Shipbuilding and Conversion, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway TY $M	Non End Item Recurring Flyaway TY $M	Non Recurring Flyaway TY $M	Total Flyaway TY $M	Total Support TY $M	Total Program TY $M
2016	1	186.6	--	20.0	206.6	63.6	270.2
2017	2	287.6	--	--	287.6	69.1	356.7
2018	2	278.5	--	--	278.5	67.0	345.5
2019	2	277.8	--	--	277.8	65.5	343.3
2020	2	282.3	--	--	282.3	65.5	347.8
2021	2	287.2	--	--	287.2	65.0	352.2
2022	2	292.7	--	--	292.7	66.1	358.8
2023	3	447.3	--	--	447.3	96.6	543.9
2024	2	303.9	--	--	303.9	67.0	370.9
2025	3	464.5	--	--	464.5	97.3	561.8
2026	1	157.8	--	--	157.8	34.9	192.7
Subtotal	**22**	**3266.2**	**--**	**20.0**	**3286.2**	**757.6**	**4043.8**

Annual Funding BY$
1611 | Procurement | Shipbuilding and Conversion, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway BY 2013 $M	Non End Item Recurring Flyaway BY 2013 $M	Non Recurring Flyaway BY 2013 $M	Total Flyaway BY 2013 $M	Total Support BY 2013 $M	Total Program BY 2013 $M
2016	1	168.1	--	18.0	186.1	57.3	243.4
2017	2	254.0	--	--	254.0	61.1	315.1
2018	2	241.2	--	--	241.2	58.0	299.2
2019	2	235.8	--	--	235.8	55.7	291.5
2020	2	235.0	--	--	235.0	54.5	289.5
2021	2	234.4	--	--	234.4	53.0	287.4
2022	2	234.2	--	--	234.2	52.8	287.0
2023	3	350.8	--	--	350.8	75.8	426.6
2024	2	233.7	--	--	233.7	51.5	285.2
2025	3	350.2	--	--	350.2	73.3	423.5
2026	1	116.6	--	--	116.6	25.8	142.4
Subtotal	**22**	**2654.0**	**--**	**18.0**	**2672.0**	**618.8**	**3290.8**

Procurement funding for AMDR is also included in the DDG 51 Selected Acquisition Report under Program Element: 0204222N.

Annual Funding TY$
1205 | MILCON | Military Construction, Navy and Marine Corps

Fiscal Year	Total Program TY $M
2009	27.5
Subtotal	**27.5**

Annual Funding BY$
1205 | MILCON | Military Construction, Navy and Marine Corps

Fiscal Year	Total Program BY 2013 $M
2009	28.6
Subtotal	**28.6**

Low Rate Initial Production

	Initial LRIP Decision	Current Total LRIP
Approval Date	10/4/2013	10/4/2013
Approved Quantity	16	16
Reference	Milestone B Acquisition Decision Memorandum (ADM)	Milestone B ADM
Start Year	2016	2016
End Year	2023	2023

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 Acquisition Decision Memorandum dated October 4, 2013 included approval for a planned LRIP quantity not to exceed 16 units.

