

UNCLASSIFIED



**CLEARED AS AMENDED
For Open Publication**

8
Apr 28, 2022

Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

LITTORAL COMBAT SHIP MISSION MODULES (LCS MM)

December 2021 Selected Acquisition Report (SAR)



DECEMBER 31, 2021
DEPARTMENT OF THE NAVY

UNCLASSIFIED

Contents

Common Acronyms and Abbreviations for MDAP Programs	2
Program Manager	3
Mission and Description	3
Executive Summary	4
History of Significant Developments Since Program Initiation	6
Schedule	7
Schedule Events	7
Schedule Notes:	7
Deviation Explanations:	7
Performance	9
Performance Notes:	9
Requirements Source:	10
Acquisition Budget Estimate	11
Total Acquisition Cost	11
Total End Item Quantity	11
Budget Notes:	11
Quantity Notes:	12
APB Unit Cost Deviations Explanations:	13
Risk and Sensitivity Analysis	14
Unit Cost	14
Current Baseline Compared with Current Estimate	14
Original Baseline Compared with Current Estimate	14
Current Baseline PAUC NMC Breach Explanation:	15
Original Baseline PAUC NMC Breach Explanation:	15
Current Baseline APUC NMC Breach Explanation:	15
Contracts	16
Contract Notes:	16
Contract Notes:	17
Contract Notes:	18
Technologies and Systems Engineering	19
Significant Technical Risks	19
Deliveries and Expenditures	20
Deliveries and Expenditures Notes:	20
Low Rate Initial Production	21
LRIP Note:	21
Operating and Support Costs	22
Total Program O&S Cost Compared with Baseline	22
O&S Cost Breakdown	22
Cost Estimate Source	22
O&S Cost Notes	22

UNCLASSIFIED

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
\$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
\$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
\$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost
PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

UNCLASSIFIED

Program Manager

Name: Captain Godfrey (Gus) Weekes

Date Assigned: April 26, 2019

Address: 1333 Isaac Hull Ave SE, Bldg 197 Washington Navy Yard, DC 20037

Phone: 202-781-2303

Email: godfrey.d.weekes.mil@us.navy.mil

Mission and Description

The Littoral Combat Ship (LCS) is a fast, agile, and networked surface combatant optimized for operations close to shore, otherwise known as the littorals. The LCS Mission Modules (MM) Program provides a modular, focused mission capability to the Combatant Commanders to provide assured access against littoral threats. The primary missions for the LCS include countering littoral mine and surface threats to assure maritime access for Joint Forces.

A Mission Package (MP) consists of Mission Modules with crew and support aircraft. Mission Modules combine Mission Systems (vehicles, sensors, weapons) and support equipment that install into the ship via standard interfaces.

Mission Modules are added to the Mission Package baselines incrementally as they reach a level of maturity necessary for fielding. This approach provides for continuous improvement of warfighting capability through an evolutionary acquisition process.

UNCLASSIFIED

Executive Summary

Significant Accomplishments:

The LCS MM Program continues to incrementally field additional capabilities to the Fleet. The Program of Record (PoR) will field capabilities as approved in the budget and in-phase with ship deliveries. With the PB for FY 2023 submission, the Navy has revised the LCS MM Program quantities to align with the proposed LCS decommissioning's and to reflect the planned divestment of the Anti-Submarine Warfare (ASW) Mission Package (MP) from LCS. The revised quantities include a total of 35 MPs as follows:

- 24 Mine Countermeasures (MCM) MPs for LCS and Vessels Of Opportunity (VOOs)
- 10 Surface Warfare (SUW) MPs
- 1 ASW MP – previously procured with FY 2020 and FY 2021 funds.

The 24 deployable MCM MPs will support 15 Independence variant LCS (LCS 10-38) and the Chief of Naval Operations direction to use other Navy platforms (VOOs). The 10 deployable SUW MPs procured from FY 2010 to FY 2018 will support 8 LCS (LCS 6, 8, and all Freedom variant – LCS 21, 23, 25, 27, 29, 31). Additionally, the 10 SUW MPs will remain in-service to support LCS deployments on other hulls until MCM MPs are delivered in quantities sufficient to support LCS 10-38.

SUW MP:

- SUW MP is mature and operating in the Fleet today (FY 2021 deployments included LCS 4, 5, 6, 10, 11, 12, 13 and 15)
- Five Surface to Surface Missile Module (SSMM) production units awarded with FY19-FY21 Other Procurement, Navy (OPN). Delivery of first SSMM occurred in February 2022.
- Certified SSMM for deployment on Independence (IND) variant. Successfully completed its Mission Package Certification Decision in December 2021 with the final certification letter signed February 2022.
- In January 2022, LCS 5 with a U.S. Coast Guard (USCG) Law Enforcement Detachment embarked with the 11M Rigid Hull Inflatable Boat (RHIB), part of SUW MP, and MH-60S helicopter successfully executed counternarcotics missions including the capture of \$22M in suspected cocaine.
- SUW MP Cyber Security Testing resumed in November 2021. Based on competing Fleet deployment priorities, SUW MP Cyber Security Testing is projected to complete aboard LCS 9 in August 2022.

ASW MP:

- Continued testing on LCS 3 of the ASW MP for Freedom (FRE) variant.
- Successfully tracked and engaged a target, submarine asset in October 2020
- Completed performance modeling and hydrodynamic design of ASW MP systems.
- Completed transducer acoustic and reliability testing at Naval Undersea Warfare Center (NUWC) Seneca Lake in FY 2021 and early FY 2022.
- Conducted hydrodynamic testing at the Large Cavitation Channel in January 2022 to determine tow cable and transmit array interactions.
- Testing completed to date has included towed targets and live submarine assets, and focused on improving hydrodynamic stability and reliability.
- Significant challenges and risk currently remain in resolving hydrodynamic and transducer issues. With PB 2023, the ASW MP will be divested with no additional procurements beyond LRIP #1 (procured 3Q FY 2020) planned.

