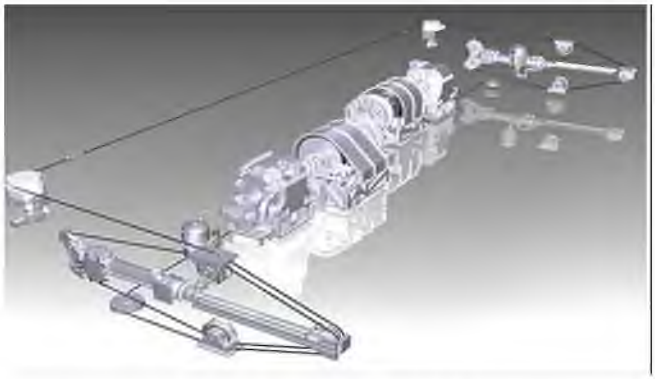
ADVANCED ARRESTING GEAR (AAG)

December 2021 Selected Acquisition Report (SAR)



DECEMBER 31, 2021
DEPARTMENT OF THE NAVY

Contents

Common Acronyms and Abbreviations
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(A&S) - Under Secretary of Defense (Acquisition and Sustainment)
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

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Mission and Description

The Advanced Arresting Gear (AAG) program is a system-level acquisition for a new arresting gear to replace the aging Mark 7 (Mk-7) arresting gear. The AAG is designed to provide total life-cycle savings by reducing operational and maintenance costs when compared to the Mk-7 while providing new operational capabilities for the GERALD R. FORD-class (CVN 78) aircraft carrier, including the ability to safely and efficiently recover both heavier/faster aircraft and lightweight unmanned air vehicles that will enter the fleet in the future.

Executive Summary

On January 30, 2020, the Advanced Arresting Gear (AAG) system operating on USS Gerald R. Ford (CVN 78) completed Aircraft Compatibility Testing (ACT) culminating in the first shipboard recoveries of C-2A, E-2D+, EA-18G and T-45C aircraft. Following ACT, the Navy released final Aircraft Recovery Bulletins for F/A-18E/F, EA-18G, C-2A, E-2C, E-2D, T-45C and Barricade. On January 31, 2020, the AAG PM and CVN 78 Commanding Officer signed a Memorandum of Agreement documenting the official turnover of the AAG system to the CVN 78 crew.

As of April 30, 2021, the CVN 78 recovered 8,157 aircraft with the AAG system. This date also marked the end of the Post-Delivery Test and Trials (PDT&T) and achievement of the IOC criteria.

During CVN 78 Independent Steaming Events (ISEs), the AAG operated on multiple days with 100+ aircraft recoveries, including the completion of 175 arrestments in a single day. The AAG system has demonstrated steadily improving performance supporting CVN 78's first Air Wing full-cyclic operations. The CVN 78 completed all planned catapults and traps during its latest PDT&T and ISE 18. The CVN 78 conducted Full-Ship Shock Trials from June to August 2021 with no AAG system issues. The CVN 78 Planned Incremental Availability 1 (PIA1) commenced in September 2021 and ended in February 2022. Planned engineering changes and software updates completed during PIA1 addressed system reliability and availability.

The AAG Operational Availability (Ao) is currently below the APB threshold requirement. The Ao requirement in the CDD is the expected value after AAG reaches system maturity (25,000 cycles on one ship's system), which should occur no later than 2023. The AAG system has insufficient time and cycles to accurately assess the Ao requirement and achieve the APB performance parameter. As the AAG system increases cyclic operations, increases to the system reliability and operational availability are expected. Additional time-based data will be collected during future CVN 78 flight operational periods to determine operational up-time and operational total time to assess AAG meeting the Ao requirement. The AAG program continues to address system reliability and Ao through hardware and software improvements.

