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CVN 78 Gerald R. Ford Class Nuclear Aircraft Carrier (CVN 78)

December 2021 Selected Acquisition Report (SAR)



DECEMBER 31, 2021
DEPARTMENT OF THE NAVY

CLEARED
For Open Publication

Apr 28, 2022

Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

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Contents

Program Manager	1
Mission and Description	3
Executive Summary	4
History of Significant Developments Since Program Initiation	6
Schedule	11
Schedule Events	11
Schedule Notes:	12
Significant Schedule Risks	12
Schedule Events	12
Schedule Notes:	13
Significant Schedule Risks	13
Performance	14
Acquisition Budget Estimate	17
Total Acquisition Cost	17
Total End Item Quantity	17
Total End Item Quantity	17
Risk and Sensitivity Analysis	18
Current Baseline Compared with Current Estimate (Base Year \$)	20
Original Baseline Compared with Current Estimate (Base Year \$)	20
Current Baseline Compared with Current Estimate (Base Year \$)	21
Original Baseline Compared with Current Estimate (Base Year \$)	21
Contracts	22
Contract Notes:	22
Contract Notes:	23
Contract Notes:	24
Contract Notes:	25
Contract Notes:	26
Contract Notes:	27
Technologies and Systems Engineering	28
Significant Technical Risks	28
Significant Technical Risks	28
Deliveries and Expenditures	29
Low Rate Initial Production	30
LRIP Note:	30
LRIP Note:	30
Operating and Support Costs	31
Total Program O&S Cost Compared with Baseline	31
O&S Cost Breakdown	31
Cost Estimate Source: POE	31
O&S Cost Notes	31
Total Program O&S Cost Compared with Baseline	32
O&S Cost Breakdown	32
Cost Estimate Source: POE	32
O&S Cost Notes	32

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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 CVN 78 GERALD R. FORD Class Nuclear Aircraft Carrier (CVN 78) is the successor to the NIMITZ Class (CVN 68) aircraft carrier. The CVN 78 mission is to provide credible, sustainable, independent forward presence during peacetime without access to land bases; operate as the cornerstone of a joint and/or allied maritime expeditionary force in response to crisis; and carry the war to the enemy through joint multi-mission offensive operations by: (a) being able to operate and support aircraft in attacks on enemy forces ashore, afloat, or submerged independent of forward-based land facilities, (b) protecting friendly forces from enemy attack through the establishment and maintenance of battle space dominance independent of forward-based land facilities, and (c) engaging in sustained operations in support of the United States and its allies independent of forward-based land facilities.

The CVN 78 Class Aircraft Carrier program includes major efforts for Nuclear Propulsion/Electric Plant Design, Electromagnetic Aircraft Launching System, and all electric auxiliary systems. Additional design features and new technologies have been added, including a new/enlarged flight deck, improved weapons handling capabilities, and improved survivability.

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Executive Summary

GERALD R. FORD (CVN 78)

CVN 78 completed an 18-month Post-Delivery Test and Trials (PDT&T) phase on April 30, 2021. During PDT&T the ship was underway for 245 days, the crew certified fuel systems, conducted aircraft compatibility testing, exercised the flight deck, and conducted tests to on-board combat systems. PDT&T included early accomplishment of 40 percent of Planned Incremental Availability (PIA) line items. Aircraft Compatibility Testing has been completed for T-45A/C, F/A-18E/F, EA-18G, C-2A, E-2C+ and E-2D aircraft with deployment-capable launch and recovery bulletins. Flight Deck and Carrier Air Traffic Control Center Certification was achieved on March 20, 2020. To date, 8,157 launches and arrestments have been completed. Acoustic Trials, Performance/Special Trials, and Sensor Accuracy Testing were also successfully conducted. One hundred percent of the over 9,000 discrepancies (trial cards) from delivery have been corrected. In November 2020 CVN 78 was underway for 25 days to embark Carrier Air Wing 8 (CVW-8) and conduct integrated strike group operations under the command of Carrier Strike Group 12 (CSG 12). All told, CVW-8 completed over 1,000 launches and arrestments during the underway period. During this underway period, CVW-8 conducted day/night operationally relevant cyclic operations up to 50 sorties per day – with a reduced air wing size of approximately 35 aircraft (approximately 50 percent of a complete air wing) - to include light and heavy inert ordnance deliveries. This follows accomplishing over 165 launches and arrestments in a single 10-hour period in May 2020. In December 2020, the crew supported a new single-day GERALD R. FORD record of 170 launches and 175 arrestments in a single 8.5-hour period, at an average rate of 20 arrestments per hour. These recent operations highlight FORD's increasing capability and provide growing confidence that a fully trained FORD crew and embarked air wing will achieve the required sortie generation rate. Additionally, CSG-12 embarked multiple warfare commanders and conducted multi-ship operations demonstrating the growing maturity of the command and control systems and architecture. In April 2021, CVN 78 conducted Combat Systems Ship Qualification Trials and completed Combat Systems Operational Readiness Examination. CVN 78 entered the Full Ship Shock Trials (FSST) period, a four-month (approximately May 2021 – August 2021) evolution comprised of pre-trial preparations, at-sea shock events, and post-trial inspections. CVN 78 completed all pre-trial preparations and successfully executed all three shock events on June 18, July 16, and August 08, 2021. No major redesign efforts were identified. Repairs resulting from post-trial inspections were completed during the September 2021 - February 2022 PIA. Approximately 88 percent of the issues identified were repairable by ship's force. The robust component shock program on CVN 78 resulted in a much lower repair volume than projected as compared to the last CVN to undergo FSST, CVN 71. Specifically, the CVN 78 discrepancies required less than 20 percent of the industrial man hours required to correct than the CVN 71 discrepancies. In December 2021, the 11th and final AWE was turned over to ship's force with over 16,200 elevator cycles performed by the crew both in port and at sea, including operations in high sea states. With all elevators, we have redundant access to forward, mid, and aft weapons magazines. All requirements for Advanced Arresting Gear (AAG) and EMALS Initial Operational Capability (IOC) were accomplished with the successful completion of PDT&T in April 2021 and IOC was declared with an achievement date of April 30, 2021. CVN 78 IOC requirements were met in December 2021, and IOC was declared for GERALD R. FORD Class (CVN 78) aircraft carrier with an achievement date of December 22, 2021.

Electromagnetic Aircraft Launch System (major subprogram)

EMALS issued Aircraft Launch Bulletins for T-45A/C, F/A-18E/F, EA-18G, C-2A, E-2C+ and E-2D. EMALS launches of all type/model/series in the CVN 78 air wing were conducted during the PDT&T period. To date, 8,157 EMALS launches have been completed aboard CVN 78. EMALS completed shock testing as part of CVN 78 FSST in August 2021 with no significant failures. During the CVN 78 PIA engineering changes and software updates were made to address EMALS system reliability and availability. The Naval Air Systems Command (NAVAIR) awarded the EMALS Integrated Test and Evaluation (IT&E) contract to General Atomics (GA) in March 2019 for Correction of Deficiencies (COD) and dead-load launches for reliability growth through second quarter FY 2021. NAVAIR modified the IT&E

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contract in December 2020 to extend fleet interim training through first quarter FY 2022, due to a delay in Ready For Training and COD resolution. NAVAIR awarded the EMALS depot planning contract to GA in February 2020. Maturity of logistics products are in development and prioritized for high failure components to support phased depot stand-up starting in FY 2022. Logistics contracts are in place for repair of repairables and interim spares. Sustainment contracts are in place with GA for EMALS support, including capability for fleet interim training. NAVAIR awarded the CVN 81 AAG/EMALS Pre-production Planning contract to GA on December 28, 2021 and plans to award a contract modification for full-production in fourth quarter FY 2023.