Foreign Military Sales

None

Nuclear Costs

None

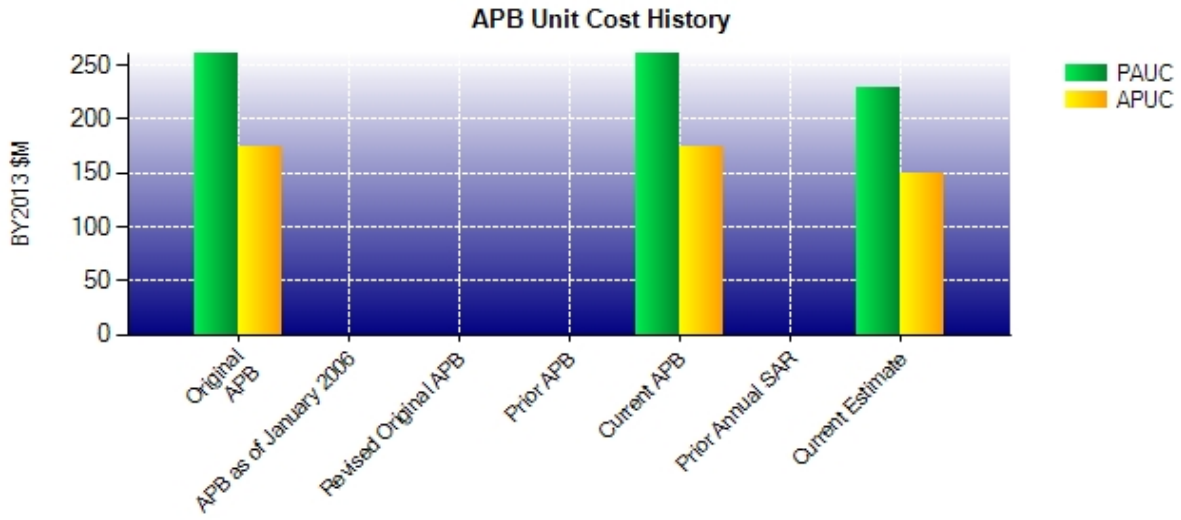
Unit Cost

Unit Cost Report

Unit Cost	BY2013 $M Current UCR Baseline (OCT 2013 APB)	BY2013 $M Current Estimate (DEC 2013 SAR)	BY % Change
Program Acquisition Unit Cost (PAUC)			
Cost	5735.7	5030.6	
Quantity	22	22	
Unit Cost	260.714	228.664	-12.29
Average Procurement Unit Cost (APUC)			
Cost	3846.9	3290.8	
Quantity	22	22	
Unit Cost	174.859	149.582	-14.46

Unit Cost	BY2013 $M Original UCR Baseline (OCT 2013 APB)	BY2013 $M Current Estimate (DEC 2013 SAR)	BY % Change
Program Acquisition Unit Cost (PAUC)			
Cost	5735.7	5030.6	
Quantity	22	22	
Unit Cost	260.714	228.664	-12.29
Average Procurement Unit Cost (APUC)			
Cost	3846.9	3290.8	
Quantity	22	22	
Unit Cost	174.859	149.582	-14.46

Unit Cost History



		BY2013 $M		TY $M	
	Date	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	N/A	N/A	N/A	N/A	N/A
Current APB	OCT 2013	260.714	174.859	302.845	214.727
Prior Annual SAR	N/A	N/A	N/A	N/A	N/A
Current Estimate	DEC 2013	228.664	149.582	265.123	183.809

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY $M)

Initial PAUC Dev Est	Changes								PAUC Current Est
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
302.845	0.436	0.000	0.000	0.000	-10.973	0.000	-27.185	-37.722	265.123

Current SAR Baseline to Current Estimate (TY $M)

Initial APUC Dev Est	Changes								APUC Current Est
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
214.727	0.405	0.000	0.000	0.000	-4.136	0.000	-27.186	-30.917	183.809

SAR Baseline History

Item/Event	SAR Planning Estimate (PE)	SAR Development Estimate (DE)	SAR Production Estimate (PdE)	Current Estimate
Milestone A	N/A	N/A	N/A	N/A
Milestone B	N/A	JUL 2013	N/A	SEP 2013
Milestone C	N/A	JUL 2017	N/A	SEP 2017
IOC	N/A	SEP 2023	N/A	SEP 2023
Total Cost (TY $M)	N/A	6662.6	N/A	5832.7
Total Quantity	N/A	22	N/A	22
Prog. Acq. Unit Cost (PAUC)	N/A	302.845	N/A	265.123

Cost Variance

Summary Then Year $M				
	RDT&E	Proc	MILCON	Total
SAR Baseline (Dev Est)	1911.1	4724.0	27.5	6662.6
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes				
Economic	+0.5	+8.9	+0.2	+9.6
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-150.2	-91.0	-0.2	-241.4
Other	--	--	--	--
Support	--	-598.1	--	-598.1
Subtotal	-149.7	-680.2	--	-829.9
Total Changes	-149.7	-680.2	--	-829.9
CE - Cost Variance	1761.4	4043.8	27.5	5832.7
CE - Cost & Funding	1761.4	4043.8	27.5	5832.7

Summary Base Year 2013 $M				
	RDT&E	Proc	MILCON	Total
SAR Baseline (Dev Est)	1860.0	3846.9	28.8	5735.7
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-148.8	-73.7	-0.2	-222.7
Other	--	--	--	--
Support	--	-482.4	--	-482.4
Subtotal	-148.8	-556.1	-0.2	-705.1
Total Changes	-148.8	-556.1	-0.2	-705.1
CE - Cost Variance	1711.2	3290.8	28.6	5030.6
CE - Cost & Funding	1711.2	3290.8	28.6	5030.6

Initial SAR - Above variances (if any) reflect changes since the SAR Baseline/APB.
SAR Baseline Reference: Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated October 03, 2013

RDT&E	$M	
Current Change Explanations	**Base Year**	**Then Year**
Revised escalation indices. (Economic)	N/A	+0.5
Adjustment for current and prior escalation. (Estimating)	-2.1	-2.1
Revised estimate based on contract pricing for Engineering and Manufacturing Development (E&MD) being less than Government estimate. (Estimating)	-146.7	-148.1
RDT&E Subtotal	-148.8	-149.7