The AAG program received approval for the AAG Acquisition Strategy brief that documents planned milestones and the contracting strategy for the USS Doris Miller (CVN 81) requirements on September 1, 2021. The AAG program awarded the CVN 81 Pre-production Planning contract on December 28, 2021, and plans to award a contract modification for full-production in 4Q of FY 2023.

The AAG program is continuously evaluating system software performance in an operational environment, and has mitigated several issues with multiple software patches. A significant software upgrade is underway for delivery in FY 2023 to address high-priority software network communication issues identified during CVN 78's ISE periods.

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
Mar – 2015	PMA 251 requested the re-designation of Advanced Arresting Gear (AAG) as an ACAT IC program (from an ACAT II program).
Jun – 2015	ASN requested USD(AT&L) reclassify AAG as an ACAT IC program.
Jul – 2015	USD(AT&L) reclassified AAG as an ACAT IC program.
Dec – 2016	Navy Center for Cost Analysis completed the AAG Component Cost Position.
Dec – 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	CVN 79 AAG contract option exercised for the CVN 80 AAG system.
Jul – 2017	The Nunn McCurdy review and certification of AAG completed and documented, and USD(AT&L) designated AAG an ACAT ID program in the July 12, 2017 Acquisition Decision Memorandum.
Nov – 2017	The AAG program proposed an adjusted APB based on the CAPE ICE completed July 2017 for the Nunn McCurdy review. On November 17, 2017, the USD(AT&L) approved the APB, which became the original baseline.
Dec – 2017	The AAG program submitted the AAG Software plan addressing software safety and requirements that reflect the operational concept addressed in the AAG Nunn McCurdy Certification ADM.
Jan – 2018	USD(AT&L) delegated MDA to ASN(RDA) and re-designated AAG an ACAT IC program.
Aug – 2018	AAG completed unmanned F/A-18E/F and EA-18G aircraft performance testing, using deadloads, at the Lakehurst Jet Car Track Site (JCTS).
Aug – 2018	AAG SDD contract Over Target Baseline/Over Target Schedule re-plan completed.
Sep – 2018	Letter of Offer and Acceptance for Technical Assistance Case between the U.S. Government and the Government of France signed.
Dec – 2018	First Future French Carrier Working Group meeting held.
Dec – 2018	AAG completed manned F/A-18E/F and EA-18G aircraft performance testing at Lakehurst Runway Arrested Landing Site (RALS).
Aug – 2019	Integrated Test (IT)-B3 completed at Lakehurst JCTS.
Aug – 2019	The AAG program provided a rough order of magnitude for the Future French Carrier (FFC) Electromagnetic Aircraft Launch System/AAG effort to the French Ministry of Defense.
Oct – 2019	IT-B4 RALS completed at Lakehurst RALS.
Nov – 2019	CVN 78 Post-Shakedown Availability - AAG system recertification completed (Formal Certification message containing required information was released January 8, 2020.) Post-delivery Test and Evaluation (PDT&T) commenced.

Dec – 2019	All F/A-18E/F, EA-18G, E-2D, E-2C, C-2A, T-45C aircraft launch bulletins, aircraft recovery bulletins, and fleet barricade capability released; AAG system fully supports current air wing.
Jan – 2020	AAG aircraft compatibility testing completed; AAG system officially turned-over to CVN 78 crew.
Feb – 2020	The AAG APB Change 1 approved February 5, 2020. This revision aligned schedule events with CVN 78 and increased program cost parameters due to the program of record change (increase of one shipset - USS Doris Miller (CVN 81)).
Mar – 2020	AAG flight deck certification complete.
Dec - 2020	The French Government announces the FFC will include the AAG system.
Apr – 2021	PDT&T complete; AAG Initial Operating Capability criteria achieved.
Jun – 2021	CVM 78 Full Ship-Shock Trials (FSST) commence to evaluate ship and subsystems (including AAG) ability to withstand battle conditions.
Aug – 2021	CVN 78 FSST successfully completed with continued operations throughout events.
Sep – 2021	CVN 78 Planned Incremental Availability I commenced to address modernization, maintenance, and repairs prior to operational employment.
Dec – 2021	CVN 81 Pre-production Planning contract awarded.