MCM MP:

- MCM MP Aviation Modules (Near Surface Detection, Airborne Mine Neutralization, and Coastal Mine Reconnaissance) completed integration on Freedom and Independence variants and are certified for deployment on both variants.
- MCM MP Aviation Modules were embarked on LCS 14 in FY 2021.

UNCLASSIFIED

- The Aviation Modules were embarked and deployed on LCS 16 and 18 in 2Q FY 2021 to 7th Fleet Area of Responsibility (AoR).
- In 1Q FY 2022, LCS 16 participated in Maritime Training Activity Malaysia with the Royal Malaysian Navy
- Supported the completion of Unmanned Influence Sweep System (UISS) (MCM Unmanned Surface Vehicle (USV) + Minesweeping Payload Delivery System (PDS)) Shipboard Initial Operational Test and Evaluation (IOT&E) in June 2021 and UISS Underwater Explosive (UNDEX) shock testing completion in October 2021.
- Successfully embarked the Remote Minehunting (RMH) Module on LCS 20 in September and October 2021.
- Completed Buried Minehunting (BMH) Module integration events with Knifefish Block 0 and RMH Module integration events with shipboard testing on Independence variant in October 2021.

Significant Issues:

With the PB 2019 budget submission, the LCS MM Program incurred a cost breach due to a 25% reduction in the original baseline MP quantity from 64 MPs to 44 deployable MPs. The revised 44 deployable MP quantity was designated by the CNO and certified by the Office of the Secretary of Defense for PB 2019. The PB 2019 certified MP quantities increased the proportion of the most expensive MP (MCM) relative to the least expensive MPs (ASW & SUW), increasing the average MP cost. Based on the certified quantities, the PM estimated a 16% increase to the original APB baseline established at Milestone B, resulting in a significant Nunn-McCurdy breach for PAUC. On September 28, 2018, the LCS MM Program was re-baselined with APB Change 1.

With the PB 2023 budget submission, the LCS MM Program has incurred a cost breach due to a 20% reduction in the current baseline MP quantity from 44 deployable MPs to 35 MPs. The revised 35 MP quantity aligns to the proposed LCS decomissionings and ASW MP divestment from LCS in PB 2023 and increased the proportion of the most expensive MP (MCM) relative to the least expensive MPs (ASW & SUW), increasing average MP cost. Based on the revised quantities, the PM estimates an 18% unit cost increase to the current APB Change 1 baseline for PAUC, 17% increase for APUC, and a 37% increase to the original APB baseline for PAUC, resulting in a significant Nunn-McCurdy breach.

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

PEO Comments:

ASN RD&A approved Milestone B for the LCS MM program on January 7, 2014. ASN RD&A waived the following provisions of Section 2366b of Title 10, United States Code:

1. 2366b(a)(1)(D) " That funding is available to execute the product development and production plan under the program, through the period covered by the FYDP submitted during the fiscal year in which the certification is made, consistent with the estimates described in subparagraph (1)(C) for the program, having determined that, but for such a waiver, the Department would be unable to meet critical national security objectives.
2. 2366(b)(2): That the MDA has received a PDR and conducted formal post-PDR assessment, and certifies on the basis of such assessment that the program demonstrates a high likelihood of accomplishing its intended mission, having determined that, but for such a waiver, the Department would be unable to meet critical national security objectives.

ASN RD&A increased the LCS MM program LRIP authority to 44 MPs on February 14, 2020. The current total LRIP quantity is more than 10% of the total production quantity due to leveraging several individual Programs of Record (PoRs) as separate ACAT programs.

UNCLASSIFIED

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	Significant Development Description
MAY 2004	Milestone A / Program Initiation for the LCS Seaframes and Mission Modules.
APR 2011	ADM signed splitting the LCS Seaframe and LCS MMs into two separate MDAPs.
OCT 2012	USD(AT&L) signed ADM of October 3, 2012 re-designating the LCS MM program as an ACAT IC program.
NOV 2013	USD(AT&L) approved the APB based on a Resources & Requirements Review Board conducted August 6, 2013. Initial APB included a quantity 64 deployable mission packages (MPs).
JAN 2014	The program achieved Milestone B approving entry into the EMD phase and procurements of five developmental MPs and up to 27 LRIP MPs.
DEC 2015	Secretary of Defense Memo of December 14, 2015 directed the Navy to build no more than 40 LCS and Frigate and to down select to one variant no later than FY 2019. Navy submitted a 40 ship SAR (29 LCS / 11 Frigate), consistent with PB 2017 and SECDEF guidance. Navy initiated review of the LCS Mission Package quantities based on updated LCS quantities.
FEB 2016	Chief of Naval Operations (CNO) directed the establishment of the LCS Review Team to review the LCS operations and sustainment strategy and number of mission packages required to support the LCS Seaframes.
FEB 2018	With the PB 2019 submission, the Navy reduced MP quantities (from 64 to 48 total MPs consisting of 44 deployable and 4 non-deployable Engineering Development Model (EDM) MPs) based upon the total planned 32 LCS class ships, pending FY 2018 and FY 2019 budget approvals, and CNO direction to use other Navy platforms (Vessels of Opportunity) to host the Mine Countermeasures (MCM) MP to comply with Section 1046 of the FY 2018 NDAA which prohibits the retirement of legacy MCM forces until the Navy has identified a replacement capability and procured a quantity of such systems to meet combatant MCM operational requirements that are currently being met by legacy forces. The PB 2020 submission supports procurement of 24 MCM MPs, 10 Surface Warfare (SUW) MPs, and 10 Anti-Submarine (ASW) MPs.
AUG 2018	MDA signed ADM of August 20, 2018 increasing quantity of developmental ASW MPs from one to two resulting in a total of 5 non-deployable EDM MPs. In addition, this ADM authorized removal of the LRIP decision (Milestone C) for the LCS MM Program on the basis that 12 of the 13 mission systems that comprise the LCS MM Program will achieve independent LRIP decisions as separate ACAT programs.
SEP 2018	MDA approved the LCS MM Program re-baseline via APB Change 1.
FEB 2020	MDA signed ADM of February 14, 2020 increasing LRIP authority to 44 Mission Packages.
JAN 2021	JROC approved revised Navy requirements in a new MCM MP Capabilities Development Document.
APR 2022	With the PB 2023 submission, the Navy reduced MP quantities to 35 MPs (24 MCM MPs, 10 SUW MPs, 1 ASW MP), and 5 non-deployable EDMs (1 MCM MP, 2 SUW MPs, 2 ASW MPs), 40 total MPs based on the planned LCS ship decommissionings and ASW MP divestment from LCS.

