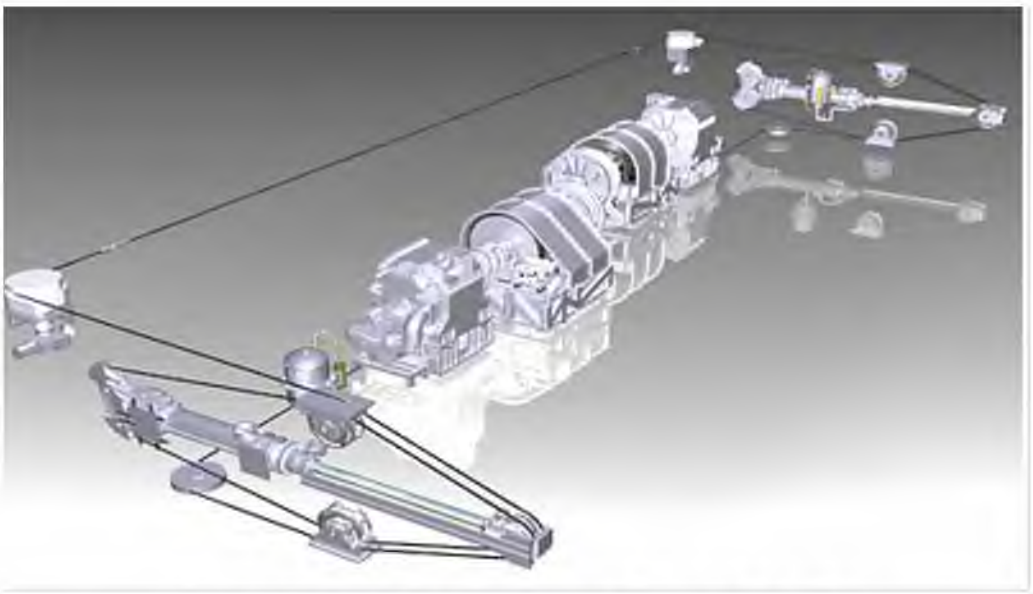
Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-529



Advanced Arresting Gear (AAG)

As of FY 2019 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Sensitivity Originator

No originator info Available at this time.

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)

Program Information

Program Name
Advanced Arresting Gear (AAG)

DoD Component
Navy

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Date Assigned: September 18, 2014

References

SAR Baseline (Development Estimate)

Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN(RDA)) Approved Acquisition Program Baseline (APB) dated December 20, 2016

Approved APB

Under Secretary of Defense (Acquisition, Technology & Logistics) Approved Acquisition Program Baseline (APB) dated November 17, 2017

Mission and Description

The Advanced Arresting Gear (AAG) program is a system level acquisition for a new arresting gear for the GERALD R. FORD-class (CVN 78) aircraft carrier. AAG is designed to provide total life cycle savings by reducing O&M costs when compared to the NIMITZ-class (CVN 68). AAG provides new operational capabilities required by the GERALD R. FORD-class, which include the ability to safely and efficiently recover both heavier and faster aircraft as well as light weight unmanned air vehicles that will enter the fleet in the future.

Executive Summary

Program Highlights Since Last Report

The December 2016 (ACAT IC) APB was revised to reflect the restructured AAG program and to set a new original baseline estimate for the program in accordance with 10 U.S.C. § 2435(d)(2). The Nunn McCurdy reassessment and certification process was completed on July 12, 2017. The USD(AT&L) ADM also rescinded Milestone Decision Authority from the Navy and designated AAG as an ACAT ID program. This decision was recently reviewed and MDA authority was re-delegated to the Navy Service Acquisition Executive on January 8, 2018 making AAG an ACAT IC program.

The AAG System Design and Development effort is in the process of an over target baseline/over target schedule review to realign the contract's cost and schedule with the CAPE ICE. An AAG CVN 80 Firm Fixed Price option to the CVN 79 contract was awarded on May 18, 2017. This provides efficiencies across configuration management, production and obsolescence across the two ships (CVN 79 and 80) resulting in overall reduced workload and cost for both the Prime Contractor (General Atomics) and the Government. This also provides the Government a more robust hardware delivery schedule, minimizing changes to the ship's construction sequence and reducing the ship's overall construction cost.

To date, the AAG system at the Lakehurst-based Jet Car Track Site (JCTS) successfully completed 1,789 dead load arrestments, simulating fleet aircraft at various recovery speeds and weights, and the system at Lakehurst's Runway Arrested Landing Site (RALS) successfully completed 351 F/A-18E/F arrestments. The AAG Aircraft Recovery Bulletin (ARB), released on February 27, 2017 was used to support completion of CVN 78 Aircraft Compatibility Testing as well as Independent Steaming Events (ISEs). The initial AAG ARB for FA-18E/F supported the first four AAG aircraft recoveries aboard CVN 78 on July 28, 2017. AAG successfully completed 83 recoveries during ISE-2, 259 during ISE-3, and 401 additional recoveries during ISE-5, using all three wires and Energy Absorber Systems. Furthermore, on January 19, 2018 during ISE-5, AAG completed 135 recoveries in a single day. The CVN 78 AAG system and flight deck crew demonstrated proficiency in both day and night flight operations, executing 82 day recoveries during a 4 hour flight period and 44 night recoveries during a 3 hour period. The AAG system demonstrated promising performance and added a significant amount of data to the ongoing system reliability growth program.