Schedule

Schedule Events

Schedule Events					
Events	**Development APB Objective**	**Current APB Development Objective/Threshold**		**Current Estimate/Actual**	**Deviation**
Milestone A	Jul 2003	Jul 2003	Jul 2003	Jul 2003	
Milestone B	Feb 2005	Feb 2005	Feb 2005	Feb 2005	
IT-B3 JCTS complete	Aug 2020	Aug 2019	Aug 2019	Aug 2019	
IT-B4 RALS complete	Dec 2021	Oct 2019	Oct 2019	Oct 2019	
IOC	Mar 2022	Jul 2021	Jan 2022	Apr 2021	
IOT&E	Aug 2021	Nov 2023	May 2024	Nov 2023	

Acronyms and Abbreviations
IT-B3 – Integrated Test-B3 (Jet Car Track Site Functional and Performance Testing)
JCTS - Jet Car Track Site
RALS – Runway Assisted Launch Site
IOT&E – Initial Operational Test and Evaluation

Schedule Notes:
Current APB: AAG Development APB Change 1, approved February 5, 2020

The AAG IOC current estimate changed from Jan 2022 to Apr 2021 due to the achievement of IOC criteria at the completion of Post-Delivery Test and Trials.

The AAG IOT&E current estimate changed from May 2024 to Nov 2023 for consistency with the CVN 78 IOT&E current estimate date.

Significant Schedule Risks

Significant Schedule Risks	
Current Estimate (December 2021)	
1.	There are no schedule risks identified with this program.

Performance

Performance Characteristics					
Development APB Objective	**Current APB Development Objective/Threshold**		**Demonstrated Performance (include Date of Demonstration)**	**Current Estimate/Actual**	**Deviation**
Aircraft Interoperability[1]					
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 T-45 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.	Hookload limits and G-load limits demonstrated to be within limits as defined in Aircraft Recovery Bulletin (ARB) NO. 35-12 E. (January 2020)	Meets threshold requirements for C-2A, E-2C, E-2D, F/A-18E/F, EA-18G and T-45C. F-35C testing planned for FY 2022.	
Cycle Time[2]					
30 seconds	30 seconds	35 seconds	Runway Arrested Landing Site (RALS) testing demonstrated a minimum cycle time of 35 seconds. (October 2019)	35 seconds	
Operational Availability IOT&E demonstration[3, 7]					
0.988	0.988	0.985	0.866 based on 8,157 CVN 78 shipboard arrestments for a three-wire	0.866	

Performance Characteristics					
Development APB Objective	**Current APB Development Objective/Threshold**		**Demonstrated Performance (include Date of Demonstration)**	**Current Estimate/Actual**	**Deviation**
			system (0.962 based on last 4,677 arrestments during Independent Steaming Events 11-18). (April 2021)		
AAG Operating Envelope					
9,000 to 55,000 lbs.	9,000 to 55,000 lbs.	13,360 to 55,000 lbs.	JCTS testing demonstrated the ability to absorb deadload arrestment energy within the threshold operating envelope.(March 2019)	Meets threshold.	
Barricade Interoperability[5]					
<1 minute / < 3 minutes	<1 minute / < 3 minutes	<3 minutes / <10 minutes	Barricade testing demonstrated 15 seconds/15 seconds time to convert the system. (February 2019)	Meets objective.	
Manning[6]					
45	45	55	55 is based on November 2018 Manpower Analysis Report. (November 2018)	Meets threshold.	
Peak Aircraft Recovery Rate[8]					
Recover 28 aircraft in 21 minutes	Recover 28 aircraft in 21 minutes	(T=O) Recover 28 aircraft in 21 minutes	System analysis (thermal stress) supports recovery of 28 aircraft in 21 minutes for the CVN 78 three-wire system. Aircraft demonstration conducted at RALS October	System expected to meet threshold /objective based on RALS testing.	