UNCLASSIFIED

Schedule

Schedule Events

Schedule Events					
Events	Development APB Objective	Current APB Development Objective/Threshold		Current Estimate/Actual	Deviation
Milestone A (Combined LCS program)	MAY 2004	MAY 2004	MAY 2004	MAY 2004	
Mission MP, Production, and Assembly contract award	MAR 2006	MAR 2006	MAR 2006	MAR 2006	
First MCM MP delivery	SEP 2007	SEP 2007	SEP 2007	SEP 2007	
First SUW MP delivery	JUL 2008	JUL 2008	JUL 2008	JUL 2008	
Milestone A Prime	AUG 2009	AUG 2009	AUG 2009	AUG 2009	
Milestone B	AUG 2013	JAN 2014*	JAN 2014*	JAN 2014*	
SUW MP IOC	N/A	NOV 2014*	NOV 2014*	NOV 2014*	
ASW MP IOC	N/A	SEP 2020*	SEP 2021*	N/A (Ch-1)	Yes
MCM MP IOC	N/A	JUN 2022*	JUN 2023*	SEP 2022* (Ch-2)	

Schedule Notes:

(Ch-1) Anti-Submarine Warfare (ASW) Mission Package (MP) IOC changed from June 2020 to N/A as the ASW MP will be divested in FY 2023. With this divestment, the LCS MM Program will no longer have an ASW MP requirement.

(Ch-2) Mine Countermeasures (MCM) MP IOC changed from June 2022 to September 2022 due to revised MCM MP test schedules driven by Unmanned Influence Sweep System (UISS) Initial Operational Test and Evaluation (IOT&E) delays and completion of system-level MCM Unmanned Surface Vehicle (USV) Minehunting contractor verification testing.

Threshold dates for ASW MP and MCM MP IOC are set to 12 months vice 6 months to be consistent with the Milestone B APB. The test schedule is heavily reliant on ship availability and the duration of testing for the ASW and MCM MPs is approximately a year. Any small deviation in schedule would likely result in a schedule breach if objective to threshold remained at 6 months.

Items are listed as N/A above due to revision of Schedule Events when the APB was updated with LCS MM APB Change 1. Milestone C was removed because nearly all of the LCS mission systems that comprise the LCS MM Program's MPs achieve independent Milestone C decisions in separate acquisition programs. Additionally, the IOC dates for each MP were consolidated to a single IOC date for each warfare area instead of multiple increments.

Deviation Explanations:

On June 7, 2021, the LCS MM Program notified the MDA of a schedule breach to the ASW MP IOC date due to delays completing formal ASW MP testing as a result of system hydrodynamic instability, system availability, ship availability, and limited availability of submarine test assets for testing in FY 2020 and FY 2021.

UNCLASSIFIED

Significant Schedule Risks

Significant Schedule Risks	
Current Estimate (December 2021)	
1. Milestone B January 2014	Program is delivering mission systems as able to under sequestration-level budget constraint. Congressional Marks adversely impact ability to procure systems, delaying delivery of capability to the fleet to meet operational needs.
2. APB Change 1 9/2018	The Program did not report any schedule risks in APB Change 1.
3. Current Estimates December 2021	The Program is tracking schedule risk to complete all entry criteria to support achieving MCM MP IOC in 4Q FY 2022. The Navy is currently conducting Minehunting testing at the system-level with the MCM USV, AQS-20 sonar, and Minehunting PDS. Based on testing progress, additional Minehunting Data Collection may be necessary to complete all test objectives planned at the system-level prior to MCM MP IOT&E. MCM MP End-to-End IOT&E is scheduled to complete in late 4Q FY 2022 with cyber security testing in 1Q FY 2023. Based on nominal test reporting timelines by OPTEVFOR and DOT&E, the outputs of which support IOC, the Program may not receive approved test reports until late 1Q FY 2023 resulting in a delay to MCM MP IOC. MCM MP IOC would still be in advance of the APB threshold of June 2023.
4. Current December 2021	The Program has incurred production delays due to extended material lead times, sub-tier suppliers experiencing raw material shortages, and related labor complications as a result of the COVID-19 pandemic increasing schedule risk for mission system and support equipment/container hardware deliveries. For example, the Surface to Surface Missile Module (SSMM) Prime Contractor has indicated a potential schedule delay for the four SSMM in production because of COVID-19 impacts due to availability of Honeycomb panels as a result of the original supplier of the core material going out of business. The Program has accounted for this delay and working with Fleet to establish a plan for deployment of the modules. The Fleet plans to continue to embark and deploy Surface Warfare (SUW) MPs with SSMMs as they deliver from the production line. The Program has delivered the first production SSMM in February 2022 which will be ready for deployment in Q3 FY 2022, as well as all 10 deployable SUW MP with Gun Mission Modules (GMM), Maritime Security (MSM), and Aviation assets to the Fleet.
5. Current December 2021	Completing testing for the ASW MP has high schedule risk. ASW MP maturation continued with design improvements and testing. Program schedule has been impacted by system reliability/hydrodynamic stability, LCS 3 (test platform) materiel availability, and submarine (target) availability during FY 2021. Program focus has been on maturing the underwater vehicle's hydrodynamic stability through the rapid implementation of active roll controls. Hydro maturation efforts are expected to last through July 2022. In part due to assessed high risk of the hydrodynamic corrective actions as well as transducer reliability and performance, PB 2023 divests the ASW mission for LCS. With this divestment, the Program will conduct an orderly shutdown of the ASW MP. Discussions are ongoing with the Original Equipment Manufacturer on the contractual way ahead.

