Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy											Date: February 2020	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603596N *I LCS Mission Modules*							
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
Total Program Element	625.684	99.728	108.505	67.875	-	67.875	54.332	35.502	43.922	35.364	Continuing	Continuing
2550: *Mine Countermeasure (MCM) Mission Package*	0.000	40.175	39.499	26.895	-	26.895	27.853	10.687	10.859	11.044	Continuing	Continuing
2551: *Anti-Submarine Warfare (ASW) Mission Package*	0.000	39.925	41.580	23.897	-	23.897	17.585	15.796	23.865	14.938	Continuing	Continuing
2552: *Surface Warfare (SUW) Mission Package*	0.000	10.923	17.558	8.115	-	8.115	0.000	0.000	0.000	0.000	0.000	36.596
3129: *LCS Mission Package Development*	625.684	8.705	9.868	8.968	-	8.968	8.894	9.019	9.198	9.382	Continuing	Continuing
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 443												

A. Mission Description and Budget Item Justification

The Littoral Combat Ship (LCS) Mission Modules (MM) Program Element (PE) provides funds for detailed design, development, issue resolution, certification, integration, and testing of the LCS MM. LCS is a fast, agile, and networked surface combatant with capabilities optimized to defeat asymmetric threats, and ensure naval and joint force access into contested littoral regions. It uses open-systems architecture design, modular weapons, sensor systems, and a variety of manned and unmanned vehicles to expand the battle space and project offensive power into the littoral.

The LCS MM Program employs an incremental development approach to deliver capability, which allows for insertion of mature capabilities throughout the life of the program without the need for modifications to the sea frames. Future capabilities will be considered when joint warfighting objectives or changing threats create new operational capability requirements that cannot be met by current mission package designs, or when new technological opportunities allow significant progress toward delivering cost effective, enhanced capabilities. Future mission module increments can be tested, constructed, and incorporated into existing mission packages, one of the most important benefits of LCS modular design.

Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:
2550 Mine Countermeasures (MCM) Mission Package
2551 Anti-Submarine Warfare (ASW) Mission Package
2552 Surface Warfare (SUW) Mission Package
3129 LCS Mission Package Development

Prior to FY 2019 all Mission Package funding was in Project 3129.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Navy	Date: February 2020
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603596N *I LCS Mission Modules*

MCM MP: Counters bottom, tethered, near surface, and surface mines in the littorals without putting sailors in the minefield.

SUW MP: Increases firepower and offensive/defensive capabilities against large numbers of highly maneuverable, fast, small craft threats, giving LCS the ability to protect the sea lanes while moving a force quickly through a choke point or other strategic waterway, and to conduct maritime security missions.

ASW MP: Enables the LCS to conduct detect-to-engage operations against modern submarines that pose a threat.

C5I: Enabling products required by all MPs such as common hardware interfaces, computer operating environment (Mission Package Computing Environment (MPCE)), communications systems (Multi-Vehicle Communications System (MVCS)), aviation interface systems, and Mission Package Portable Control Stations (MPPCS). MPCE provides common services and an Operating Environment to support all Mission Package Application Software (MPAS) and Open Architecture Products. MVCS enables the simultaneous control and data exchange between unmanned mission vehicles and the Ship. Aviation interface systems include integration and management of data communications, data processing, and physical hardware interfaces such as common equipment and containers used by all mission packages. MPPCS provides a mobile operating environment installed in a 20ft ISO container and serves as a surrogate Ship during mission package development and integration test events at test ranges.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	103.559	108.505	44.694	-	44.694
Current President's Budget	99.728	108.505	67.875	-	67.875
Total Adjustments	-3.831	0.000	23.181	-	23.181
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.831	0.000			
• Program Adjustments	0.000	0.000	22.800	-	22.800
• Rate/Misc Adjustments	0.000	0.000	0.381	-	0.381

Change Summary Explanation

FY 2019: -$3.831M SBIR transfer

FY 2021: +$6.400M for ASW MP ACB/TI Development; +$8.300M for ASW MP TEMP requirements; +$8.100M for SUW MP Temp requirements; and $0.381M NWCF rate adjustments.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / *LCS Mission Modules*	Project (Number/Name) 2550 / *Mine Countermeasure (MCM) Mission Package*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2550: *Mine Countermeasure (MCM) Mission Package*	0.000	40.175	39.499	26.895	-	26.895	27.853	10.687	10.859	11.044	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 443

A. Mission Description and Budget Item Justification

The MCM Mission Package (MP) employs an incremental development approach to deliver capability, which allows the continued insertion of mature capabilities throughout the life of the program without the need for modifications to the sea frames. The focus is to minimize service life extensions to both MCM-1 ships and the MH-53E Helicopters. Future MCM MP capabilities will be considered when joint warfighting objectives or changing threats create new operational capability requirements that cannot be met by current mission package designs, or when new technological opportunities allow significant progress toward delivering cost effective, enhanced capabilities. Future mission module increments can be tested, constructed, and incorporated into existing mission packages, one of the most important benefits of LCS modular design.