The AAG program is working through normal developmental software issues as the system is being updated to meet the full range of air wing performance requirements for all type model series aircraft. As such, the system's Dynamic Control System and health monitoring software are undergoing extensive testing at both JCTS and RALS. Shipboard testing of the current software with F/A-18E/F aircraft continued during available ISE periods with minimal failures or issues. Based on current progress, it is expected that the ARB encompassing F/A-18E/F, EA-18G, E-2C, E-2D, and C-2A in support of post-shakedown availability flight operations will be completed by the end of 2018.

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

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
March 2015	PMA 251 request to re-designate Advanced Arresting Gear (AAG) as ACAT IC program.
June 2015	ASN request to OSD to reclassify AAG as an ACAT IC program.
July 2015	AAG reclassified as an ACAT IC program.
December 2016	Navy Center for Cost Analysis completed the Component Cost Position for AAG.
December 2016	Section 125 of the National Defense Authorization Act includes a requirement to perform a Nunn-McCurdy review of AAG using the 2009 APB.
May 2017	PMA 251 submitted a Nunn McCurdy SAR in accordance with the NDAA FY 2017 Section 125.
May 2017	AAG CVN 80 Option for the CVN 79 contract was awarded.
July 2017	The Nunn McCurdy review and certification of AAG was completed and documented in the MEMORANDUM FOR UNDER SECRETARY OF DEFENSE (ACQUISITION, TECHNOLOGY & LOGISTICS, Certification of Cost Estimates for the Advanced Arresting Gear Program, July 2017 Nunn McCurdy Certification ADM was issued July 2017.
November 2017	AAG received an adjusted APB based on the CAPE ICE completed July 2017 for the Nunn McCurdy review. This APB was approved November 2017 and will become the original baseline.
December 2017	Submitted the AAG Software plan addressing software safety and requirements that reflect the operational concept that addresses the AAG Nunn McCurdy Certification ADM.
January 2018	AAG was reclassified as an ACAT IC.

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 Development Estimate	Current APB Development Objective/Threshold		Current Estimate	
Milestone A	Jul 2003	Jul 2003	Jul 2003	Jul 2003	
Milestone B	Feb 2005	Feb 2005	Feb 2005	Feb 2005	
IT-B3 JCTS complete	Mar 2019	Aug 2020	Feb 2021	Aug 2020	(Ch-1)
Milestone C	Sep 2019	Aug 2021	Feb 2022	Aug 2021	(Ch-1)
IOT&E	Apr 2020	Aug 2021	Feb 2022	Aug 2021	(Ch-1)
IT-B4 RALS complete	Sep 2020	Dec 2021	Jun 2022	Dec 2021	(Ch-1)
IOC	Jul 2021	Mar 2022	Sep 2022	Mar 2022	(Ch-1)

Change Explanations

(Ch-1) The current estimate for IT-B3 JCTS complete changed from March 2019 to August 2020 based on post Nunn McCurdy guidance. The current estimate for Milestone C changed from September 2019 to August 2021 based on post Nunn McCurdy guidance. The current estimate for IOT&E changed from April 2020 to August 2021 based on post Nunn McCurdy guidance. The current estimate for IT-B4 RALS complete changed from September 2020 to December 2021 based on post Nunn McCurdy guidance. The current estimate for IOC changed from July 2021 to March 2022 based on post Nunn McCurdy guidance.

Notes

1. In accordance with the Assistant Secretary of the Navy (Research, Development and Acquisition) letter dated December 22, 2016, the AAG System Development & Demonstration Phase Exit Criteria for Milestone C is defined as "Successful generation of the Aircraft Recovery Bulletins for the Carrier Airwing that will conduct the first deployment on CVN 78 and the completion of the shipboard CVN Operational Test period OT-C I as defined in the CVN 78 Test and Evaluation Master Plan."

2. AAG IOT&E is based on the CVN 78 OT-C1 part of the Aviation Operational Test Period.

3. In accordance with Department of the Navy, Director of Air Warfare (N98) letter dated February 12, 2016, Advanced Arresting Gear Program of Record Requirements Revision, IOC definition is "AAG IOC will occur when the first AAG configured ship is fully operational, logistically supported, and ready to deploy and conduct air operations."

Acronyms and Abbreviations

IOT&E - Integrated Operational Test and Evaluation
IT - Integration Test
JCTS - Jet Car Track Site
OT - Operational Test
RALS - Runway Arrested Landing Site