UNCLASSIFIED

Performance

Performance Characteristics					
Development APB Objective	Current APB Development Objective/Threshold	Demonstrated Performance (include Date of Demonstration)	Current Estimate/Actual	Deviation	
Mine Countermeasures (MCM) Mission Package (MP)					
Material Availability					
.712	.712	.64	TBD	.64	
Train to Certify					
Trained-to-Certify at all Team (Watch Section) levels	Trained-to-Certify at all Team (Watch Section) levels	Trained-to-Certify at all Team (Watch Section) levels		N/A	
Surface Warfare (SUW) MP					
Material Availability					
.712	.712	.64	TBD	.87	
Train to Certify					
Trained-to-Certify at all Team (Watch Section) levels	Trained-to-Certify at all Team (Watch Section) levels	Trained-to-Certify at all Team (Watch Section) levels	TBD	Trained-to-Certify at all Team (Watch Section) levels	
Anti-Submarine Warfare (ASW) MP					
Material Availability					
.712	.712	.64		N/A	
Train to Certify					
Trained-to-Certify at all Team (Watch Section) levels	Trained-to-Certify at all Team (Watch Section) levels	Trained-to-Certify at all Team (Watch Section) levels		N/A	

Performance Notes:

Reflects APB Change 1 requirements.

The MCM MP CDD with Command and Control (C2)/Integration based KPPs received joint validation and final approval from JROC and OPNAV on January 28, 2021. These updated requirements focus on C2 and Integration – areas of modular MCM MP operations not previously demonstrated during mission system level testing. Reporting will be aligned to these KPPs when the APB is updated in accordance with the approved MCM MP CDD. Demonstrated Performance is blank as performance has not yet been demonstrated since MCM MP testing has not been completed. Testing will be conducted in accordance with the KPPs in the MCM MP CDD. Current Estimates are N/A as the MCM MP CDD has replaced the performance requirements listed with Command and Control (C2)/Integration based KPPs.

UNCLASSIFIED

Demonstrated Performance is blank as performance for the ASW MP has not been demonstrated since testing has not been completed. Current Estimates are N/A as the ASW MP is planned to be divested from LCS eliminating the ASW MP requirement.

Interoperability Information Exchange Requirement KPP replaced by Net Ready KPP.

Classified Performance is available in Classified Annex.

Requirements Source: LCS Flight 0 Capability Development Document (CDD) dated May 25, 2004. JROC. LCS Flight 0+ CDD dated June 17, 2008. JROC.

UNCLASSIFIED

Acquisition Budget Estimate

Total Acquisition Cost

Category (\$M)	Base Year	Development APB	APB Change 1 (Current) 09/28/2018		Budget Estimate PB 2023		Deviation
		Objective (BY\$)	Objective (BY\$)	Threshold (BY\$)	BY\$	TY\$	
RDT&E	2010	\$ 2,233.7	\$ 2,369.3	\$2,606.2	\$ 2,380.4	\$ 2,546.3	
Procurement	2010	\$ 4,116.7	\$ 3,279.6	\$ 3,634.3	\$ 3,058.2	\$ 4,045.8	
MILCON	2010	\$ 29.1	\$ 36.1	\$ 39.7	\$ 36.1	\$ 44.4	
Acq. O&M	2010	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	
Total		\$ 6,379.5	\$ 5,685.0	\$ 6,280.2	\$ 5,474.8	\$ 6,636.4	
PAUC	2010	\$ 99.7	\$ 116.0	N/A	\$ 136.9	N/A	
APUC	2010	\$ 69.8	\$ 74.5	N/A	\$ 87.4	N/A	

Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	5	5
Procurement	44	35

Budget Notes:

RDT&E, Navy; Other Procurement, Navy (OP,N); and Weapons Procurement, Navy (WP,N) costs associated with replacement, attrition, and technology refresh (RAT) costs are accounted for in O&S per the LCS MM APB.

- RDT&E, Navy reflects PB 2023 budget controls, however, RDT&E,N for this SAR submission deviates from the PB 2023 budget due to RAT costs for the development associated with obsolescence/technology refreshes for the Mission Package Computing System (MPCE), Multiple Vehicle Communications System (MVCS), and MPCE Sonar Signal Processing System which are being captured under O&S. RDT&E,N further deviates from budget in this SAR to fully account for divestment of the ASW MP.
- OP,N reflects PB 2023 controls, however, OP,N for this SAR submission deviates from the PB 2023 budget due to RAT costs for Airborne Mine Neutralization System, Airborne Laser Mine Detection System, Gun Module Modernization, and 11m Rigid Hull Inflatable Boats, Surface Warfare Mission Package Obsolescence, MPCE, Mission Package Portable Control Station (MPPCS), MVCS, Common Mission Package Trainer, and MPCE Sonar Signal Processing obsolescence/technology refreshes which are being captured under O&S. OP,N further deviates from budget in this SAR to fully account divestment of the ASW MP.
- WP,N includes initial procurement costs for the Longbow Hellfire missiles for the Surface to Surface Missile Module (SSMM). WP,N costs for replenishment missiles accounted for in O&S.

History of Acquisition Cost and Budget Cost Since December 2001:

- In November 2013, LCS MM Development APB (Original) was established in support of Milestone B. Total Acquisition Cost was \$7448.30M TY, \$6379.50M BY (Total QTY = 64). PAUC was \$116.38M TY, \$99.68M BY (QTY = 64); and APUC was \$84.66M TY, \$69.77M BY (QTY = 59).