JOHN F. KENNEDY (CVN 79)

The Navy has transitioned CVN 79 from a two-phase delivery to a single-phase delivery, which will deliver the ship from the current construction period with its complete warfare systems and F-35C Joint Strike Fighter capability in accordance with the FY 2020 NDAA. The Navy awarded a \$315 million not-to-exceed contract modification on November 02, 2020 for the single-phase delivery and definitized the work on January 20, 2022. This change in delivery strategy has no impact on the ship's milestone delivery of September 2024. The Navy increased the ship's Cost Limitation Baseline to \$12.7 billion on August 06, 2021. The cost increase is comprised of \$1.115 billion for the shipbuilding contract and \$187 million for non-nuclear Government Furnished Equipment (GFE). These increases are required to execute the single-phase delivery strategy, ensure a quality and timely delivery of the CVN 79 with the F-35C modifications, incorporate lessons learned from first of class CVN 78, and to account for shipbuilder performance. The shift to single-phase delivery provides the Navy with \$313 million of funds which were planned and budgeted in other appropriated funds (F-35C GFE; OPN/APN, Ship Operations and Maintenance; OM&N, and Shift in Post Shakedown Availability/Selected Restricted Availability; SCN Post Delivery) that were not included under the cost limitation baseline and are thus not new costs. The program has shown recent improvements with indirect and engineering labor inputs, however, cost growth continues to be driven by first of class technical resolutions, material availability and performance in assembly trades. The COVID-19 pandemic continues to affect the shipbuilder's labor availability as well as some material and equipment vendors. The program office continues to monitor the shipbuilder's assessment of the potential impacts to construction performance due to COVID-19.

ENTERPRISE (CVN 80) / DORIS MILLER (CVN 81)

The Navy awarded the CVN 80/81 Detail Design and Construction (DD&C) contract on January 31, 2019. Key to achieving the cost targets of the two-ship buy is implementation of Integrated Digital Shipbuilding (iDS) which is a new set of tools that will improve the efficiency of the construction planning and execution process. The development of the toolset requires coordination between the shipbuilder's engineering, planning and production departments to produce the ship's design, build plan, and trade production instructions. These iDS products will be used on FORD Class and the shipbuilder's other production lines, including the COLUMBIA Class submarine. The development of these products precedes ship construction and is currently at 98 percent to schedule requirements. The two-ship acquisition strategy delivers significant savings to the government – exceeding \$4 billion when compared to the Navy's cost estimate to procure these CVNs separately. CVN 81 Ceremonial First Cut of Steel was conducted on August 25, 2021. The CVN 80 keel laying is planned for third quarter FY 2022 and the CVN 81 keel laying is planned for FY 2026.

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

Significant Accomplishments:

CVN 78 completed Post-Delivery Test and Trials phase on April 30, 2021.

AAG and EMALS IOC was achieved with an achievement date of April 30, 2021.

CVN 78 completed Full Ship Shock Trials on August 08, 2021.

CVN 78 Class IOC was achieved with an achievement date of December 22, 2021.

CVN 78 completed Planned Incremental Availability one day early on February 28, 2022.

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History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	Significant Development Description
March 1996	Milestone 0 approval.
October 1998	USD(AT&L) approved the Navy request for a large-capacity (75 aircraft) carrier with new nuclear propulsion plant and electric plant design, employing an evolutionary acquisition approach. The first ship of the class (CVNX-1) to be based upon a NIMITZ Class hull.
December 1999	Navy awarded two Electromagnetic Aircraft Launch System Program Definition and Risk Reduction contracts to General Atomics and Northrop Grumman.
June 2000	Future Aircraft Carrier program (CVNX), the planned successor to the NIMITZ Class aircraft carrier, was granted Milestone I approval on June 15, 2000.
October 2000	Northrop Grumman Newport News was awarded a cost-plus-fixed-fee contract for research and design development engineering services in support of the CVNX. Design and integration efforts for the class began with the Integrated Product and Process Development contract.
April 2001	Completion of the CVNX-1 Systems Requirement Review marked a major milestone toward commencement of design activities to support the Milestone B Defense Acquisition Board planned for September 2002.
February 2002	President's Budget FY 2003 slips the original CVNX-1 program of record for design start construction and delivery by one year to FY 2007, and reflects split funding of CVNX construction over FY 2007 and FY 2008.
September 2002	Milestone B schedule date has been delayed five months from September 2002 to February 2003 due to a delay in the release of the Operational Requirements Document.
December 2002	Program Decision Memorandum dated December 12, 2002 redesignated CVNX as CVN 21, pulling forward technologies originally planned for CVNX-2. Increases in sortie generation rate requirements and additional manpower reduction requirements previously slated for CVNX-2, such as advanced weapons handling and material movement were pulled forward into the lead ship, the follow on CVN 21 is now considered a modified repeat. Additional design features/new technologies were also added and include: improved/enlarged flight deck, advanced arresting gear, improved weapons handling capabilities, and improved survivability.
June 2003	Program reports delay to Early Operational Assessment (from June 2003 to March 2004) and an additional delay to Milestone B to April 2004.
April 2004	Milestone B Defense Acquisition Board Decision Review held on April 02, 2004. Program major milestones construction contract award in FY 2007 and ship delivery planned for FY 2014 remained unchanged. Approved Acquisition Program Baseline low rate initial production quantity not to exceed three ships. Navy down selected General Atomics as the Electromagnetic Aircraft Launch System Prime Contractor and awarded the System Development and Demonstration contract.
April 2004	CVN 78 Construction Preparation contract awarded.
May 2004	Program Office awarded the Construction Preparation contract which funds the Research, Development, Test, and Evaluation), Long Lead Time Material, integrated design, advance procurement and advance construction of components in support of FY 2007 CVN 21 Construction contract.