Performance

Performance Characteristics				
SAR Baseline Development Estimate	**Current APB Development Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Aircraft Interoperability				
The hookload limits and G-load limits applicable to each aircraft listed in the Development Threshold plus those listed in Table 2 shall not be exceeded when each aircraft engages the AAG at up to its maximum weight, net applied thrust, and maximum aircraft engaging velocity.	The hookload limits and G-load limits applicable to each aircraft listed in the Development Threshold plus those listed in Table 2 shall not be exceeded when each aircraft engages the AAG at up to its maximum weight, net applied thrust, and maximum aircraft engaging velocity.	The hookload limits and G-load limits applicable to C-2A,E-2 Type/Model/Series (TMS), F/A-18, EA-18 TMS, F-35, and T45 aircraft shall not be exceeded when each aircraft engages the AAG at up to its maximum weight, net applied thrust, and maximum aircraft engaging velocity.	TBD	The hookload limits and G-load limits applicable to each aircraft listed in the Development Threshold plus those listed in Table 2 shall not be exceeded when each aircraft engages the AAG at up to its maximum weight, net applied thrust, and maximum aircraft engaging velocity.
Cycle Time JCTS and RALS demonstration				
30 Seconds	30 Seconds	35 Seconds	TBD	30 Seconds
Operational Availability IOT&E demonstration				
0.988	0.988	0.985	TBD	.985
AAG Operating Envelope				
9,000 to 55,000 lbs.	9,000 to 55,000 lbs.	13,360 to 55,000 lbs.	TBD	13,360 to 55,000 lbs.
Barricade Interoperability				
<1 minute / < 3minutes	<1 minute / < 3minutes	<3 minutes / <10 minutes	TBD	<1 minute / < 3minutes
Manning				
45	45	55	TBD	46
Peak Aircraft Recovery Rate				
Recover 28 aircraft in 21 minutes	Recover 28 aircraft in 21 minutes	(T=O) Recover 28 aircraft in 21 minutes	TBD	Recover 28 aircraft in 21 minutes
Human Systems Integration				
Operable and maintainable by 5th to 95th percentile range of operators/maintainers. operator-system interfaces (e.g., switches, displays) will be operated with	Operable and maintainable by 5th to 95th percentile range of operators/maintainers. operator-system interfaces (e.g., switches, displays) will be operated with	(T=O) Operable and maintainable by 5th to 95th percentile range of operators/maintainers. operator-system interfaces (e.g., switches, displays) will be operated with	TBD	Operable and maintainable by 5th to 95th percentile range of operators/maintainers. operator-system interfaces (e.g., switches, displays) will be operated with

minimal errors.	minimal errors.	minimal errors.		minimal errors.

Requirements Reference

AAG CDD dated July 15, 2008, and the Department of the Navy, Program Executive Officer, Aircraft Carriers, Subject: Transfer of one AAG Engine Set from CVN 78 to CVN 79, dated May 19, 2014, and the Department of the Navy,Director, Air Warfare (N98), Subject: AAG POR Requirements Revision dated February 12, 2016.

Change Explanations

None

Notes

1. Aircraft Interoperability (KPP). Removed Navy-Unmanned Combat Air System requirements in accordance with Director, Air Warfare (N98) direction letter dated February 12, 2016.
2. Cycle time JCTS and RALS demonstration (KPP). Separate from the peak recovery rate attribute in Table 3 (AAG Additional Major Attributes) of the AAG CDD.
3. Operation Availability IOT&E demonstration (KPP). These are expected values after system maturity is reached. System maturity is defined as the Navy Support Date plus 25,000 cycles on one ship's system. This should occur not later than CY 2026.
4. AAG Operating Envelope (KSA). Test program prioritized existing MK-7 operating envelope limitations and current airwing Aircraft Recovery Bulletins based on February 12, 2016 letter from Director of Air Warfare (N98); however, AAG is funded to test to the CDD requirements and full Operating Envelope.
5. Barricade Interoperability (KSA). Time required to convert an engine from tailhook to barricade operation/convert from barricade to tailhook operation. The times listed are for conditions of daylight, dry deck, and Sea State 1 (i.e., winds 4 to 6 knots and wave heights of 1 to 3 feet).
6. Manning (KSA). Shall be determined by the Navy Total Force Manpower Requirements Handbook (Navy Manpower Analysis Center, April 2000), from a baseline of Operator and Maintenance Workload only.

Acronyms and Abbreviations

IOT&E - Integrated Operational Test and Evaluation
JCTS - Jet Car Track Site
KSA - Key System Attribute
lbs - Pounds
O - Objective
RALS - Runway Arrested Landing Site
T - Threshold

Track to Budget

RDT&E

Appn		BA	PE	
Navy	1319	05	0604512N	
	Project		**Name**	
	2232		CV/CVN Launch	(Shared)
Navy	1319	05	0604530N	
	Project		**Name**	
	2367		Advanced Arresting Gear	

Notes

A separate RDT&E line item, not shared with non-program activities has been established.

Procurement

Appn		BA	PE		
Navy	1611	02	0204112N		
	Line Item		**Name**		
	2001		Carrier Replacement Program	(Shared)	
Navy	1810	03	0204112N		
	Line Item		**Name**		
	4213		Aircraft Support Equipment	(Shared)	
	Notes:		No planned acquisition beyond MS C		
	4216		Aircraft Launch & Recovery Equipment	(Shared)	(Sunk)
	4217		Advanced Arresting Gear (AAG) MDAP 529		
Navy	1810	08	0204112N		
	Line Item		**Name**		
	9020		Spares and Repair Parts	(Shared)	
	Notes:		No planned acquisition beyond MS C		

Notes

The AAG Appropriation for 1611 is also accounted for in the CVN 78 GERALD R. FORD-class SAR.