UNCLASSIFIED

- In February 2018, the Navy reduced total Mission Package (MP) quantity from 64 to 48 with the submission of PB 2019. The December 2017 SAR reflected the new Total Acquisition Cost as \$6478.70 TY, \$5580.60M BY. PAUC was \$134.973 TY, \$116.262M BY (QTY = 48); and APUC was \$93.695M TY, \$75.791 BY (QTY = 44).
 - Based on a 16% increase from the original APB baseline established at Milestone B, the LCS MM Program had a significant Nunn-McCurdy breach for PAUC. The PB 2019 revised MP quantities also increased proportion of Mine Countermeasures (MCM) MPs relative to Anti-Submarine Warfare (ASW) & Surface Warfare (SUW) MPs, increasing average MP cost.
- In September 2018, APB Change 1 was approved in accordance with the PB 2019 certified quantities with the additional ASW MP Engineering Development Model (EDM) authorized via the August 2018 ADM, increasing the total MP quantity from 48 to 49. New Total Acquisition Cost was \$6606.50M TY, \$5685.00M BY; PAUC was \$134.83M TY, \$116.02M BY (QTY = 49); APUC was \$91.98M TY, \$74.54M BY (QTY = 44).
- With the PB 2023 budget submission, the Navy divested the ASW MP reducing MP quantities. The December 2021 SAR reflects the new Total Acquisition Cost as \$6,636.4M TY, \$5,474.8M BY; PAUC was \$136.9M BY (QTY = 40); APUC was \$87.4M BY (QTY = 35).
 - Due to the reduction in overall MP quantities, the Program estimates an 18% and 17% unit cost increase from the current APB Change 1 baseline in PAUC and APUC respectively, as well as a 37% increase in PAUC from the original baseline established at Milestone B, the LCS MM Program has a significant Nunn-McCurdy breach. Additionally, the revised MP quantities increase proportion of MCM MPs relative to ASW & SUW MPs, increasing average MP cost.

Quantity Notes:

The LCS MM Program uses Mission Packages (MP) as its quantity unit of measure. A MP consists of mission modules, plus a mission crew detachment and supporting aircraft. The program provides funding to other programs for the purpose of procuring mission systems (MS). These MS (offboard vehicles, sensors, and weapons) are then combined with common mission modules equipment. For the purposes of Congressional visibility into program execution, the annual PB submission breaks out these MS procurements in detail.

With the PB for FY 2023 submission, the Navy has revised the LCS MM Program quantities to align with the proposed LCS decommissioning's and to reflect the planned divestment of the ASW MP from LCS. The revised quantities include a total of 35 MPs as follows:

- 24 MCM MPs for LCS and Vessels Of Opportunity (VOOs)
- 10 Surface Warfare (SUW) MPs
- 1 Anti-Submarine Warfare (ASW) MP – previously procured with FY 2020 and FY 2021 funds.

The 24 deployable MCM MPs will support the 15 Independence variant LCS (LCS 10-38) and the Chief of Naval Operations direction to use other Navy platforms (VOOs) to comply with Section 1046 of the FY 2018 National Defense Authorization Act (NDAA) (P.L. 115-91), as modified by the FY 2021 NDAA (P.L. 116-283), which prohibits the retirement of legacy MCM forces until the Navy has identified a replacement capability, and OSD Director, Operational Test & Evaluation (DOT&E) has certified that capability, and procured a quantity of such systems to meet combatant MCM operational requirements that are currently being met by legacy forces. The 10 deployable SUW MPs procured from FY 2010 to FY 2018 will support eight LCS (LCS 6, 8, and all Freedom variant – LCS 21, 23, 25, 27, 29, and 31). Additionally, the 10 SUW MPs will remain in-service to support LCS deployments until MCM MPs are delivered in quantities sufficient to support LCS 10-38.

The 35 MPs along with five non-deployable EDM MPs equate to 40 total MPs. The 35 MPs are comprised of deployable, production representative systems (one deployable SUW MP was procured with both RDT&E, Navy and Other Procurement, Navy (OPN) and is included in the inventory objective of 10 SUW

UNCLASSIFIED

MPs), as well as the one production ASW MP procured with FY 2020-FY 2021 OPN funds. The five non-deployable EDM assets are comprised of one MCM MP, two SUW MPs, and two ASW MP, which are not included in the deployable MP quantities.

APB Unit Cost Deviations Explanations:

With the PB 2019 budget submission, the LCS MM Program incurred a cost breach due to a 25% reduction in the original baseline MP quantity from 64 MPs to 44 deployable MPs. The revised 44 deployable MP quantity was designated by the CNO and certified by the Office of the Secretary of Defense for PB 2019. The PB 2019 certified MP quantities increased the proportion of the most expensive MP (MCM) relative to the least expensive MPs (ASW & SUW), increasing the average MP cost. Based on the certified quantities, the PM estimated a 16% increase to the original APB baseline established at Milestone B, resulting in a significant Nunn-McCurdy breach for PAUC. On September 28, 2018, the LCS MM Program was re-baselined with APB Change 1.

With the PB 2023 budget submission, the LCS MM Program has incurred a cost breach due to a 20% reduction in the current baseline MP quantity from 44 deployable MPs to 35 MPs. The revised 35 MP quantity aligns to the proposed LCS decomissionings and ASW MP divestment from LCS in PB 2023 and increased the proportion of the most expensive MP (MCM) relative to the least expensive MPs (ASW & SUW), increasing average MP cost. Based on the revised quantities, the PM estimates an 18% unit cost increase to the current APB Change 1 baseline for PAUC and 17% for APUC, and a 37% increase to the original APB baseline for PAUC resulting in a significant Nunn-McCurdy breach.