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February 2005	President's Budget FY 2006 moves full funding of the lead ship (CVN 78) from FY 2007 to FY 2008. Key event and acquisition dates have been adjusted to accommodate the change in program funding. Construction contract award delayed from FY 2007 to FY 2008. The overall change to the program is a one year slip in delivery for both the lead ship (CVN 78) and the second ship (CVN 79) which is 2015 and 2019, respectively.
October 2006	FY 2007 National Defense Authorization Act provides contract authority for construction of a CVN 21 Class (subsequently re-designated the CVN 78 Class) aircraft carrier designated CVN 78, CVN 79, or CVN 80. The Navy received authority for the ships to be split funded across four years. The act also provided a sense of Congress that the first ship of the class, CVN 78, should be named U.S.S. GERALD R. FORD.
April 2008	Navy awarded the Electromagnetic Aircraft Launch System CVN 78 Long Lead Time Material contract to General Atomics.
August 2008	USD(AT&L) chaired Defense Acquisition Board authorized Navy to enter the production phase for CVN 78, and enter the construction preparation phase for the first follow ship, CVN 79.
September 2008	CVN 78 Detail Design and Construction contract awarded.
January 2009	CVN 79 Construction Preparation contract awarded.
April 2009	Department of Defense announced the CVN 21 Program would shift from a four-year to a five-year build cycle, thereby placing the program on a more fiscally sustainable path while continuing to support a minimum of 11 aircraft carriers through FY 2040. This change, which was reflected in the FY 2010 President's Budget, moved the ship authorization year for the CVN 79 from FY 2012 to FY 2013 and the ship authorization year for CVN 80 from FY 2016 to FY 2018.
June 2009	Navy awarded the Electromagnetic Aircraft Launch System CVN 78 shipset contract to General Atomics.
November 2009	General Atomics Electromagnetic Systems division, along with the U.S. Navy Naval Air Systems Command (NAVAIR), celebrated the opening of the Electromagnetic Aircraft Launch System test track at Joint Base McGuire-Dix-Lakehurst, N.J., with a ribbon-cutting ceremony.
December 2010	Electromagnetic Aircraft Launch System successfully performed land-based F/A-18E risk reduction launches.
May 2011	Secretary of the Navy announced on May 29, 2011 that the nuclear-powered aircraft carrier CVN 79 would be named the JOHN F. KENNEDY.
June 2011	Electromagnetic Aircraft Launch System Aircraft Compatibility Testing began.
December 2011	FY 2012 National Defense Authorization Act extended the full funding period for CVN 79 from four years to five years and directed the Electromagnetic Aircraft Launch System be designated as a major subprogram.
August 2012	Navy awarded the Electromagnetic Aircraft Launch System Logistics Product Development contract to General Atomics.
December 2012	Secretary of Navy announced at the December 01, 2012 de-activation ceremony of the ENTERPRISE (CVN 65) that the CVN 80 would be named ENTERPRISE.
January 2013	FY 2013 National Defense Authorization Act extended the full funding period for CVN 79 and CVN 80 from five to six years.

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March 2013	An extension to the CVN 79 Construction Preparation contract for efforts through FY 2013 was awarded.
April 2013	Electromagnetic Aircraft Launch System designation as a major subprogram approved by USD (AT&L) on April 02, 2013.
November 2013	CVN 78 was christened by the ship's sponsor and daughter of President Ford, Susan Ford Bales, on November 09, 2013 and launched on November 17, 2013 and weighed 77,000 tons. The ship was 70% complete – the highest level attained in aircraft carrier new construction.
February 2014	In President's Budget 2015 the Navy modified CVN 79 acquisition strategy to a two-phased delivery strategy, the basic ship to be constructed and tested in the most efficient manner by the shipbuilder (Phase I). Select ship systems and compartments to be completed in a second phase, wherein the work can be completed more affordably. This approach enables the Navy to replace the Dual Band Radar with the Enterprise Radar Suite, increase competitive opportunities, reduce obsolescence at delivery and increase Government Furnished Equipment cost savings through common purchases of equipment with follow-on ship CVN 80.
April 2014	The Electromagnetic Aircraft Launch System completes land-based Aircraft Compatibility Testing.
May 2014	Navy awarded the Electromagnetic Aircraft Launch System CVN 79 Long Lead Time Material contract to General Atomics.
June 2015	Electromagnetic Aircraft Launching System shipboard catapult testing commenced on schedule, with testing of the bow catapults.
June 2015	Navy awarded Huntington Ingalls Industries - Newport News Shipbuilding a Fixed Price Incentive Firm target contract in the amount of \$3.35B for the JOHN F. KENNEDY (CVN 79) Detail Design & Construction effort. The contract represents an 18 percent reduction in man-hours needed to construct CVN 79 as compared to CVN 78. Additionally, a \$941M modification to the Construction Preparation contract was awarded the same day. Navy awarded the Electromagnetic Aircraft Launch System CVN 79 shipset contract to General Atomics.
August 2015	CVN 78 crew moved aboard as scheduled.
August 2015	USD(AT&L) ADM directed the Navy to conduct Full Ship Shock Trials on CVN 78 prior to first deployment.
May 2016	Navy awarded a \$152M initial contract for CVN 80 long lead time procurements; workload and layout planning; material tracking; development of an integrated master schedule and work packages; as well as other activities necessary to support start of construction in FY 2018.
October 2016	CVN 79 delivery date revised from June 2022 to September 2024 as required by Section 121 of the FY 2017 National Defense Authorization Act (Public Law 114-328). Completion of the CVN 79 Detail Design and Construction contract in June 2022 will represent preliminary acceptance from the shipbuilder.
January 2017	The Electromagnetic Aircraft Launch System (EMALS) aboard CVN 78 was turned over to Ship's force. To mitigate future cost growth, EMALS and Advanced Arresting Gear (AAG) CVN 80 Firm Fixed Price options to the CVN 79 EMALS/AAG shipset contract with General Atomics were exercised in January 2017 and May 2017, locking in dual ship savings.

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May 2017	CVN 78 delivered to the Navy on May 31, 2017 after successfully completing Builder's Sea Trials in April 2017 and Acceptance Trials in May 2017. With delivery of CVN 78, the carrier force returned to 11 ships as required by 10 U.S.C. 5062(b).
June 2017	The Electromagnetic Aircraft Launch System completed land-based Aircraft Compatibility Testing, to correct deficiencies with launching the F/A-18E/F with external fuel tanks.
June 2017	CVN 79 reached the 50% structurally erected milestone with 224 of the 447 total erectableslanded in the dry dock.
July 2017	CVN 78 formally entered in the active fleet following her commissioning ceremony on July 22,2017.
July 2017	CVN 78 made Naval Aviation history by successfully recovering and launching its first fixed-wingaircraft on July 28, 2017. A total of four launches were conducted on the Electromagnetic Aircraft Launching System and four arrestments on the Advanced Arresting Gear.
January 2018	On January 08, 2018 USD(AT&L) designated the CVN 78 Class Acquisition Category 1C (ACAT1C) and delegated MDA to the Navy.
April 2018	CVN 79 reached the 75% structurally erected milestone with 341 of the 447 total erectableslanded in the dry dock.
June 2018	CVN 78 completed the eighth Independent Steaming Event and completed 747 total successful Electromagnetic Aircraft Launch System catapult launches and 747 successful Advanced Arresting Gear arrestments, including 135 launches and recoveries while underway on January 19, 2018
July 2018	CVN 78 commenced Post Shakedown Availability/Selected Restricted Availability on July 15,2018.
December 2018	On December 31, 2018 the Secretary of Defense provided Congressional notification in accordance with Section 121 of the FY 2019 National Defense Authorization Act (Public Law 115-232) certifying the CVN 80/81 two-ship buy cost savings and provided the Secretary of the Navy the authority to enter into a contract for the procurement of CVN 80/81 under a single contract.
January 2019	CVN 80/81 two-ship buy Detail Design and Construction contract awarded on January 31, 2019.
October 2019	CVN 78 completed Post Shakedown Availability/Selected Restricted Availability on October 30,2019.
November 2019	CVN 78 commenced Post-Delivery Test and Trials phase in November 2019.
December 2019	CVN 79 was christened by the ship's sponsor and daughter of President Kennedy, AmbassadorCaroline Kennedy, on December 07, 2019 and launched on December 16, 2019, more than two months ahead of the baseline schedule.
January 2020	Acting Secretary of the Navy announced on January 20, 2020 that the nuclear-powered aircraftcarrier CVN 81 would be named the DORIS MILLER.
December 2020	CVN 78 set a new single-day record of 170 launches and 175 arrestments in an 8.5-hour period,an average of 20 sorties per hour, highlighting the increasing capability and growing confidence that a fully trained crew and embarked air wing will achieve the required sortie generation rate.
April 2021	CVN 78 completed Post-Delivery Test and Trials phase on April 30, 2021.
April 2021	AAG and EMALS IOC achieved with an achievement date of April 30, 2021.