MILCON

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

P251 AAG Land Based Test Sites (Sunk)

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2017 $M			BY 2017 $M	TY $M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	1220.4	1446.7	1591.4	1443.1	1191.6	1438.0	1431.2
Procurement	792.7	764.2	840.6	784.8	839.1	800.0	809.7
Flyaway	--	--	--	784.8	--	--	809.7
Recurring	--	--	--	784.8	--	--	809.7
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	0.0	--	--	0.0
Other Support	--	--	--	0.0	--	--	0.0
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	16.9	16.9	18.6	16.9	15.4	15.4	15.4
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2030.0	2227.8	N/A	2244.8	2046.1	2253.4	2256.3

Current APB Cost Estimate Reference

CAPE ICE dated July 12, 2017

The Base Year for the program has been updated from FY 2016 to FY 2017 using the following deflators:

Appn Category	Deflation Factor
RDT&E	1.01801894
Procurement	1.01801894
MILCON	1.01801894

Cost Notes

In accordance with Section 842 of the National Defense Authorization Act for FY 2017, which amended Title 10 U.S. Code § 2334, the Director of Cost Assessment and Program Evaluation, and the Secretary of the military department concerned or the head of the Defense Agency concerned, must issue guidance requiring a discussion of risk, the potential impacts of risk on program costs, and approaches to mitigate risk in cost estimates for MDAPs and major subprograms. The information required by the guidance is to be reported in each SAR. This guidance is not yet available; therefore, the information on cost risk is not contained in this SAR.

Consistent with OSD CAPE guidance and the 12 July 2017 CAPE ICE, AAG Procurement Appropriation 1611 utilizes Shipbuilding and Conversion, Navy (SCN) OSD indices and not the SCN Naval Sea Systems Command/Bureau of Labor Statistics indices used for CVN 78 GERALD R. FORD-class.

Total Quantity			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	0	0	0
Procurement	3	3	3
Total	3	3	3

Cost and Funding

Funding Summary

Appropriation Summary FY 2019 President's Budget / December 2017 SAR (TY$ M)									
Appropriation	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
RDT&E	812.3	170.5	184.1	147.4	93.5	22.6	0.8	0.0	1431.2
Procurement	477.2	79.3	135.9	50.6	23.7	12.7	30.3	0.0	809.7
MILCON	15.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.4
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2019 Total	1304.9	249.8	320.0	198.0	117.2	35.3	31.1	0.0	2256.3
PB 2018 Total	1268.7	232.4	326.2	143.0	54.3	7.3	18.3	0.0	2050.2
Delta	36.2	17.4	-6.2	55.0	62.9	28.0	12.8	0.0	206.1

Quantity Summary FY 2019 President's Budget / December 2017 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	3	0	0	0	0	0	0	0	3
PB 2019 Total	0	3	0	0	0	0	0	0	0	3
PB 2018 Total	0	3	0	0	0	0	0	0	0	3
Delta	0	0	0	0	0	0	0	0	0	0

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
2003	--	--	--	--	--	--	12.3
2004	--	--	--	--	--	--	15.7
2005	--	--	--	--	--	--	24.2
2006	--	--	--	--	--	--	33.5
2007	--	--	--	--	--	--	26.7
2008	--	--	--	--	--	--	34.4
2009	--	--	--	--	--	--	45.5
2010	--	--	--	--	--	--	64.5
2011	--	--	--	--	--	--	65.2
2012	--	--	--	--	--	--	40.4
2013	--	--	--	--	--	--	52.9
2014	--	--	--	--	--	--	72.3
2015	--	--	--	--	--	--	117.5
2016	--	--	--	--	--	--	106.8
2017	--	--	--	--	--	--	100.4
2018	--	--	--	--	--	--	170.5
2019	--	--	--	--	--	--	184.1
2020	--	--	--	--	--	--	147.4
2021	--	--	--	--	--	--	93.5
2022	--	--	--	--	--	--	22.6
2023	--	--	--	--	--	--	0.8
Subtotal	--	--	--	--	--	--	1431.2

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2017 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2003	--	--	--	--	--	--	15.7
2004	--	--	--	--	--	--	19.5
2005	--	--	--	--	--	--	29.3
2006	--	--	--	--	--	--	39.4
2007	--	--	--	--	--	--	30.6
2008	--	--	--	--	--	--	38.8
2009	--	--	--	--	--	--	50.6
2010	--	--	--	--	--	--	70.7
2011	--	--	--	--	--	--	69.8
2012	--	--	--	--	--	--	42.6
2013	--	--	--	--	--	--	55.1
2014	--	--	--	--	--	--	74.3
2015	--	--	--	--	--	--	119.3
2016	--	--	--	--	--	--	106.6
2017	--	--	--	--	--	--	98.6
2018	--	--	--	--	--	--	164.6
2019	--	--	--	--	--	--	174.5
2020	--	--	--	--	--	--	137.0
2021	--	--	--	--	--	--	85.2
2022	--	--	--	--	--	--	20.2
2023	--	--	--	--	--	--	0.7
Subtotal	--	--	--	--	--	--	1443.1

Annual Funding 1810 | Procurement | Other 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
2012	--	--	1.4	--	1.4	--	1.4
2013	--	--	52.9	--	52.9	--	52.9
2014	--	--	7.1	--	7.1	--	7.1
2015	--	--	16.0	--	16.0	--	16.0
2016	--	--	9.7	--	9.7	--	9.7
2017	--	--	2.2	--	2.2	--	2.2
2018	--	--	10.9	--	10.9	--	10.9
2019	--	--	11.1	--	11.1	--	11.1
2020	--	--	4.7	--	4.7	--	4.7
2021	--	--	3.1	--	3.1	--	3.1
2022	--	--	2.5	--	2.5	--	2.5
2023	--	--	2.5	--	2.5	--	2.5
Subtotal	--	--	124.1	--	124.1	--	124.1