Performance Characteristics					
Development APB Objective	**Current APB Development Objective/Threshold**		**Demonstrated Performance (include Date of Demonstration)**	**Current Estimate/Actual**	**Deviation**
			2019. RALS high-cycle peak recovery of 28 aircraft in 22.3 minutes demonstrated on a 1-wire system. (October 2019)		
Human Systems Integration[9]					
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.	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.	(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 minimal errors.	Requirement assessed during CVN 78 Post-Shakedown Availability and Post-Delivery Test and Trials (PDT&T); fleet operators and maintainers did not report any issues through the end of PDT&T (April 2021).	Meets objective.	

Acronyms and Abbreviations
IOT&E - Initial Operational Test and Evaluation
JCTS - Jet Car Track Site
KSA - Key System Attribute
RALS - Runway Arrested Landing Site

Performance 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. Table 2 of the AAG CDD delineates Hookload and G-Load KPP objectives. The current estimate was updated to include the T-45C aircraft, which participated in the testing that concluded January 30, 2020.

2. Cycle time (KPP). Separate from the peak recovery rate attribute in Table 3 (AAG Additional Major Attributes) of the AAG CDD. The KPP title was changed from "Cycle Time JCTS and RALS demonstration" to "Cycle Time" because the previous title erroneously included "JCTS and RALS demonstration." This revision makes the KPP title consistent with AAG CDD. The demonstration date changed from March 5, 2019 to October 24, 2019 to reflect the actual high-cycle demonstration date versus a previously projected date.

3. Operation Availability IOT&E demonstration (KPP). The objective and threshold 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 2023. The current estimate changed from "AAG is tracking and assessing CVN 78 performance data, under fleet operational conditions, until system maturity is reached in accordance with the CDD. Current cycle-based Operational Availability is calculated to be 0.971 MCBOMF based on 747 F/A-18E/F CVN
78 shipboard arrestments for a three wire system." to "0.866 based on 8,157 CVN 78 shipboard arrestments for a three-wire system (0.962 based on last 4,677 arrestments during Independent Steaming Events 11-18)." due to accounting for additional CVN 78 shipboard arrestments.

4. AAG Operating Envelope (KSA). Test program prioritized existing MK-7 operating envelope limitations and current airwing Aircraft Recovery Bulletins based on N98 direction letter of February 12, 2016.

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.

7. CDD and APB Operational Availability (Ao) requirements are time-based (operational up-time divided by operational total time). The current Ao is calculated based on cycles (up-cycles divided by total cycles). Additional time-based data will be collected during future CVN 78 flight operational periods to determine operational up-time and operational total time to assess AAG meeting the Ao requirement. Per the CDD, "these are the expected values after system maturity has been reached. System maturity is defined by Navy Support Date + 25,000 cycles on one ship's system. This should occur no later than 2023." Since July 2020, AAG has demonstrated significant increases in Ao as compared to the early phases of PDT&T. As the AAG system increases cyclic operations, increases to system reliability and Ao are expected. The AAG program will continue to update Ao with the resumption of flight operations in 2022. At this time, AAG has insufficient time and cycles to accurately assess the Ao requirement.

8. The Peak Aircraft Recovery Rate current estimate changed from "System analysis (thermal stress) supports recovery of 28 aircraft in 21 minutes for the CVN 78 3 wire system. Aircraft demonstration planned for October 2019." to "System analysis (thermal stress) supports recovery of 28 aircraft in 21 minutes for the CVN 78 three-wire system. Aircraft demonstration conducted at RALS October 2019. RALS high-cycle peak recovery of 28 aircraft in 22.3 minutes demonstrated on
a 1-wire system." as a result of the performance demonstrated during RALS testing.