The Program has begun investigation into the feasibility of integrating the MCM MP on Vessels of Opportunity (VOO). In FY2019, the Program demonstrated the flexibility of the modular MCM MP components by conducting a MCM Vessel of Opportunity (VOO) at-sea demonstration onboard the USNS Hershel "Woody" Williams (T-ESB 4).

The MCM MP will counter deep, shallow, and tethered mines in the littoral without putting Sailors in the minefield. When the MCM MP is embarked, LCS is capable of conducting detect-to-engage operations (hunting, sweeping, and neutralization) against very shallow to deep-water sea mine threats. The MCM MP provides these capabilities through the use of sensors and weapons deployed from an MH-60S multi-mission helicopter, unmanned offboard vehicles, and support equipment/ containers. The MCM MP consists of the following modules:

- Remote Minehunting (RMH) Module: Unmanned Surface Vehicle (USV) + Minehunting Payload Delivery System + AN/AQS-20 Minehunting Sonar
- Coastal Mine Reconnaissance (CMR) Module: Coastal Battlefield Reconnaissance & Analysis (COBRA) + MQ-8B Fire Scout Vertical Take-off and Landing Tactical Unmanned Aerial Vehicle (VTUAV)
- Near Surface Detection (NSD) Module: Airborne Laser Mine Detection System (ALMDS) + MH-60S Helicopter
- Airborne Mine Neutralization (AMN) Module: Airborne Mine Neutralization System (AMNS) + MH-60S Helicopter
- Unmanned Minesweeping (UMS) Module: Unmanned Influence Sweeping System (UISS) (USV + Minesweeping Payload Delivery System)
- Buried Minehunting (BMH) Module: Knifefish Unmanned Underwater Vehicle (UUV)

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Mine Countermeasures (MCM) Mission Modules	40.175	39.499	26.895	0.000	26.895

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2550 / *Mine Countermeasure (MCM) Mission Package*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Articles:	-	-	-	-	-
FY 2020 Plans: For the MCM MP Unmanned Minesweeping (UMS) module, the program is supporting the Unmanned Influence Sweep System (UISS) Developmental Test (DT) and Operational Assessment (OA) on LCS Independence variant, and will begin efforts to certify UMS for deployment on LCS Independence variant. In addition, the program is planning to integrate UMS on LCS Freedom variant and conduct LCS based integration testing (UISS Launch and Recovery). For the MCM MP Buried Minehunting (BMH) Module, the program is supporting Knifefish integration testing on LCS Independence variant. Program has commenced planning to integrate BMH on LCS Freedom variant and has initiated LCS based integration testing. For the MCM MP Remote Minehunting (RMH) Module, the program is supporting the system level at-sea developmental testing and is preparing for formal testing of the MCM MP on the Independence variant in FY 2021. Testing requires placement and removal of exercise mines in a minefield along with 24 hour monitoring of the minefield with an at-sea chase boat for the duration of the test event. In support of testing the program is procuring test spares and test support equipment. The program is in the process of completing integration of Net-Centric Sensor Analysis for Mine Warfare (NSAM) and MCM USV with AQS-20C software along with development and incorporation of Problem Trouble Reports (PTRs) into MCM MPAS Build 3.0 to support formal MCM MP Developmental and Operational Testing in FY21. The program is integrating MPAS Build 3.0 into the Common Mission Package Trainer. The program is continuing vendor training for MCM MP crews until outfitting of LCS Training Facilities is completed in FY 2023, to include crew travel to facilities. The program has commenced development of test scenarios conduct work-ups and test plan for execution of at-sea MCM MP developmental testing (DT-B10 Phase I and II) to be conducted in FY 2021. The tactics team is conducting test analysis for both the Freedom and Independence hull variants. Will execute test scenarios on the Naval Mine Warfare Simulator (NMWS) to support certification events, Mission Package Readiness Assessments (MPRAs), and the Tactical Action Working Group meetings.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2550 / *Mine Countermeasure (MCM) Mission Package*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
The Program is certifying all aviation modules (NSD, AMN, CMR) for deployment on Freedom variant and executing a follow-on VOO event - MCM VOO Phase III aboard USNS Herschel "Woody" Williams (T-ESB-4). The program is performing systems engineering (risk management, information assurance, human systems integration, safety), configuration management and Integrated Logistics Support (ILS) efforts. The program is continuing to compile system and package level Reliability and Maintainability (RAM-C) data to support reliability engineering and a prioritized initial spares list. The program has initiated Full Operational Capability (FOC) RAM-C analysis with updated data and update RAM-C Rationale Report. The program is continuing efforts on MCM MP Failure Reporting, Analysis, and Corrective Action System (FRACAS). ***FY 2021 Base Plans:*** For the MCM MP Unmanned Minesweeping (UMS) module, the program will certify UMS for deployment on both LCS Independence and Freedom variants. For the MCM MP Buried Minehunting (BMH) Module, the program will support the Knifefish system-level operational assessment on LCS Independence variant. The Program will conduct Knifefish Launch and Recovery (L&R) testing and certify BMH for deployment on both LCS Independence and Freedom variants. For the MCM MP Remote Minehunting (RMH) Module, the program will conduct RMH integration tests on LCS Independence variant. The program will conduct MCM MP developmental testing (DT-B10 Phase I and II) and begin TECHEVAL. Testing requires placement and removal of exercise mines in a minefield along with 24 hour monitoring of the minefield with an at-sea chase boat for the duration of the test. Testing also requires procuring test spares and test support equipment. The program will complete development and incorporation of PTRs into MCM MPAS Build 3.0 to support FY 2022 MCM MP IOC. Integrate MPAS Build 3.0 into the Common Mission Package Trainer. The program will support Barracuda development efforts to ensure the system development accounts for eventual integration with the MCM MP and LCS Seaframe.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2550 / *Mine Countermeasure (MCM) Mission Package*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Continue vendor training for MCM MP crews until outfitting of LCS Training Facilities is completed in FY 2023, to include crew travel to facilities. The tactics team will continue to conduct test analysis for both the Freedom and Independence hull variants. Will execute test scenarios on the Naval Mine Warfare Simulator (NMWS) to support certification events, Mission Package Readiness Assessments (MPRAs), and the Tactical Action Working Group meetings. The program will perform systems engineering (risk management, information assurance, human systems integration, safety), configuration management and Integrated Logistics Support (ILS)). Continue to compile system and package level Reliability and Maintainability (RAM-C) data to support reliability engineering and a prioritized initial spares list. Initiate Full Operational Capability (FOC) RAM-C analysis with updated data and update RAM-C Rationale Report. Continue MCM MP Failure Reporting, Analysis, and Corrective Action System (FRACAS) effort. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease between FY 2020 and FY 2021 reflects the program completing mission system integration and mission system testing. Starting in FY 2021 the program will focus on Mission Package formal testing and fielding. MCM Mission Package is scheduled to IOC based on Independence variant testing in FY 2022.					
Accomplishments/Planned Programs Subtotals	40.175	39.499	26.895	0.000	26.895