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August 2021	CVN 78 completed Full Ship Shock Trials on August 08, 2021.
September 2021	CVN 78 began Planned Incremental Availability at Newport News Shipbuilding on September 01, 2021.
December 2021	CVN 78 Class IOC achieved with an achievement date of December 22, 2021.
February 2022	CVN 78 completed Planned Incremental Availability one day early on February 28, 2022.

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Schedule

Schedule Events

Schedule Events					
Events	Development APB Objective	Current APB Development Objective/Threshold		Current Estimate/Actual	Deviation
CVN 78					
Early Operational Assessment	Mar 2004	Mar 2004	Mar 2004	Mar 2004	
Milestone B	Apr 2004	Apr 2004	Apr 2004	Apr 2004	
DAB Program Review (PR)	Jan 2006	Jul 2008	Jul 2008	Jul 2008	
Start Construction	Jan 2007	Sep 2008	Sep 2008	Sep 2008	
Launch	Nov 2012	Nov 2013	Nov 2013	Nov 2013	
Delivery	Sep 2014	May 2017	May 2017	May 2017	
OPEVAL					
Start	Oct 2014	N/A	N/A	N/A	
Complete	Sep 2017	N/A	N/A	N/A	
TECHEVAL	Feb 2015	N/A	N/A	N/A	
Combat Systems Trial Rehearsal (CSTR)	Jul 2014	Jan 2017	Jan 2017	Jan 2017	
Initial Operational Capability (IOC)	Sep 2015	Jul 2021	Jan 2022	Dec 2021	
Follow-on Ship (CVN 79)					
DAB Program Review	Jan 2010	Apr 2015	Apr 2015	Apr 2015	
Start Construction	Jan 2011	Jun 2015	Jun 2015	Jun 2015	
Delivery	Sep 2018	Sep 2024	Mar 2025	Sep 2024	
DAB Program Review	Jan 2015	N/A	N/A	N/A	
Milestone C	Mar 2017	N/A	N/A	N/A	
Follow-on Ship (CVN 80)					
Delivery	N/A	Mar 2028	Mar 2029	Mar 2028	
IOT&E					
IOT&E Start	N/A	Aug 2022	Feb 2023	Aug 2022	
IOT&E Complete	N/A	Nov 2023	May 2024	Nov 2023	

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Platform-Level Integration DT Period Complete	N/A	May 2023	Nov 2023	May 2023	
Follow-on Ship (CVN 81)					
Delivery	N/A	Feb 2032	Feb 2033	Feb 2032	

Schedule Notes:

The IOC Current Estimate changed from July 2021 to Actual December 2021 to reflect CVN 78 Class IOC achievement date of December 22, 2021.

Obligation Work Limiting Date for:

CVN 78 – 07/2022

CVN 79 – 01/2026

CVN 80 – 04/2029

CVN 81 – 03/2033

Significant Schedule Risks

Significant Schedule Risks	
Post Milestone B (September 2006)	
1.	CVN 78. Schedule Risk: Contracts. Driver: Ship design maturity. Mitigation: Alpha contracting process implemented. Date: December 2007.
2.	CVN 78. Schedule Risk: Lack of Build Contract for the Dual Band Radar potential impacts to Lead Design Yard construction. Driver: Technology maturity. Mitigation: Award contract to build carrier version of the Dual Band Radar, control of common array power system and common array cooling system, unique power, unique cooling design, air traffic control, and firm delivery dates.
Current Estimate (December 2021)	
1.	CVN 79. If SPY-6(V)3 Enterprise Air Surveillance Radar is delivered to CVN 79 without radar core developmental and Ship Self-Defense System combat system integration land-based testing, then testing will occur shipboard which may result in delays to combat system light off.
2.	CVN 80/81. If resolution of CVN 78 Class deficiencies identified after the award of CVN 80/81 are not implemented timely, then schedule and performance may be impacted.

Schedule Events

Schedule Events					
Events	Development APB Objective	Current APB Development Objective/Threshold		Current Estimate/Actual	Deviation
EMALS					
Delivery (with Ship)	Sep 2015	May 2017	May 2017	May 2017	
EMALS IOC	Sep 2016	Jul 2021	Jan 2022	Apr 2021	
IOT&E					
IOT&E Start	Feb 2017	Aug 2022	Feb 2023	Aug 2022	

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IOT&E Complete	Aug 2019	Nov 2023	May 2024	Nov 2023	
Platform-Level Integration DT Period Complete	Sep 2017	May 2023	Nov 2023	May 2023	

Schedule Notes:

The IOC Current Estimate changed from July 2021 to Actual April 2021 to reflect EMALS IOC achievement date of April 30, 2021.

Significant Schedule Risks

Significant Schedule Risks	
Post Milestone B (September 2006)	
1.	Electromagnetic Aircraft Launch System (EMALS). Performance Risk: EMALS - Risk: Component delivery dates may miss required in yard dates for ship. Driver: Land-based testing schedule. Mitigation: Manage scheduled events leading to Low Rate Initial Production decision. Date: September 2009
Current Estimate (December 2021)	
1.	There are no risks identified with this program.

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Performance

Performance Characteristics					
Development APB Objective	Current APB Development Objective/Threshold	Demonstrated Performance (Include Date of Demonstration)	Current Estimate/Actual	Deviation	
CVN 78 Class					
Sustained Sortie Rate					
220	220	160	TBD	172	
Surge Sortie Rate					
310	310	270	TBD	284	
Ship Service Electrical Generating Capacity (times NIMITZ Class capacity in MW)					
3.0	3.0	2.5	Oct 2019	3.25	
Weight Service Life Allowance (% of full load displacement in long tons)					
7.5	7.5	5.0	Feb 2022	5.82	
Stability Service Life Allowance (feet)					
2.5	2.5	1.5	Feb 2022	1.62	
Ship's Force Manpower (billets)					
2391	2391	2791	TBD	2716	
Interoperability					
Note 2	N/A	N/A	N/A	N/A	
Force Protection and Survivability in an Asymmetric Threat Environment					
Survivability					
N/A	Level III as defined by OPNAV Instruction 9070.1	Level II as defined by OPNAV Instruction 9070.1 with the exception of Collective Protection System	TBD	Level II as defined by OPNAV Instruction 9070.1 with the exception of Collective Protection System	
Net-Ready					
N/A	Meets 100% of top level IERs	Meets 100% of top level IERs designated as critical	TBD	Meets 100% of top level IERs designated as critical	
Follow-on Ship					
Interoperability					

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Performance Characteristics					Deviation
Development APB Objective	Current APB Development Objective/Threshold		Demonstrated Performance (include Date of Demonstration)	Current Estimate/Actual	
	N/A	N/A	N/A	N/A	
Sustained Sortie Rate					
220	N/A	N/A	N/A	N/A	
Surge Sortie Rate					
310	N/A	N/A	N/A	N/A	
Service Electrical Generating Capacity (times NIMITZ Class capacity in MW)					
3.0	N/A	N/A	N/A	N/A	
Weight Service Life Allowance (% of full load displacement in long tons)					
7.5	N/A	N/A	N/A	N/A	
Stability Service Life Allowance (feet)					
2.5	N/A	N/A	N/A	N/A	
Ship's Force Manpower (billets)					
2391	N/A	N/A	N/A	N/A	

Performance Notes:

Classified Performance Table is available in the Classified Annex.