9. The Human Systems Integration current estimate changed from "Requirement to be assessed during Aircraft Compatibility Testing onboard CVN 78 Jan 2020" to "Meets objective" due to achievement of performance objective demonstrated through PDT&T.

Requirements Source: AAG Capabilities Development Document, Change 1, Deputy Chief of Naval Operations for Integration of Capabilities and Resources approved August 18, 2008
Office of the Chief of Naval Operations Director, Air Warfare memorandum, "Advanced Arresting Gear (AAG) Program of Record (POR) Requirements Revision," of February 12, 2016

Acquisition Budget Estimate

Total Acquisition Cost

Category	Base Year	Development APB Objective (BY$)	APB Name (Current) (02/05/2020) Objective (BY$)	APB Name (Current) (02/05/2020) Threshold (BY$)	Budget Estimate PB 2023 BY$	Budget Estimate PB 2023 TY$	Deviation
RDT&E	2017	1446.7	1550.1	1705.1	1346.8	1334.4	-13.11
Procurement	2017	764.2	1114.8	1226.3	1108.9	1044.9	-0.53
MILCON	2017	16.9	16.9	18.6	16.9	15.4	0.06
Acq. O&M	2017	0.0	0.0	0.0	0.0	0.0	0.00
Total		2227.8	2681.8	N/A	2472.6	2379.3	
PAUC	2017	742.600	670.450	737.495	618.150	N/A	-7.90
APUC	2017	254.733	278.700	306.570	277.218	N/A	-0.60

Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	0	0
Procurement	4	4

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Procurement Cost (March 2022)	
1.	The current procurement cost estimate reflects the May 2, 2019 PLCCE that was approved in support of AAG APB Change 1 (Development). The current baseline estimate remains current and unchanged. The risk and sensitivity analysis performed in support of APB Change 1 remains current and unchanged.
Original Baseline Estimate (December 2016)	
1.	This is a Phase I Transition SAR for the AAG program. The MDA reclassified AAG as an ACAT IC program on July 23, 2015. The original baseline estimate reflected in this Phase I Transition SAR is the Component Cost Position approved on December 20, 2016 in support of the ACAT IC re-designation.
Revised Original Estimate (November 2017)	
The revised original estimate reflects a CAPE ICE approved in July 2017 in support of the AAG Nunn-McCurdy certification and establishes the revised original APB for the program's ACAT IC reclassification.	
Current Baseline Estimate (March 2022)	
1.	The current baseline estimate aligns with the FY 2023 PB.
2.	The Procurement estimate includes Shipbuilding and Conversion, Navy funding ($1,038.59M) allocated to AAG from the CVN 78 Shipbuilding and Conversion, Navy 17-1611 budget (also captured in the CVN 78 SAR Procurement estimate).
3.	The FY 2018 through FY 2025 procurement funding supports the water twister effort accounted for in the APB. Continuing system improvements FY 2025 and beyond are captured in the O&S section of the APB and SAR.

Unit Cost

Current Baseline Compared with Current Estimate

Category ($M)	Current APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	2681.8	2472.60	-	-
Quantity	4	4	-	-
Unit Cost	670.450	618.150	-7.90	
APUC				
Cost	1114.8	1108.87	-	-
Quantity	4	4	-	-
Unit Cost	278.700	277.218	-0.60	

Original Baseline Compared with Current Estimate

Category ($M)	Original APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	2,227.8	2472.60	-	-
Quantity	3	4	-	-
Unit Cost	742.600	618.150	-16.80	
APUC				
Cost	764.2	1108.87	-	-
Quantity	3	4	-	-
Unit Cost	254.734	277.218	8.90	