UNCLASSIFIED

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Procurement Cost (December 2021)	
1.	The Program has incurred production delays due to extended material lead times, sub-tier suppliers experiencing raw material shortages, and related labor complications as a result of the COVID-19 pandemic increasing risk for procurement cost overruns for mission systems, support equipment, and support container hardware.
Original Baseline Estimate: Milestone B (January 2014)	
1.	The Navy accepted full funding responsibility in accordance with the Service Cost Position policy in support of the FY 2014 – FY 2018 FYDP.
Current Baseline Estimate: APB Change 1 (September 2018)	
1.	In support of the FY 2018 program re-baseline, a Program Life Cycle Cost Estimate (PLCCE) was developed as the cost baseline for the revised APB (APB Change 1 approved September 2018). The program performed a risk assessment on the remaining drivers of acquisition cost impacting Program Acquisition Unit Cost (PAUC) and Average Procurement Unit Cost (APUC). With an inventory objective of 44 deployable mission packages, the Program is at low risk of breaching PAUC and APUC objectives approved in the APB Change 1.

Unit Cost

Current Baseline Compared with Current Estimate

Category (BY10\$M)	Current APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	\$ 5,685	\$ 5,475	-4%	-
Quantity	49	40	-18%	-
Unit Cost	\$ 116	\$ 137	18%	Yes
APUC				
Cost	\$3,280	\$3,058	-7%	-
Quantity	44	35	-20%	-
Unit Cost	\$75	\$87	17%	Yes

Original Baseline Compared with Current Estimate

Category (BY10\$M)	Original APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	\$ 6,380	\$ 5,475	-14%	-
Quantity	64	40	-38%	-
Unit Cost	\$ 100	\$ 137	37%	Yes
APUC				
Cost	\$ 4,117	\$ 3,058	-26%	-
Quantity	59	35	-41%	-
Unit Cost	\$ 70	\$ 87	25%	No

UNCLASSIFIED

Current Baseline PAUC NMC Breach Explanation:

With the PB 2023 budget submission, the LCS MM Program has incurred a cost breach due to a 20% reduction in the current baseline Mission Package (MP) quantity from 44 deployable MPs to 35 MPs. The revised 35 MP quantity aligns to the proposed LCS decommissionings and ASW MP divestment from LCS in PB 2023 and increased the proportion of the most expensive MP (Mine Countermeasures (MCM)) relative to the least expensive MPs (Anti-Submarine Warfare (ASW) & Surface Warfare (SUW)), increasing average MP cost. Based on the revised quantities, the PM estimates an 18% increase to the current APB Change 1 baseline, resulting in a Significant Nunn-McCurdy breach for PAUC.

Original Baseline PAUC NMC Breach Explanation:

With the PB 2019 budget submission, the LCS MM Program incurred a cost breach due to a 25% reduction in the original baseline MP quantity from 64 to 48 with the submission of PB 2019. The PB 2019 revised quantity, designated by Office of Chief of Naval Operations (CNO) and certified by the Office of the Secretary of Defense, also increased proportion of MCM MPs relative to ASW & SUW MPs, increasing average MP cost. Based on the new certified quantities, the PM, LCS MM, estimated a 16% increase to the original APB baseline established at Milestone B, resulting in a Significant Nunn-McCurdy breach for PAUC.

With the PB 2023 budget submission, the LCS MM Program has incurred a cost breach due to a 20% reduction in the current baseline MP quantity from 44 deployable MPs to 35 MPs. The revised 35 MP quantity aligns to the proposed LCS decommissionings and ASW MP divestment from LCS in PB 2023 and increased the proportion of the most expensive MP (MCM) relative to the least expensive MPs (ASW & SUW), increasing average MP cost. Based on the revised quantities, the PM estimates a 37% increase to the original APB baseline established at Milestone B, resulting in a Significant Nunn-McCurdy breach for PAUC.

Current Baseline APUC NMC Breach Explanation:

With the PB 2023 budget submission, the LCS MM Program has incurred a cost breach due to a 20% reduction in the current baseline MP quantity from 44 deployable MPs to 35 MPs. The revised 35 MP quantity aligns to the proposed LCS decommissionings and ASW MP divestment from LCS in PB 2023 and increased the proportion of the most expensive MP (MCM) relative to the least expensive MPs (ASW & SUW), increasing average MP cost. Based on the revised quantities, the PM estimates a 17% increase to the current APB Change 1 baseline, resulting in a Significant Nunn-McCurdy breach for APUC.

UNCLASSIFIED

Contracts

Northrop Grumman Contract - Design Engineering Production & Sustainment (DEP&S)

Contract Data (\$TYM)		
Contract Number	N00024-17-C-6311	
Effort Number	N/A	
Modification Number	P00088	
Award Date	16 MAR 2017	
Definitization Date	16 MAR 2017	
Order Number	N/A	
CAGE Code/CAGE Legal Name	26512	
Contract Title	Design, Engineering, Production & Sustainment	
Contract Address	925 Oyster Bay Road, Bethpage, NY 11714-1035	
Contracts/Effort Price, Quantity, and Performance (\$M)		
Initial Target Price \$23,037,260	Current Target Price \$292,743,566	
Initial Ceiling Price \$812,000,000	Current Ceiling Price \$381,517,683	
Contract's EAC N/A	PM's EAC N/A	
Initial Quantity N/A	Current Quantity N/A	Delivered Quantity N/A
BAC N/A	BCWP N/A	ACWP N/A
BCWS N/A	Cost Variance N/A	Schedule Variance N/A

Contract Notes:

Target Price reflects funded value on contract. Initial Target Price includes funded value for CLINs awarded on contract at time of award. Current Target Price includes funded value for all CLINs exercised on contract due date. Ceiling Price reflects total value of the contract if all available options are exercised. Ceiling Price has decreased because several CLINs were not exercised prior to expiration and have been removed.

Cost Variance:

Cost Variances are not reported for this contract, because all active non-level of effort CLINs are firm fixed priced and no EVM reporting is required because the threshold requirements for EVM reporting are not met.

Schedule Variance:

Schedule Variances are not reported for this contract, because all active non-level of effort CLINs are firm fixed priced and no EVM reporting is required because the threshold requirements for EVM reporting are not met.