- Ship Service Electrical Generating Capacity current estimate was updated to reflect demonstrated performance achieved in October 2019.

- Weight Service Life Allowance current estimate was updated to reflect demonstrated performance achieved in February 2022.

- Stability Service Life Allowance current estimate was updated to reflect demonstrated performance achieved in February 2022.

CVN 78 performance Threshold and Objectives apply to all ships in the class. Current estimates for the follow-on ship will be updated, if different from the lead ship, when they become available.

For additional description regarding CVN 78 and follow-on ship Interoperability and other Performance Characteristics, see Table 4.4, KPPs, contained in the Future Aircraft Carrier (CVN 21) ORD Change 2 dated June 22, 2007.

Requirements Source: ORD Change 2 dated June 22, 2007 was revalidated by the JROC on April 27, 2015.

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Performance Characteristics					
Development APB Objective	Current APB Development Objective/Threshold		Demonstrated Performance (include Date of Demonstration)	Current Estimate/Actual	Deviation
EMALS					
N/A	N/A	N/A	N/A	N/A	

Performance Notes:

Classified Performance Table is available in the Classified Annex.

CVN 78 performance Threshold and Objectives apply to all ships in the class. Current estimates for the follow-on ship will be updated, if different from the lead ship, when they become available.

For additional description regarding CVN 78 and follow-on ship Interoperability and other Performance Characteristics, see Table 4.4, KPPs, contained in the Future Aircraft Carrier (CVN 21) ORD Change 2 dated June 22, 2007.

Requirements Source: ORD Change 2 dated June 22, 2007 was revalidated by the JROC on April 27, 2015.

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Acquisition Budget Estimate

Total Acquisition Cost

CVN 78		Development APB	APB Change 4 (Production) 02/06/2020		Budget Estimate PB 2023		
Category	Base Year	Objective (BY\$)	Objective (BY\$)	Threshold (BY\$)	BY\$	TY\$	Deviation
RDT&E	2000	3490.6	3704.4	4074.8	3721.85	4583.92	
Procurement	2000	24235.0	28800.2	31680.2	30178.64	53883.26	
MILCON	2000	0.0	283.9	312.3	171.28	274.45	
Acq. O&M	2000	0.0	98.1	107.9	122.64	178.07	
Total		27725.6	32886.6	N/A	34194.41	58919.7	
PAUC	2000	9567.067	8221.650	9043.815	8548.6	14729.3	
APUC	2000	8275.3	7200.050	7920.055	7544.66	13470.8	

Total End Item Quantity

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

Total Acquisition Cost

EMALS		Development APB	APB Change 4 (Production) 02/06/2020		Budget Estimate PB 2023		
Category	Base Year	Objective (BY\$)	Objective (BY\$)	Threshold (BY\$)	BY\$	TY\$	Deviation
RDT&E	2000	384.7	1000.5	1100.6	865.87	1043.08	
Procurement	2000	590.9	1510.5	1661.6	1568.15	2835.19	
MILCON	2000	0.0	18.8	20.7	18.75	20.64	
Acq. O&M	2000	0.0	0.0	0.0	0	0	
Total		975.6	2529.8	N/A	2452.77	3,898.91	
PAUC	2000	754.467	632.450	695.695	613.19	974.74	
APUC	2000	531.133	377.625	415.388	392.04	708.80	

Total End Item Quantity

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

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Risk and Sensitivity Analysis

CVN 78

Risks and Sensitivity Analysis	
Current Baseline Estimate (February 2020)	
1.	In accordance with Section 121(b) of the Fiscal Year 2019 National Defense Authorization Act (NDAA) (Public Law 115-232), the Secretary of Defense provided a detailed certification package in support of the CVN 80/81 two-ship buy Detailed Design and Construction contract to the Congressional defense committees on December 31, 2018. The two-ship acquisition strategy resulted in \$4 billion in procurement savings on CVN 80 and CVN 81 compared to the Navy single-ship estimates. The Navy's projected cost of CVN 80 and CVN 81, as negotiated with the shipbuilder, and the estimated cost avoidance described in the Department's certification package are realistic; informed by a thorough review with the Navy's cost estimating, engineering, and contracting organizations. Also, the Department of Defense's Office of CAPE developed an Independent Estimate of Savings for the two-ship procurement and forecast savings of \$3.1 billion (Then-Year), or approximately 11 percent. The Navy projects \$4 billion in savings. The primary differences between CAPE and Navy estimates of savings are in Government Furnished Equipment and production change orders.
Original Baseline Estimate (April 2004)	
1.	The Cost Analysis Improvement Group (CAIG) and Navy life cycle cost estimates differed by \$1.55 billion (FY04) or 5.6 percent. The majority of the delta resides in the production effort. There were three important contributors to the production effort: production labor, the hourly billing rates applied to production labor, and the cost of the material to be incorporated in the ship. The RDT&E estimates and O&S estimates differences are not considered significant.
Revised Original Estimate (N/A)	
None	
Current Procurement Costs (December 2021)	
1.	In accordance with Section 121(b) of the Fiscal Year 2019 NDAA (Public Law 115-232), the Secretary of Defense provided a detailed certification package in support of the CVN 80/81 two-ship buy Detailed Design and Construction contract to the Congressional defense committees on December 31, 2018. The two-ship acquisition strategy resulted in \$4 billion in procurement savings on CVN 80 and CVN 81 compared to the Navy single-ship estimates. The Navy's projected cost of CVN 80 and CVN 81, as negotiated with the shipbuilder, and the estimated cost avoidance described in the Department's certification package are realistic; informed by a thorough review with the Navy's cost estimating, engineering, and contracting organizations. Also, the Department of Defense's Office of CAPE developed an Independent Estimate of Savings for the two- ship procurement and forecast savings of \$3.1 billion (Then-Year), or approximately 11 percent. The Navy projects \$4 billion in savings. The primary differences between CAPE and Navy estimates of savings are in Government Furnished Equipment and production change orders.