Contracts

Contract Data ($TYM)		
Contract Number	N00019-14-C-0037	
Effort Number		
Modification Number	P00070	
Award Date	5/8/2014	
Definitization Date	12/22/2016	
Order Number		
CAGE Code/CAGE Legal Name	4V360/ General Atomics	
Contract Title	AAG/EMALS CVN 79/80 Production	
Contract Address	3550 General Atomics Court, San Diego, CA	
Contracts/Effort Price, Quantity, and Performance ($M)		
Initial Target Price	Current Target Price	
$8.88	$478.30	
Initial Ceiling Price	Current Ceiling Price	
$8.88	$478.30	
Contract's EAC	PM's EAC	
Initial Quantity	Current Quantity	Delivered Quantity
0	2	0
BAC	BCWP	ACWP
BCWS	Cost Variance	Schedule Variance

Contract Notes:
Contract N00019-14-C-0037 is a combined Electromagnetic Aircraft Launch System (EMALS) and AAG CVN 79/CVN 80 Production contract with a total contract value of $1,583.57M. The Naval Air Systems Command (NAVAIR) awarded the base (original) contract for the procurement of EMALS and AAG long lead-time materials. The difference between the Initial Contract Price Target and the Current Contract Price Target is due to contract modifications to add the CVN 79 and CVN 80 AAG shipsets as well as other AAG production-related requirements. The Current Target Price reflects the AAG-related contract funding.

Contract Data ($TYM)		
Contract Number	N00019-22-C-0033	
Effort Number		
Modification Number		
Award Date	12/28/2021	
Definitization Date	12/28/2021	
Order Number		
CAGE Code/CAGE Legal Name	4V360/ General Atomics	
Contract Title	AAG/EMALS CVN 81 Pre-production	
Contract Address	3550 General Atomics Court, San Diego, CA	
Contracts/Effort Price, Quantity, and Performance ($M)		
Initial Target Price	Current Target Price	
$0.85	$0.85	
Initial Ceiling Price	Current Ceiling Price	
$0.85	$0.85	
Contract's EAC	PM's EAC	
Initial Quantity	Current Quantity	Delivered Quantity
0	0	
BAC	BCWP	ACWP
BCWS	Cost Variance	Schedule Variance

Contract Notes:
This is the first time this contract is being reported. Contract N0001922C0033 is a combined EMALS and AAG CVN 81 Pre-production contract with a total contract value of $69.8M. NAVAIR will modify this base contract to add CVN 81 EMALS and AAG shipset production. The Current Target Price reflects the AAG-related contract funding.

Technologies and Systems Engineering

Significant Technical Risks

Significant Technical Risks	
Current Estimate (December 2021)	
1.	AAG Reliability, Availability, and Maintainability (RAM). AAG RAM requirements not being met due to system immaturity and component failures. Insufficient number of operational cycles limits the program's ability to identify, analyze, and address critical AAG RAM degraders.
2.	AAG Software (SW) Reliability (Robustness and Stability). Frequent network communication dropouts, lag-time issues, and database corruption problems negatively impact AAG SW ability to support fast-paced CVN flight operations.
3.	Purchase Cable Drum Follower Screw and Roller Nut Redesign. Current Follower Nut design failed during Runway Arrested Landing Site testing; damage found on CVN 78 units. Redesign installed during Planned Incremental Availability 1 and is currently undergoing high-cycle life testing to achieve a 70K arrestment service life.
4.	Water Twister Modification II (WT Mod-II) Production Timeline. WT Mod-II production schedule is highly pressurized to meet CVN retrofit/install timeline.

Deliveries and Expenditures

Deliveries				
Delivered to Date	**Planned to Date**	**Actual to Date**	**Total Quantity**	**Percent Delivered**
Development	0	0	0	0.00%
Production	0	1	4	25.00%
Total Program Quantity Delivered	0	1	4	25.00%

Expended and Appropriated (TY $M)

Total Acquisition Cost: $2,571.47
Expended to Date: $1,815.07
Percent Expended: 70.6
Total Funding Years: 27
Years Appropriated: 26
Percent Years Appropriated: 96
Appropriated to Date: $2,539.66
Percent Appropriated: 98.8

The above data is current as of April 18, 2022.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	2/10/2005	12/22/2015
Approved Quantity	5	2
Reference	Milestone B ADM	Revision to Milestone B ADM
Start Year	2005	2005
End Year	2010	2024

Rationale if Current Total LRIP Quantity exceeds 10% of the total Procurement quantities:
The Current Total LRIP Quantity is more than 10% of the total production quantity as MDA approved and documented in the Milestone B ADM, dated February 10, 2005.