Annual Funding 1810 | Procurement | Other Procurement, Navy							
Fiscal Year	Quantity	BY 2017 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2012	--	--	1.5	--	1.5	--	1.5
2013	--	--	54.7	--	54.7	--	54.7
2014	--	--	7.3	--	7.3	--	7.3
2015	--	--	16.1	--	16.1	--	16.1
2016	--	--	9.6	--	9.6	--	9.6
2017	--	--	2.1	--	2.1	--	2.1
2018	--	--	10.4	--	10.4	--	10.4
2019	--	--	10.4	--	10.4	--	10.4
2020	--	--	4.3	--	4.3	--	4.3
2021	--	--	2.8	--	2.8	--	2.8
2022	--	--	2.2	--	2.2	--	2.2
2023	--	--	2.2	--	2.2	--	2.2
Subtotal	--	--	123.6	--	123.6	--	123.6

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
2008	--	0.7	--	--	0.7	--	0.7
2009	1	52.4	--	--	52.4	--	52.4
2010	--	36.3	--	--	36.3	--	36.3
2011	--	44.3	--	--	44.3	--	44.3
2012	--	20.3	--	--	20.3	--	20.3
2013	--	7.3	--	--	7.3	--	7.3
2014	1	15.7	--	--	15.7	--	15.7
2015	--	65.0	--	--	65.0	--	65.0
2016	--	62.3	--	--	62.3	--	62.3
2017	1	83.6	--	--	83.6	--	83.6
2018	--	68.4	--	--	68.4	--	68.4
2019	--	124.8	--	--	124.8	--	124.8
2020	--	45.9	--	--	45.9	--	45.9
2021	--	20.6	--	--	20.6	--	20.6
2022	--	10.2	--	--	10.2	--	10.2
2023	--	27.8	--	--	27.8	--	27.8
Subtotal	3	685.6	--	--	685.6	--	685.6

Annual Funding 1611 | Procurement | Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	BY 2017 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	--	0.8	--	--	0.8	--	0.8
2009	1	57.0	--	--	57.0	--	57.0
2010	--	38.8	--	--	38.8	--	38.8
2011	--	46.4	--	--	46.4	--	46.4
2012	--	20.9	--	--	20.9	--	20.9
2013	--	7.4	--	--	7.4	--	7.4
2014	1	15.7	--	--	15.7	--	15.7
2015	--	64.1	--	--	64.1	--	64.1
2016	--	60.4	--	--	60.4	--	60.4
2017	1	79.6	--	--	79.6	--	79.6
2018	--	63.9	--	--	63.9	--	63.9
2019	--	114.4	--	--	114.4	--	114.4
2020	--	41.3	--	--	41.3	--	41.3
2021	--	18.2	--	--	18.2	--	18.2
2022	--	8.8	--	--	8.8	--	8.8
2023	--	23.5	--	--	23.5	--	23.5
Subtotal	3	661.2	--	--	661.2	--	661.2

Current Estimate reflects PB 2019 GERALD R. FORD-class AAG Budget as provided by Naval Sea Systems Command. Annual funding based on GERALD R. FORD-class appropriated SCN funding for CVN 78, CVN 79 and CVN 80.

AAG annual SCN funding and quantity are aligned to the AAG system procurements using recently awarded contract pricing and Naval Air Systems Command related support to deliver the AAG system to the GERALD R. FORD-Class as government furnished equipment.

The AAG Appropriation for 1611 is also accounted for in the CVN 78 GERALD R. FORD-class SAR.

Consistent with OSD CAPE guidance and the 12 July 2017 CAPE ICE, AAG Procurement Appropriation 1611 utilizes Shipbuilding and Conversion, Navy (SCN) OSD indices and not the SCN Naval Sea Systems Command/Bureau of Labor Statistics indices used for CVN 78 GERALD R. FORD-class.

Cost Quantity Information
1611 | Procurement | Shipbuilding and Conversion, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2017 $M
2008	--	--
2009	1	178.8
2010	--	--
2011	--	--
2012	--	--
2013	--	--
2014	1	241.9
2015	--	--
2016	--	--
2017	1	240.5
2018	--	--
2019	--	--
2020	--	--
2021	--	--
2022	--	--
2023	--	--
Subtotal	3	661.2

Annual Funding 1205 | MILCON | Military Construction, Navy and Marine Corps	
Fiscal Year	TY $M Total Program
2009	15.4
Subtotal	15.4

Annual Funding 1205 | MILCON | Military Construction, Navy and Marine Corps	
Fiscal Year	BY 2017 $M Total Program
2009	16.9
Subtotal	16.9

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	2/10/2005	2/10/2005
Approved Quantity	5	5
Reference	Milestone B ADM	Milestone B ADM
Start Year	2005	2005
End Year	2010	2032

The Current Total LRIP Quantity is more than 10% of the total production quantity because the current APB covers the GERALD R. FORD-class quantity of three.

CVN 78 and CVN 79 are the LRIP shipsets for the AAG program. Both are fully funded in the FYDP.

Foreign Military Sales

Notes

The Electromagnetic Aircraft Launch System (EMALS) and Advanced Arresting Gear (AAG) Technology Transfer and Security Assistance Review Board documentation is complete and an Exception to National Disclosure Policy is in place. A Pricing and Availability Rough Order of Magnitude for EMALS/AAG was provided to India.