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EMALS

Risks and Sensitivity Analysis	
Current Baseline Estimate (December 2021)	
1.	In accordance with Section 121(b) of the FY 2019 NDAA (Public Law 115-232), the Secretary of Defense provided a detailed certification package in support of the CVN 80/81 two-ship buy Detailed Design and Construction contract to the Congressional defense committees on December 31, 2018. The two-ship acquisition strategy resulted in \$4 billion in procurement savings on CVN 80 and CVN 81 compared to the Navy single-ship estimates. The Navy's projected cost of CVN 80 and CVN 81, as negotiated with the shipbuilder, and the estimated cost avoidance described in the Department's certification package are realistic; informed by a thorough review with the Navy's cost estimating, engineering, and contracting organizations. Also, the Department of Defense's Office of CAPE developed an Independent Estimate of Savings for the two-ship procurement and forecast savings of \$3.1 billion (Then-Year), or approximately 11 percent. The Navy projects \$4 billion in savings. The primary differences between CAPE and Navy estimates of savings are in Government Furnished Equipment and production change orders.
Original Baseline Estimate (April 2013)	
1.	No cost estimate conforming to the Enhanced SAR guidelines for developing a risk statement was performed associated with the Original Baseline, April 2013. The Original Baseline reflects APB Change 3 which established EMALS as a major sub-program as directed by Section 221 of the NDAA for FY 2012 and updated selected program schedule dates to reflect the known schedule changes.
Revised Original Estimate (N/A)	
None	
Current Procurement Costs (December 2021)	
1.	In accordance with Section 121(b) of the Fiscal Year 2019 NDAA (Public Law 115-232), the Secretary of Defense provided a detailed certification package in support of the CVN 80/81 two-ship buy Detailed Design and Construction contract to the Congressional defense committees on December 31, 2018. The two-ship acquisition strategy resulted in \$4 billion in procurement savings on CVN 80 and CVN 81 compared to the Navy single-ship estimates. The Navy's projected cost of CVN 80 and CVN 81, as negotiated with the shipbuilder, and the estimated cost avoidance described in the Department's certification package are realistic; informed by a thorough review with the Navy's cost estimating, engineering, and contracting organizations. Also, the Department of Defense's Office of CAPE developed an Independent Estimate of Savings for the two- ship procurement and forecast savings of \$3.1 billion (Then-Year), or approximately 11 percent. The Navy projects \$4 billion in savings. The primary differences between CAPE and Navy estimates of savings are in Government Furnished Equipment and production change orders.

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Unit Cost

Current Baseline Compared with Current Estimate (Base Year \$)

CVN 78

Category (\$M)	Current APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	32886.6	34194.41		-
Quantity	4	4		-
Unit Cost	8221.650	8548.6	3.98	
APUC				
Cost	28800.2	30178.64		-
Quantity	4	4		-
Unit Cost	7200.050	7544.66	4.79	

Original Baseline Compared with Current Estimate (Base Year \$)

Category (\$M)	Apr 2004 APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	28701.2	34194.41		-
Quantity	3	4		-
Unit Cost	9567.067	8548.6	-10.65	
APUC				
Cost	24825.9	30178.64		-
Quantity	3	4		-
Unit Cost	8275.3	7544.66	-8.83	

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*Current Baseline Compared with Current Estimate (Base Year \$)***EMALS**

Category (\$M)	Current APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	2529.8	2452.77		-
Quantity	4	4		-
Unit Cost	632.45	613.19	-3.0	
APUC				
Cost	1510.5	1568.15		-
Quantity	4	4		-
Unit Cost	377.625	392.04	3.8	

Original Baseline Compared with Current Estimate (Base Year \$)

Category (\$M)	Apr 2013 APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	2263.4	2452.77		-
Quantity	3	4		-
Unit Cost	754.467	613.19	-18.7	
APUC				
Cost	1593.4	1568.15		-
Quantity	3	4		-
Unit Cost	531.133	392.04	-26.19	

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Contracts

CVN 78

Contract Data (\$TYM)			
Contract Number		N00024-09-C-2116	
Effort Number		1	
Modification Number		P00157	
Award Date		January 15, 2009	
Definitization Date		December 08, 2010	
Order Number			
CAGE Code/CAGE Legal Name		43689/Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)	
Contract Title		CVN 79 Construction Preparation (CP)	
Contract Address		4101 Washington Avenue Newport News, VA 23607-2734	
Contracts/Effort Price, Quantity, and Performance (\$M)			
Initial Target Price	373.5	Current Target Price	4319.3
Initial Ceiling Price	N/A	Current Ceiling Price	N/A
Contractor EAC	4517.2	PM's EAC	4517.2
Initial Quantity	0	Current Quantity	0
		Delivered Quantity	0
BAC	3888.65	BCWP	3718.87
		ACWP	3990.25
BCWS	3832.02	Cost Variance	Schedule Variance
		-271.38	-113.25

Contract Notes:

The CVN 79 CP contract is 95.6 percent complete based on dollars.

Cost Variance:

The unfavorable net change in the cost variance is due to material and overhead overruns including overhead rates, outside services, production leased labor, electrical, maintenance material, complex machinery and valves.

Schedule Variance:

The unfavorable net change in the schedule variance is due to various direct buy material commodities arriving late, including stock, paint, raw materials and support material.

UNCLASSIFIED

Contract Data (\$TYM)			
Contract Number		N00024-15-C-2114	
Effort Number		1	
Modification Number		P00098	
Award Date		June 05, 2015	
Definitization Date		June 05, 2015	
Order Number			
CAGE Code/CAGE Legal Name		43689/Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)	
Contract Title		CVN 79 Detail Design & Construction (DD&C)	
Contract Address		4101 Washington Avenue Newport News, VA 23607-2734	
Contracts/Effort Price, Quantity, and Performance (\$M)			
Initial Target Price	3352.6	Current Target Price	3881.9
Initial Ceiling Price	N/A	Current Ceiling Price	N/A
Contractor EAC	4177.4	PM's EAC	4177.35
Initial Quantity	1	Current Quantity	1
		Delivered Quantity	0
BAC	3379.42	BCWP	2507.48
		ACWP	2948.63
BCWS	2857.41	Cost Variance	Schedule Variance
		-441.15	-349.93

Contract Notes:

On November 02, 2020 NAVSEA awarded a not-to-exceed modification to the CVN 79 DD&C contract, which will shift the CVN 79 to a single-phase delivery in 2024 and definitized previously awarded efforts associated with warfare systems that accomplish CVN 79 single-phase delivery with F-35C capabilities on January 20, 2022.

The CVN 79 DD&C contract is 74.2 percent complete based on dollars.

Cost Variance:

The unfavorable net change in the cost variance is due to labor performance and resolving first-ship-of-class technical issues. The cost variance is driven by challenges in support trades, structural fabrication, assembly (sheet metal fabrication, production trades, electrical, machinery install), as well as resequencing deferred and delayed work, green labor, and continued constrained shared labor resources across all shipbuilding programs at NNS.

Schedule Variance:

The unfavorable net change in the schedule variance is due to assembly trades (production trades, cleaners, machinery install), facilities trades, test engineering, nuclear engineering, test, and facilities. Similar to the cost variance, resequencing deferred and delayed work, green labor, and continued constrained shared labor resources across all shipbuilding programs at NNS impacts the schedule variance.