UNCLASSIFIED

Advanced Acoustic Concepts (AAC) Contract – Mission Package Computing, Software, and Trainers

Contract Data (\$TYM)		
Contract Number	N00024-19-C-6311	
Effort Number	N/A	
Modification Number	P00017	
Award Date	09/27/2019	
Definitization Date	N/A	
Order Number	N/A	
CAGE Code/CAGE Legal Name	4GPS8	
Contract Title	Mission Package Computing, Software, and Trainers	
Contract Address	425 Oser Ave Hauppauge, NY 11789	
Contracts/Effort Price, Quantity, and Performance (\$M)		
Initial Target Price \$13,108,701.98	Current Target Price \$45,100,607.44	
Initial Ceiling Price \$78,519,044	Current Ceiling Price \$78,519,044	
Contract's EAC N/A	PM's EAC N/A	
Initial Quantity N/A	Current Quantity N/A	Delivered Quantity N/A
BAC N/A	BCWP N/A	ACWP N/A
BCWS N/A	Cost Variance N/A	Schedule Variance N/A

Contract Notes:

Target Price reflects funded value on contract. Initial Target Price includes funded value for CLINs awarded on contract at time of award. Current Target Price includes funded value for all CLINs exercised on contract due date. Ceiling Price reflects total value of the contract if all available options are exercised.

Cost Variance:

Cost Variances are not reported for this contract, because all active non-level of effort CLINs are firm fixed priced and no EVM reporting is required because the threshold requirements for EVM reporting are not met.

Schedule Variance:

Schedule Variances are not reported for this contract, because all active non-level of effort CLINs are firm fixed priced and no EVM reporting is required because the threshold requirements for EVM reporting are not met.

UNCLASSIFIED

Raytheon Contract – Anti-Submarine Warfare (ASW) Rapid Technology Insertion (RTI)

Contract Data (\$TYM)		
Contract Number	N66604-15-C-086C	
Effort Number		
Modification Number	P00074	
Award Date	22 July 2015	
Definitization Date	N/A	
Order Number	N/A	
CAGE Code/CAGE Legal Name	94404 / Raytheon Company	
Contract Title	Anti-Submarine Warfare Rapid Technology Insertion (RTI)	
Contract Address	1847 West Main Road Portsmouth, RI 02871-1087	
Contracts/Effort Price, Quantity, and Performance (\$M)		
Initial Target Price \$26,717,000	Current Target Price \$101,733,174	
Initial Ceiling Price \$101,914,173	Current Ceiling Price \$173,005,923	
Contract's EAC N/A	PM's EAC N/A	
Initial Quantity N/A	Current Quantity N/A	Delivered Quantity N/A
BAC N/A	BCWP N/A	ACWP N/A
BCWS N/A	Cost Variance N/A	Schedule Variance N/A

Contract Notes:

Target Price reflects funded value on contract. Initial Target Price includes funded value for CLINs awarded on contract at time of award. Current Target Price includes funded value for all CLINs exercised on contract due date. Ceiling Price reflects total value of the contract if all available options are exercised. Current Target and Ceiling Prices reflect inclusion of additional labor hours and other direct costs for test and integration, engineering change proposals and period of performance extensions, as well as inclusion of additional hardware production stepladders for Variable Depth Sonar procurements.

Cost Variance:

Cost Variances are not reported for this contract, because all active non-level of effort CLINs are firm fixed priced and no EVM reporting is required because the threshold requirements for EVM reporting are not met.

Schedule Variance:

Schedule Variances are not reported for this contract, because all active non-level of effort CLINs are firm fixed priced and no EVM reporting is required because the threshold requirements for EVM reporting are not met.

UNCLASSIFIED

Technologies and Systems Engineering

Significant Technical Risks

In accordance with Section 2432(i) of the FY 2022 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted Controlled Unclassified Information.

Significant Technical Risks	
Current Estimate (December 2021)	
1.	Risk that Gun Mission Module (GMM) operational availability may drop below KPP threshold if sufficient spare Magic 1s are not available before Gun Module Remote Control System (GMRCs) redesign/production is complete. PB 2023 funds ramp-up of production units; risk will be mitigated once enough GMRCs units are produced to alleviate current spares impact.
2.	There is a high risk that <u>Dual ARray Transmitter (DART)</u> will not meet performance requirements due to design, manufacturing, and hydrodynamic performance issues. Risks can be mitigated with manufacturing process improvements, design changes, and testing planned through the end of FY 2022. With the PB 2023 submission, the Navy has proposed divestment of the ASW MP from LCS.
Original Baseline Estimate: Milestone B (January 2014)	
1.	Risk that Mine Countermeasures (MCM) Mission Package (MP) Deep Volume Focused Minehunting (DVFMH) Sustained Area Coverage Rate (ACRS) will be below requirements if the individual Program of Record (PoR) mission systems do not achieve their required performance, or if the System of System (SOS) assumptions are incorrect.
Revised Original Estimate: APB Change 1 (September 2018)	
1.	The Program did not report any technical risks in APB Change 1.

UNCLASSIFIED

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	5	5	5	100.0%
Production	11	11	35	31.4%
Total Program Quantity Delivered	16	16	40	40.0%

Expended and Appropriated (TY \$M)

Total Acquisition Cost: \$6,636.4
 Expended to Date: \$3,791.0
 Percent Expended: 57.1%
 Total Funding Years: 32
 Years Appropriated: 19
 Percent Years Appropriated: 59.4%
 Appropriated to Date: \$4,206.9
 Percent Appropriated: 63.4%

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

Deliveries and Expenditures Notes:

10 Surface Warfare (SUW) Mission Packages (MPs) and 1 Mine Countermeasures (MCM) MP included in production deliveries.

UNCLASSIFIED

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	1/7/2014	2/14/2020
Approved Quantity	27	44
Reference	Milestone B ADM	ADM
Start Year	2006	2006
End Year	2018	2033

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 leveraging several individual Programs of Record (PoRs) as separate ACAT programs.