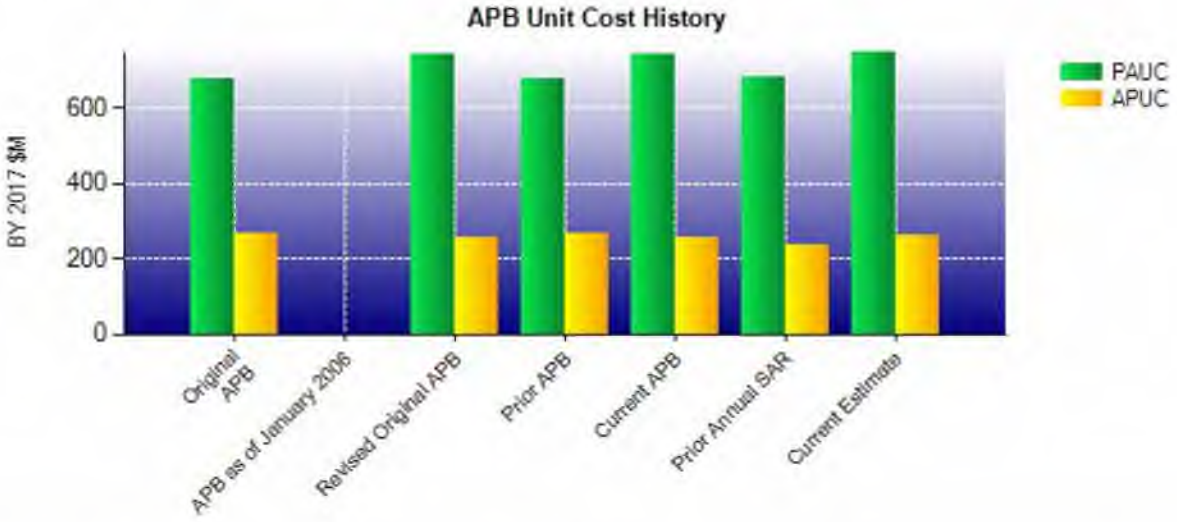
Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2017 $M Current UCR Baseline (Nov 2017 APB)	BY 2017 $M Current Estimate (Dec 2017 SAR)	% Change
Program Acquisition Unit Cost			
Cost	2227.8	2244.8	
Quantity	3	3	
Unit Cost	742.600	748.267	+0.76
Average Procurement Unit Cost			
Cost	764.2	784.8	
Quantity	3	3	
Unit Cost	254.733	261.600	+2.70

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2017 $M Revised Original UCR Baseline (Nov 2017 APB)	BY 2017 $M Current Estimate (Dec 2017 SAR)	% Change
Program Acquisition Unit Cost			
Cost	2227.8	2244.8	
Quantity	3	3	
Unit Cost	742.600	748.267	+0.76
Average Procurement Unit Cost			
Cost	764.2	784.8	
Quantity	3	3	
Unit Cost	254.733	261.600	+2.70



APB Unit Cost History					
Item	Date	BY 2017 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Dec 2016	676.667	264.233	682.033	279.700
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	Nov 2017	742.600	254.733	751.133	266.667
Prior APB	Dec 2016	676.667	264.233	682.033	279.700
Current APB	Nov 2017	742.600	254.733	751.133	266.667
Prior Annual SAR	Dec 2016	683.267	236.667	683.400	244.333
Current Estimate	Dec 2017	748.267	261.600	752.100	269.900

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
682.033	-0.767	0.000	0.000	15.033	55.801	0.000	0.000	70.067	752.100

Current SAR Baseline to Current Estimate (TY $M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
279.700	-0.333	0.000	0.000	0.000	-9.467	0.000	0.000	-9.800	269.900

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	Jul 2003	N/A	Jul 2003
Milestone B	N/A	Feb 2005	N/A	Feb 2005
Milestone C	N/A	Sep 2019	N/A	Aug 2021
IOC	N/A	Jul 2021	N/A	Mar 2022
Total Cost (TY $M)	N/A	2046.1	N/A	2256.3
Total Quantity	N/A	3	N/A	3
PAUC	N/A	682.033	N/A	752.100

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	1191.6	839.1	15.4	2046.1
Previous Changes				
Economic	+0.8	+1.7	--	+2.5
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+109.4	-107.8	--	+1.6
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+110.2	-106.1	--	+4.1
Current Changes				
Economic	-2.1	-2.7	--	-4.8
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	+45.1	--	--	+45.1
Estimating	+86.4	+79.4	--	+165.8
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+129.4	+76.7	--	+206.1
Adjustments	--	--	--	--
Total Changes	+239.6	-29.4	--	+210.2
CE - Cost Variance	1431.2	809.7	15.4	2256.3
CE - Cost & Funding	1431.2	809.7	15.4	2256.3

Summary BY 2017 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	1220.4	792.7	16.9	2030.0
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+104.3	-84.2	--	+20.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+104.3	-84.2	--	+20.1
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	+41.0	--	--	+41.0
Estimating	+79.2	+74.8	--	+154.0
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+120.2	+74.8	--	+195.0
Adjustments	-1.8	+1.5	--	-0.3
Total Changes	+222.7	-7.9	--	+214.8
CE - Cost Variance	1443.1	784.8	16.9	2244.8
CE - Cost & Funding	1443.1	784.8	16.9	2244.8

Previous Estimate: December 2016

Cost Variance Notes

Additional adjustments made to RDT&E and Procurement Base Year Variances to account for change in program base year from 2016 to 2017.