UNCLASSIFIED

Contract Data (\$TYM)			
Contract Number		N00024-16-C-2116/2	
Effort Number		2	
Modification Number		P00080	
Award Date		January 31, 2019	
Definitization Date		January 31, 2019	
Order Number			
CAGE Code/CAGE Legal Name		43689/Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)	
Contract Title		CVN 80 Detail Design & Construction (DD&C)	
Contract Address		4101 Washington Avenue Newport News, VA 23607-2734	
Contracts/Effort Price, Quantity, and Performance (\$M)			
Initial Target Price	152.0	Current Target Price	8387.49
Initial Ceiling Price	N/A	Current Ceiling Price	9494.24
Contractor EAC	7630.66	PM's EAC	7630.66
Initial Quantity	0	Current Quantity	1
		Delivered Quantity 0	
BAC	7334.14	BCWP	1950.29
		ACWP 2282.15	
BCWS	2140.49	Cost Variance	
		Schedule Variance	
		-331.86	-190.20

Contract Notes:

On January 31, 2019, a \$14,917,738,145 fixed-price-incentive-firm target modification to previously awarded contract N00024-16-C-2116 for DD&C efforts for CVN 80 and CVN 81 was awarded.

The CVN 80 DD&C contract is 26.6 percent complete based on dollars.

Cost Variance:

The unfavorable net change in the cost variance is due to poor shop construction performance and the shipyard spending above the plan because digital shipbuilding products have been harder to produce than planned and tool enhancements targeted to reduce efforts have been slower than planned. Poor shop construction performance and poor material availability led to an unfavorable assembly construction labor variance, driven by out of sequence work, green labor, and poor services spending control. Negative material cost variance was driven by outside services, steel, electrical material, valves and complex machinery.

Schedule Variance:

The unfavorable net change in the schedule variance is due to poor shop schedule performance and material availability in addition to engineering and planning departments not meeting their schedule due to start-up issues associated with Integrated Digital Shipbuilding. Poor shop schedule performance is driven by labor resource shortages, material availability, structural fabrication and component fabrication.

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Contract Data (\$TYM)			
Contract Number		N00024-16-C-2116/3	
Effort Number		3	
Modification Number		P00080	
Award Date		January 31, 2019	
Definitization Date		January 31, 2019	
Order Number			
CAGE Code/CAGE Legal Name		43689/Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)	
Contract Title		CVN 81 Detail Design & Construction (DD&C)	
Contract Address		4101 Washington Avenue Newport News, VA 23607-2734	
Contracts/Effort Price, Quantity, and Performance (\$M)			
Initial Target Price	7954.3	Current Target Price	7954.3
Initial Ceiling Price	8926.7	Current Ceiling Price	8926.7
Contractor EAC		PM's EAC	
Initial Quantity	1	Current Quantity	1
		Delivered Quantity	0
BAC		BCWP	ACWP
BCWS		Cost Variance	Schedule Variance

Contract Notes:

On January 31, 2019, a \$14,917,738,145 Fixed-Price-Incentive-Firm (FPIF) target modification to previously awarded contract N00024-16-C-2116 for DD&C efforts for CVN 80 and CVN 81 was awarded.

Cost and Schedule Variance Explanations:

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

General Contract Variance Explanation:

Cost and schedule variances are not reported for this contract, because Earned Value Management (EVM) reporting has not yet commenced due to timing of construction activities in accordance with the CVN 80/81 two-ship construction contract.

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EMALS

Contract Data (\$TYM)			
Contract Number		N00019-14-C-0037	
Effort Number		1	
Modification Number		P00072	
Award Date		May 08, 2014	
Definitization Date		December 22, 2016	
Order Number			
CAGE Code/CAGE Legal Name		4V360/General Atomics (GA) Electromagnetic Systems	
Contract Title		EMALS CVN 79/CVN 80 Production	
Contract Address		3550 General Atomics Court San Diego, CA 92121	
Contracts/Effort Price, Quantity, and Performance (\$M)			
Initial Target Price		1072.5	Current Target Price
			1111.53
Initial Ceiling Price		N/A	Current Ceiling Price
			N/A
Contractor EAC		PM's EAC	
Initial Quantity		2	Current Quantity
			2
Delivered Quantity		0	
BAC		BCWP	
		ACWP	
BCWS		Cost Variance	
		Schedule Variance	

Contract Notes:

Contract N00019-14-C-0037 is a combined EMALS and Advanced Arresting Gear (AAG) CVN 79/CVN 80 Production contract with a total contract value of \$1,590M. The Current Target Price reflects EMALS-related funding only.

The Advanced Arresting Gear (AAG) program submitted a FY 2023 annual SAR that included procurement funding which is also reported in the CVN 78 Class SAR.

Cost Variance:

Cost Variance reporting is not required on this Firm Fixed Price (FFP) contract.

Schedule Variance:

Schedule Variance reporting is not required on this FFP contract.

UNCLASSIFIED

Contract Data (\$TYM)			
Contract Number		N00019-22-C-0033	
Effort Number		1	
Modification Number		P00002	
Award Date		December 28, 2021	
Definitization Date		December 28, 2021	
Order Number			
CAGE Code/CAGE Legal Name		4V360/General Atomics (GA) Electromagnetic Systems	
Contract Title		CVN 81 Advanced Arresting Gear (AAG)/EMALS Pre-production	
Contract Address		3550 General Atomics Court San Diego, CA 92121	
Contracts/Effort Price, Quantity, and Performance (\$M)			
Initial Target Price	37.8	Current Target Price	37.8
Initial Ceiling Price	N/A	Current Ceiling Price	N/A
Contractor EAC	37.8	PM's EAC	37.8
Initial Quantity	0	Current Quantity	0
		Delivered Quantity	0
BAC	BCWP	ACWP	
BCWS	Cost Variance	Schedule Variance	

Contract Notes:

This is the first time this contract is being reported. Contract N00019-22-C-0033 is a combined CVN 81 EMALS and AAG Pre-production contract with a total contract value of \$69.8 million. The PM's estimated price reflects the EMALS-related funding only. Naval Air Systems Command will modify this base contract to add CVN 81 EMALS and AAG shipset production.

Cost Variance:

Cost Variance reporting is not required on this Firm Fixed Price (FFP) contract.

Schedule Variance:

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

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Technologies and Systems Engineering

Significant Technical Risks

CVN 78 Significant Technical Risks	
Post Milestone B (September 2006)	
1.	CVN 78. Performance Risk: Meeting Threshold Key Performance Parameters. Driver: Performance vs Cost trade-off. Mitigation: Balanced whole ship design supported by timely technical decisions. Date: February 2007 (Interim Weight Report # 16).
2.	CVN 78. Performance Risk: Critical Technology Maturity and Ship Integration. Advanced Arresting Gear - Risk: Funding reductions will cause schedule delays. Drivers: Funding Deficiencies. Mitigation: Restore marks. Date: April 2007. Dual Band Radar - Risk: Integration with carrier systems may not support CVN 78 delivery dates. Drivers: Integration complexity. Mitigation: Integration studies, analysis, testing and monitoring of the DDG 1000 radar development effort. Date: June 2008. Electromagnetic Aircraft Launch System - Risk: Component delivery dates may miss required in yard dates for ship. Driver: Land-based testing schedule. Mitigation: Manage scheduled events leading to Low Rate Initial Production decision. Date: September 2009.
Current Estimate (December 2021)	
1.	There are no risks identified with this program.