LRIP Note:

The Navy determined there is no meaningful FRP decision needed for the LCS MM Program since systems are in production as part of individual PoRs. As such, the Navy increased the authorized LRIP quantity in February 2020 to 44 MPs (24 Mine Countermeasures (MCM) Mission Package (MP), 10 Anti-Submarine Warfare (ASW) MP, and 10 Surface Warfare (SUW) MP) based on the certified quantity in the PB 2019 submission.

Operating and Support Costs

Total Program O&S Cost Compared with Baseline

	Current APB Objective (BY 2010 \$M)	Current APB Threshold (BY 2010 \$M)	Current Estimate (BY 2010 \$M)	Current Estimate (TY\$M)	Deviation
Total O&S (\$Millions)	\$ 16,820	\$ 18,502	\$14,143	\$22,005	

Disposal Cost is included in the O&S Cost of the current APB objective and threshold for this program, but has been broken out separately below and is not included in the Current Estimate above.

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 (BY2010 \$Million)	LCS Mission Modules
Unit-Level Manpower	\$ 2,317
Unit Operations	\$ 143
Maintenance	\$ 5,527
Sustaining Support	\$ 615
Continued System Improvements	\$ 4,094
Other	\$ 1,447
Total O&S	\$ 14,143

Cost Estimate Source: Program Office Estimate (POE)

O&S Cost Notes:

- a. Disposal/Demilitarization Cost Estimate and Source of Estimate:
 - Current Baseline of \$152.4M (APB Change 1 Program Life Cycle Cost Estimate)
 - Current Estimate of \$118.0M (Program Office Estimate)
- b. Sustainment Strategy:

Based on the outcome of the LCS Review Team, the LCS Seaframes are stood-up into mission focused divisions. Each LCS will be a single focused mission ship capable of defeating conventional and asymmetric access-denial threats. These mission focused divisions will maintain the modular architecture of the Mission Packages (MPs) while allowing the use of dedicated, fused crews. Once embarked, the modular MPs provide the main warfighting capability to mitigate gaps in Mine Countermeasures (MCM) and Surface Warfare (SUW) missions. The LCS Seaframes retain the flexibility to adjust this MP division allocation structure as needed to address changing Fleet operational requirements. In FY 2022, this flexibility in Division Ship assignment is being executed with LCS 15 and 17, MCM Division Ships (prior to PB 2023), embarked with the SUW MP in order to cover Fleet operational requirements. MCM Divisions Ships are also employing a hybrid configuration comprised of the Aviation Module capabilities in the MCM MP embarked on along with a 11 meter Rigid Hull Inflatable Boat (RHIB) (part of the Maritime Security Module (MSM) in the SUW MP). These configurations are presently embarked on LCS 13, 16, and 18. The concept of employment for LCS, which includes routine deployments overseas and prepositioned support infrastructure in potential theaters of operation (Mission Module Readiness Centers (MMRCs)), contributes to a strategic deterrence.

UNCLASSIFIED

LCS carries limited onboard resources to maintain and repair the mission systems that make up the MPs. Because of this, significant maintenance and repair work is assigned to an off-ship, shore-based workforce. The LCS MMs are maintained, stored, and centrally managed through the Mission Package Support Facility (MPSF). The MPSF provides and coordinates maintenance, provides technical support, manages spares, and ensures components (mission systems, mission modules, support containers, support equipment, or other equipment) are delivered to the ships. The MPSF plans, arranges, schedules, coordinates, and manages the execution of all maintenance tasks. The MPSF receives requests for fleet assistance from the deployed or embarked MPs and translates the requests into required actions – this results in a seamless process and a single MP support interface to Fleet units. Individual mission systems maintenance plans describe specific mission system requirements and tasks necessary to sustain, maintain, or restore operational capability. Maintenance is performed by the crew, by the MPSF, by organic Navy resources, or by a contractor, as appropriate. The MPSF workforce is augmented with personnel from Navy In-Service Engineering Agents (ISEAs) to handle surge, low volume, and specialized tasks. Organizational level maintenance is managed by the MPSF by planning the work for the crew and providing schedules for maintenance execution. Intermediate level maintenance is managed and conducted by the MPSF. Depot level maintenance is coordinated by the MPSF with the assigned depots.

As an extension of the MPSF, the LCS MM Program has established MMRCs at Continental United States (CONUS) sites and forward Outside Continental United States (OCONUS) locations as required by deployed operations. The MMRCs are designed to have appropriate maintenance, administrative, and storage capabilities. The MMRCs provide support facilities and personnel for specific operations (e.g., embarkation/debarkation evolutions and major maintenance availabilities).

The LCS MM Program has a dedicated Product Support Manager (PSM) who is responsible for managing the support functions to ensure the mission modules that make-up and MPs are available. The PSM monitors and reports failures of system-level performance against Participating Acquisition Resource Manager (PARM)-initiated support contract requirements, assessing existing contractual requirements against needs and experiences, and seeks alternatives where contractual adjustments are not possible or feasible to improve performance. The PSM is responsible for data identification, collection, and analysis that correlates hardware and sustainment systems performance. This analysis determines which issues demand product and/or process improvement, what near-term mitigation is possible, and what long-term solutions are needed. In addition to the system contracts made available by the PARMs, the LCS MM Program utilizes ISEAs and other organic Navy support to provide maintenance, technical, training, and spares support. The LCS MM Program has initiated a process to transition from interim to full MPSF support.

- c. For Each Acquired System or System Variant:
 - i. Quantity to Sustain: 34 (24 Deployable MCM MPs, 10 Deployable SUW MPs)
 - ii. First Operational Fiscal Year: FY 2009
 - iii. Final Operational Fiscal Year: FY 2049
 - iv. Unit Expected Service Life: 25 Years

- d. Antecedent System(s) O&S Costs: no antecedent

UNCLASSIFIED