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-2.1
Revised requirement to eliminate Legacy Hornet integration. (Engineering)	-7.6	-8.1
Additional funding for Reliability Growth Testing and Full Envelope Testing requirements. (Engineering)	+48.6	+53.2
Revised estimate and reprogramming of funds in support of Nunn-McCurdy CAPE ICE. (Estimating)	+79.3	+86.5
Adjustment for current and prior escalation. (Estimating)	-0.1	-0.1
RDT&E Subtotal	+120.2	+129.4

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-2.7
Revised estimate to reflect actuals (Shipbuilding and Conversion, Navy (SCN)). (Estimating)	+15.8	+16.1
Revised estimate to reflect actuals (Other Procurement, Navy (OPN)). (Estimating)	+16.4	+16.3
Revised estimate and reprogramming of funds in support of Nunn-McCurdy CAPE ICE (SCN). (Estimating)	+34.2	+37.8
Revised estimate and reprogramming of funds in support of Nunn-McCurdy CAPE ICE (OPN). (Estimating)	-0.2	-0.2
Realignment of Engineering Change Proposal costs for FY 2021-FY 2023 previously reported under O&S costs to support Acquisition Procurement (OPN). (Estimating)	+7.3	+8.1
Adjustment for current and prior escalation. (Estimating)	+1.3	+1.3
Procurement Subtotal	+74.8	+76.7

Contracts

Contract Identification

Appropriation: RDT&E
Contract Name: Services and Material for AAG SDD
Contractor: General Atomics
Contractor Location: 3550 General Atomics Court
San Diego, CA 92121
Contract Number: N68335-03-C-0205
Contract Type: Cost Plus Award Fee (CPAF)
Award Date: February 17, 2005
Definitization Date: February 17, 2005

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
95.8	N/A	1	108.5	N/A	1	742.9	698.6

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to modifications to the contract to increase scope.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (9/29/2017)	-115.2	-20.9
Previous Cumulative Variances	-98.4	-18.6
Net Change	-16.8	-2.3

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to increased costs for Computer Software Configuration Item software release development and testing.

The unfavorable net change in the schedule variance is due to additional time required for component shock barge test fixture design activities and material procurement delays for Purchase Cable Drum design changes.

Notes

PM Estimated Price and PM Estimated Ceiling Price reflect the 2016, AIR 4.2 Estimate at Completion (EAC) plus the total amount of Award Fee paid to the contractor ($1.5M).

The cost section of this report only represents the values for CLIN 0003 AAG System Design and Development (SDD) Option. It does not reflect the total contract.

Performance EAC is based on Cost Performance Indicator and Schedule Performance Indicator.

The AAG SDD Contract is currently undergoing an Over Target Baseline/Over Target Schedule re-plan effort in order to align the General Atomics Integrated Master Schedule with the recently approved AAG revised APB and the CAPE/ICE estimates. Accordingly, General Atomics was authorized by Naval Air Systems Command to only report actual costs via Formats 1&2, for the October 2017 through January 2018 Cost Performance Reports. EVM reporting on this contract is suspended pending complettion of the OTB/OTS.

Contract Identification

Appropriation: Procurement
Contract Name: AAG / Electromagnetic Launch System (EMALS) CVN 79/CVN 80 Production
Contractor: General Atomics
Contractor Location: 3550 General Atomics Court
San Diego, CA 92121
Contract Number: N00019-14-C-0037/1
Contract Type: Firm Fixed Price (FFP)
Award Date: May 08, 2014
Definitization Date: May 18, 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
180.5	N/A	N/A	180.5	N/A	N/A	389.9	389.9

Cost and Schedule Variance Explanations

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

Notes

Contract number N00019-14-C-0037 is a combined EMALS and AAG CVN79/CVN 80 Production contract with a total contract value of $1,466.4M. This contract was initially awarded for the production of CVN 79 ship set hardware only with an initial price of $180.5M for the AAG specific CVN 79 ship set. During negotiations, options were added for the CVN 80 ship set hardware for both EMALS and AAG. The contract value has increased from $1,449.8M to $1,466.4M, based on modifications for EMALS schedule incentives and the the procurement of an AAG 1/2 engine. Current prices for EMALS and AAG, per ship set, are as follows:

CVN 79

AAG = $194.7

EMALS = $543.9M

CVN 80

AAG = $195.2M

EMALS = $532.6M

Contract Identification

Appropriation: Procurement
Contract Name: Land based Units
Contractor: General Atomics
Contractor Location: 3550 General Atomics Court
San Diego, CA 92121
Contract Number: N68335-11-G-0002
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: October 17, 2013
Definitization Date: December 23, 2014

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
52.0	52.0	1	51.8	52.0	1	51.8	51.8

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to definitization.