Significant Technical Risks

EMALS Significant Technical Risks	
Post Milestone B (September 2006)	
1.	Electromagnetic Aircraft Launch System (EMALS). Performance Risk: EMALS - Risk: Component delivery dates may miss required in yard dates for ship. Driver: Land-based testing schedule. Mitigation: Manage scheduled events leading to Low Rate Initial Production decision. Date: September 2009
Current Estimate (December 2021)	
1.	There are no risks identified with this program.

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Deliveries and Expenditures

CVN 78 Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	0.00%
Production	1	1	4	25.00%
Total Program Quantity Delivered	1	1	4	25.00%

Expended and Appropriated (TY \$M)

Total Acquisition Cost:	58,919.7
Expended to Date:	32,986.81
Percent Expended:	56.0%
Total Funding Years:	37
Years Appropriated:	26
Percent Years Appropriated:	70.3%
Appropriated to Date:	40,470.14
Percent Appropriated:	68.7%

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

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

Expended and Appropriated (TY \$M)

Total Acquisition Cost:	3,898.94
Expended to Date:	2,566.43
Percent Expended:	65.8%
Total Funding Years:	29
Years Appropriated:	23
Percent Years Appropriated:	79.3%
Appropriated to Date:	3,129.73
Percent Appropriated:	80.3%

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

UNCLASSIFIED

Low Rate Initial Production

CVN 78

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	April 26, 2004	April 26, 2004
Approved Quantity	3	3
Reference	Milestone B ADM	Milestone B ADM
Start Year	2004	2004
End Year	2018	2018

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 due to the Acquisition Decision Memorandum (ADM) dated April 26, 2004 approving three ships.

LRIP Note:

The current LRIP quantity reflects three ships as approved by the CVN 21 (Future Aircraft Carrier) Program ADM of April 26, 2004.

On December 31, 2018 the Secretary of Defense provided Congressional notification in accordance with Section 121 of the FY 2019 National Defense Authorization Act (Public Law 115-232) certifying the CVN 80/81 two-ship buy cost savings and provided the Secretary of the Navy the authority to enter into a contract for the procurement of CVN 80/81 under a single contract.

A fourth ship was awarded in January 2019 with award of the CVN 80/81 two-ship buy Detail Design and Construction contract awarded on January 31, 2019.

EMALS**LRIP Note:**

EMALS has no LRIP quantities because the current LRIP decision occurred prior to the establishment of EMALS as a major subprogram.

UNCLASSIFIED

Operating and Support Costs

Total Program O&S Cost Compared with Baseline

CVN 78	Current APB Objective (BY\$)	Current APB Threshold (BY\$)	Current Estimate (BY\$)	Current Estimate (TY\$)	Deviation
Total O&S (\$Millions)	88360.2	97196.2	60104.3	206672.5	

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)	CVN 78
Unit-Level Manpower	137.3
Unit Operations	10.2
Maintenance	107.2
Sustaining Support	14.6
Continued System Improvements	31.2
Other	0.0
Total O&S	300.5

Cost Estimate Source: POE

O&S Cost Notes:

Total O&S cost for 11 ships would be 165,286.7 in BY00\$M/842,452.8 in TY00\$M.

Per OSD CAPE guidance, 6.0 Indirect Support is no longer included in the SAR submission.

- a. Disposal Cost is included in the Operating and Support Cost of the current APB objective and threshold for this program. Disposal/demilitarization total cost would be 6,854.2 in BY00\$M. Costs include inactivation and disposal of the ship, including EMALS, Advanced Arresting Gear (AAG), and the nuclear reactor core.
- b. Sustainment strategy includes nuclear aircraft carrier certified Naval Shipyards (Norfolk Naval Shipyard (NNSY), Puget Sound Naval Shipyard (PSNSY) & Intermediate Maintenance Facility (IMF)) and/or Huntington-Ingalls, Inc - Newport News Shipyard (HII-NNS) for depot-level maintenance in concert with regional multi-ship/multi-option (MSMO) contractors, Intermediate-level activities (e.g., Mid-Atlantic Regional Maintenance Center (MARMC), Southwest Regional Maintenance Center (SWRMC)), organizational-level maintenance strategies, and the employment of existing shore support to the maximum extent possible.
- c. For Each Acquired System or System Variant:
 - i. Quantity to Sustain: 4
 - ii. First Operational Fiscal Year: 2017
 - iii. Final Operational Fiscal Year: 2082
 - iv. Unit Expected Service Life: 50.0 years
- d. Antecedent System(s) O&S Costs: Single ship 50 year estimate: 17,223.5 in BY00\$M
 - i. The CVN 68 Class is the antecedent for the CVN 78 Class.
The CVN 68 O&S costs were derived from requirements, actual returns, and the Naval Visibility and Management of Operating and Support Costs (VAMOSC)

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database, with the primary focus using requirements. Unit level manpower was based on authorized billets (3,354) as detailed in the CVN 68 Ship Manpower Document (SMD); the billets were multiplied against the OSD composite rates for calculating the unit level manpower. Depot Maintenance (3.4) was derived from OPNAV Note 4700 (dated May 24, 2018).

Unit operations, intermediate maintenance, sustaining support, and continuing system improvements were derived from VAMOSC, with data pulled from FY 2000 through FY 2017, using full year data and excluding forward deployed ships.

Total Program O&S Cost Compared with Baseline

EMALS	Current APB Objective (BY\$)	Current APB Threshold (BY\$)	Current Estimate (BY\$)	Current Estimate (TY\$)	Deviation
Total O&S (\$Millions)	4899.6	5389.6	4163.0	12471.0	

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)	EMALS
Unit-Level Manpower	4.9
Unit Operations	0.0
Maintenance	9.5
Sustaining Support	2.5
Continued System Improvements	4.0
Other	0.0
Total O&S	20.8

Cost Estimate Source: POE

O&S Cost Notes:

Total O&S cost for 11 shipsets would be 10,510 in BY00\$M/49,881 in TY00\$M.

Per OSD CAPE guidance, 6.0 Indirect Support is no longer included in the SAR submission.

- a. EMALS inactivation and disposal costs are included in the CVN 78 Class inactivation and disposal cost.
- b. EMALS will be under a blended support and sustainment scenario by the Original Equipment Manufacturer (OEM), General Atomics (GA), and Navy support from Naval Air Systems Command (NAVAIR) PMA 251 as applicable. The intention is for GA to provide support and have the shipyards and the Navy to provide both industrial level support, (i.e. cranes, lifts, power (including step down backup) and air) as well as shop modifications, equipment to support motor repairs, equipment storage areas, and temperature controls.

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Final maintenance planning information was approved in the first quarter FY 2018 as part of Naval Supply Systems Command approval of the Provisioning Technical Data.

- c. For Each Acquired System or System Variant:
 - i. Quantity to Sustain: 4
 - ii. First Operational Fiscal Year: 2017
 - iii. Final Operational Fiscal Year: 2082
 - iv. Unit Expected Service Life: 50.0 years
- d. Antecedent System(s) O&S Costs: N/A
 - v. No antecedent.
EMALS is specifically designed to meet the requirements of the CVN 78 Class. The advanced technologies and capabilities, and unique ship interface requirements of EMALS do not exist in any legacy launcher systems. As such, there are no comparable antecedent systems.

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