LRIP Note:
Assistant Secretary of the Navy for Research, Development and Acquisition memorandum, "Revision to Milestone B Approval of Advanced Arresting Gear Program Decision Memorandum" of December 22, 2015, approved the procurement of the first full-rate production shipset to be installed on CVN 80, starting in FY 2017. Therefore, the only two LRIP shipsets are CVN 78 and CVN 79.

Operating and Support Costs

Total Program O&S Cost Compared with Baseline

	Current APB Objective (BY$)	Current APB Threshold (BY$)	Current Estimate (BY$)	Current Estimate (TY$)	Deviation
Total O&S ($Millions)	3701.1	4071.2	3,700.9	7,962.1	

O&S Cost Breakdown:

Allocate O&S estimate by each weapon system (or system variants) acquired by the program) into the CAPE Cost Categories. Add a fresh column for each variant/system.

Category (BY$ Million)	Advanced Arresting Gear
Unit-Level Manpower	4.44
Unit Operations	0.00
Maintenance	4.12
Sustaining Support	3.14
Continued System Improvements	3.69
Other	3.21
Total O&S	$18.60

Cost Estimate Source: POE dated January 26, 2021

O&S Cost Notes:

a. Disposal/Demilitarization Cost Estimate and Source of Estimate (cost can be total or unitized): AAG disposal costs are included in the CVN 78 Class Disposal Cost.

b. Sustainment Strategy: The AAG is currently in operation onboard the CVN 78. The maintenance concept for AAG utilizes a three-level strategy (organizational (O), intermediate (I), and depot). The fleet performs O-level repairs while the ship's Aircraft Intermediate Maintenance Department, as well as the Carrier and Field Service Unit, perform minimal I-level repairs. For depot-level repair, the Commander, Fleet Readiness Centers, issued a depot source of repair decision on October 25, 2021, based on a joint service capability review, for both organic and contractor facilities at the Naval Air Warfare Center Aircraft Division (NAWCAD) Lakehurst and General Atomics, respectively. The Naval Air Systems Command (NAVAIR) awarded an AAG depot stand-up contract to General Atomics, the AAG original equipment manufacturer (OEM), in January 2021. Depot stand-up is scheduled for second quarter of FY 2023 to include OEM repairs of depot-level repairables and some organic repair capability. The planned software support concept includes a joint OEM-organic Software Support Activity, which will leverage organic advanced test capability at NAWCAD Lakehurst for software development beginning in first quarter of FY 2023. The AAG program achieved the Material Support Date on February 3, 2020, and the Naval Systems Supply Command and Defense Logistics Agency awarded spares and repair contracts for the AAG system. For fleet training, NAVAIR awarded contracts to General Atomics for interim training that will continue until the formal training curriculum and training schoolhouse are complete at the Center for Naval Aviation Technical Training Unit Norfolk in the fourth quarter of FY 2023.

c. For Each Acquired System or System Variant:
   i. Quantity to Sustain: 4
   ii. First Operational Fiscal Year: 2018

iii. Final Operational Fiscal Year: 2080
iv. Unit Expected Service Life: 50.00 years

d. Antecedent System(s) O&S Costs: No antecedent. The AAG system is specifically designed to meet the requirements of the CVN 78 Class. The advanced technologies and capabilities, and unique ship interface requirements of AAG do not exist in any legacy recovery systems. As such, there are no comparable antecedent systems.