Procurement	$M	
Current Change Explanations	**Base Year**	**Then Year**
Revised escalation indices. (Economic)	N/A	+8.9
Revised estimate based on contract pricing for Low Rate Initial Production (LRIP) units being less than Government estimates. (Estimating)	-73.7	-91.0
Decrease in Other Support due to contract pricing for LRIP support being less than Government estimates. (Support)	-482.3	-598.1
Decrease in Initial Spares. (Support)	-0.1	0.0
Procurement Subtotal	-556.1	-680.2

MILCON	$M	
Current Change Explanations	**Base Year**	**Then Year**
Revised escalation indices. (Economic)	N/A	+0.2
Adjustment for current and prior escalation. (Estimating)	-0.2	-0.2
MILCON Subtotal	-0.2	0.0

Contracts

Appropriation: RDT&E	
Contract Name	**AMDR Engineering and Manufacturing Development**
Contractor	Raytheon Company
Contractor Location	528 Boston Post Road Sudbury, MA 01776
Contract Number, Type	N00024-14-C-5315, CPIF
Award Date	October 10, 2013
Definitization Date	October 10, 2013

Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price at Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
385.7	N/A	0	385.7	N/A	0	385.7	385.7

Variance	Cost Variance	Schedule Variance
Cumulative Variances To Date	0.0	0.0
Previous Cumulative Variances	--	--
Net Change	+0.0	+0.0

Cost and Schedule Variance Explanations

None

General Contract Variance Explanation

EVM data not yet available. Integrated Baseline Review (IBR) planned to occur in June 2014.

Contract Comments

This is the first time this contract is being reported.

Deliveries and Expenditures

Delivered to Date	Plan to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	22	0.00%
Total Program Quantity Delivered	0	0	22	0.00%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	5832.7	Years Appropriated	9
Expended to Date	800.1	Percent Years Appropriated	42.86%
Percent Expended	13.72%	Appropriated to Date	1086.0
Total Funding Years	21	Percent Appropriated	18.62%

The above data is current as of 3/10/2014.

Operating and Support Cost

AMDR

Assumptions and Ground Rules

Cost Estimate Reference:
The source of this estimate is the Office of the Secretary of Defense (OSD) Cost Assessment and Program Evaluation (CAPE) Milestone (MS) B Independent Cost Estimate (ICE) which was recorded in the Milestone (MS) B Acquisition Decision Memorandum (ADM) dated October 4, 2013.

Sustainment Strategy:
The planned sustainment strategy for AMDR includes post-delivery routine software maintenance, software updates every two years to address new threats and other emergent capability requirements, Commercial Off The Shelf processing equipment upgrades on an 8-year cycle, and a two-level maintenance philosophy (Organization and Depot). AMDR operation and onboard maintenance will be 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.

- Quantity: The total quantity of systems to sustain is 22. Each system includes four fully populated AMDR-S array faces and a Radar Suite Controller (RSC).
- Service Life: Each system will have an operational life of 40 years. The O&S Time Horizon is 50 years (FY 2021 – FY 2070).

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 Systems Engineering Directorate - Cost Engineering and Industrial Analysis Division AN/SPY-1D(V) Full Rate Production ICE dated November 14, 2011. The AN/SPY-1D (V) Sustaining Support cost element does not include costs for Operating Equipment Replacement, whereas AMDR does.

Unitized 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	--	0.192
Unit Operations	--	--
Maintenance	1.177	2.047
Sustaining Support	2.722	1.047
Continuing System Improvements	0.852	0.204
Indirect Support	--	0.086
Other	--	--
Total	4.751	3.576

Unitized Cost Comments:

Costs above reflect average annual cost per system. Total System O&S = unitized cost * number of systems * service life per system. For AMDR, Unit-Level Manpower, Unit Operations, and Indirect Support are not reported because they are considered Ship Level Costs.

	Total O&S Cost $M			
	Current Development APB Objective/Threshold		Current Estimate	
	AMDR		AMDR	AN/SPY-1D(V) (Antecedent)
Base Year	4181.3	4599.4	4181.3	4005.6
Then Year	7857.3	N/A	7857.3	N/A

Total O&S Costs Comments:

Objective O&S costs include System Operations and Maintenance, Navy (OMN) (TY $6,415.1M, BY 2013 $3,385.7M) and Fleet OMN (TY $1,442.1M, BY 2013 $795.6M). Demilitarization and Disposal costs are not included (TY $74.4M; BY 2013 $30.2M). Base Year values in "Total O&S Cost" table reflect BY 2013.

Disposal Costs:

Demilitarization and Disposal costs for AMDR have been estimated at $30.2M BY 2013 / $74.4M TY for all 22 systems and are not reflected in the O&S costs. The source of this estimate is the OSD CAPE MS B ICE APB which was recorded in the MS B ADM dated October 4, 2013.