Cost and Schedule Variance Explanations

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

General Contract Variance Explanation

One-time deviation number 14-N-920 waived the Earned Value Management requirement for this Delivery Order on December 20, 2016, approved by Deputy Assistant Secretary of the Navy, (Acquisition and Procurement)

Notes

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

Contract Identification

Appropriation: Procurement
Contract Name: AAG / Electomagnetic Aircraft Launch System (EMALS) CVN 78 Production
Contractor: General Atomics
Contractor Location: 3550 General Atomics Court
San Diego, CA 92121
Contract Number: N68335-09-C-0573
Contract Type: Firm Fixed Price (FFP)
Award Date: November 09, 2009
Definitization Date: June 30, 2010

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
135.5	N/A	1	138.1	N/A	1	138.1	138.1

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to changes throughout course of contract performance.

Cost and Schedule Variance Explanations

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

Notes

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

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	1	1	3	33.33%
Total Program Quantity Delivered	1	1	3	33.33%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	2256.3	Years Appropriated	16
Expended to Date	1039.1	Percent Years Appropriated	76.19%
Percent Expended	46.05%	Appropriated to Date	1554.7
Total Funding Years	21	Percent Appropriated	68.90%

The above data is current as of February 12, 2018.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	July 12, 2017
Source of Estimate:	CAPE ICE
Quantity to Sustain:	3
Unit of Measure:	System
Service Life per Unit:	50.00 Years
Fiscal Years in Service:	FY 2018 - FY 2077

AAG shipboard units, included in quantity to sustain, are based on the GERALD R. FORD-class Unit Quantities and Program of Record as of December 1, 2016 (CVN 78, CVN 79 and CVN 80).

AAG system service life is based on an equivalent 50 year carrier service life.

Fiscal year placed in service identifies the year CVN 78 delivers with an AAG shipboard unit installed and operating.

Fiscal year retired identifies the planned year CVN 80, with an AAG shipboard unit installed and operating, is decommissioned.

O&S costs identified for AAG are included in the CVN 78 SAR.

Sustainment Strategy

AAG is currently in operation onboard the CVN 78. The maintenance concept for AAG utilizes a three level strategy (O, I, D). O-level repairs will be performed by the fleet while minimal I-level repairs will be performed by the ship's Aircraft Intermediate Maintenance Department as well as the Carrier and Field Service Unit. Organic vs. contractor Depot to be determined by future business case analysis scheduled to be conducted in FY 2019-2020. The depot facility is currently scheduled for stand up in 4th quarter (QTR) FY 2021. Until the Navy takes over configuration control of AAG, depot level repairs will be performed by the original equipment manufacturer (OEM). The software support concept is planned to transition to an organic Software Support Activity (SSA) at Naval Air Warfare Center Aviation Division, Lakehurst, NJ. Until standup of the organic SSA occurs in 1st Quarter FY 2021, software support will be provided by the OEM. On Board Repair Parts (OBRPs) are currently provided for CVN 78 through 3rd QTR FY 2019. Interim Spares will be procured to support replenishment of OBRPs and support AAG until Material Support Date (MSD) in 3rd QTR FY 2020. A Repair of Repairables contract was awarded in FY 2017 for repair of AAG Depot Level Repairables. Initial and interim training has been and will be provided to the fleet until the formal follow-on training curriculum and training schoolhouse is stood up in 4th QTR FY 2022.

Antecedent Information

No antecedent

Annual O&S Costs BY2017 $M		
Cost Element	**AAG Average Annual Cost Per System**	**No Antecedent (Antecedent) Other**
Unit-Level Manpower	3.911	--
Unit Operations	0.000	--
Maintenance	6.103	--
Sustaining Support	2.656	--
Continuing System Improvements	3.391	--
Indirect Support	2.560	--
Other	0.000	--
Total	18.621	--

Average and total O&S costs are sensitive to carrier schedule and ships operating with the AAG system.

Item	Total O&S Cost $M			
	AAG			No Antecedent (Antecedent)
	Current Development APB Objective/Threshold		Current Estimate	
Base Year	2793.1	3072.4	2793.1	N/A
Then Year	5519.1	N/A	5519.1	N/A

The December 2017 SAR for the CVN 78 FORD Class reports a quantity of four ships. AAG total reported O&S cost reflects a program of record of 3 AAG systems. Since the CVN 78 SAR O&S Cost includes O&S costs for AAG, the AAG Program Office extrapolated the current O&S cost estimate to 4 ships, baselined the value to BY 2000, and provided this O&S Cost to the CVN 78 Program Office for inclusion in the December 2017 CVN 78 SAR.

Notional total O&S cost 4 ships = $17.618M * 4 * 50 = $3,523.6M BY 2017

Sharing of fixed costs results in the lower average operation and support cost per ship when hull quantity increases from 3 to 4.

An equivalent calculation in BY 2000 dollars was provided to the CVN 78 Program Office for reporting in the FORD Class SAR.

Notional total O&S cost 4 ships = $12.276M * 4 * 50 = $2,455.2M BY 2000

Equation to Translate Annual Cost to Total Cost

Total Cost = Average Annual cost Per Shipset * Number of Shipsets * Service Life = $18.621M * 3 * 50 = $2,793.1M

O&S Cost Variance

Category	BY 2017 $M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2016 SAR	2746.8	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	17.4	Updated OSD escalation across multiple indices
Labor Rate	28.9	Updated military rates
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	46.3	
Current Estimate	2793.1	

Disposal Estimate Details

Date of Estimate:

Source of Estimate:

Disposal/Demilitarization Total Cost (BY 2017 $M):

AAG disposal costs are included in the CVN 78 Class Disposal Cost.