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPN 1600: *LCS Common Mission Modules Equipment*	33.237	38.730	39.714	-	39.714	72.210	29.929	30.330	30.921	724.161	1,459.057
• OPN 1601: *LCS MCM Mission Modules*	98.901	64.789	218.822	-	218.822	222.754	234.330	243.187	247.949	1,111.812	2,666.795

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2550 / *Mine Countermeasure (MCM) Mission Package*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The LCS MM Acquisition Strategy employs an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability as technology is matured, into the MCM MP until the full baseline capability defined in the Capability Development Document (CDD) is reached.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / *LCS Mission Modules*	Project (Number/Name) 2550 / *Mine Countermeasure (MCM) Mission Package*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MCM MP	WR	NSWC PCD : Panama City, FL	0.000	19.604	Nov 2018	13.487	Nov 2019	4.480	Dec 2020	-		4.480	Continuing	Continuing	Continuing
MCM MP	Sub Allot	PMS 406 : Various	0.000	5.000	Feb 2019	2.650	Nov 2019	0.000		-		0.000	6.400	14.050	-
MCM MP	Sub Allot	PMS 495 : Various	0.000	1.000	Feb 2019	0.000		0.000		-		0.000	2.400	3.400	-
MCM MP	WR	NSWC PHD : Port Hueneme, CA	0.000	4.571	Dec 2018	5.000	Mar 2020	0.000		-		0.000	12.800	22.371	-
MCM MP	C/CPIF	Northrop Grumman : Bethpage, NY	0.000	9.600	Jan 2019	3.700	Jan 2020	4.047	Nov 2020	-		4.047	4.800	22.147	-
		Subtotal	0.000	39.775		24.837		8.527		-		8.527	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MCM MP Test Support	WR	NSWC PCD : Panama City, FL	0.000	0.000		14.162	Nov 2019	13.439	Dec 2020	-		13.439	0.000	27.601	-
MCM MP Test Support	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.000		4.432	Jan 2021	-		4.432	0.000	4.432	-
		Subtotal	0.000	0.000		14.162		17.871		-		17.871	0.000	32.033	N/A

Management Services ($ in Millions)

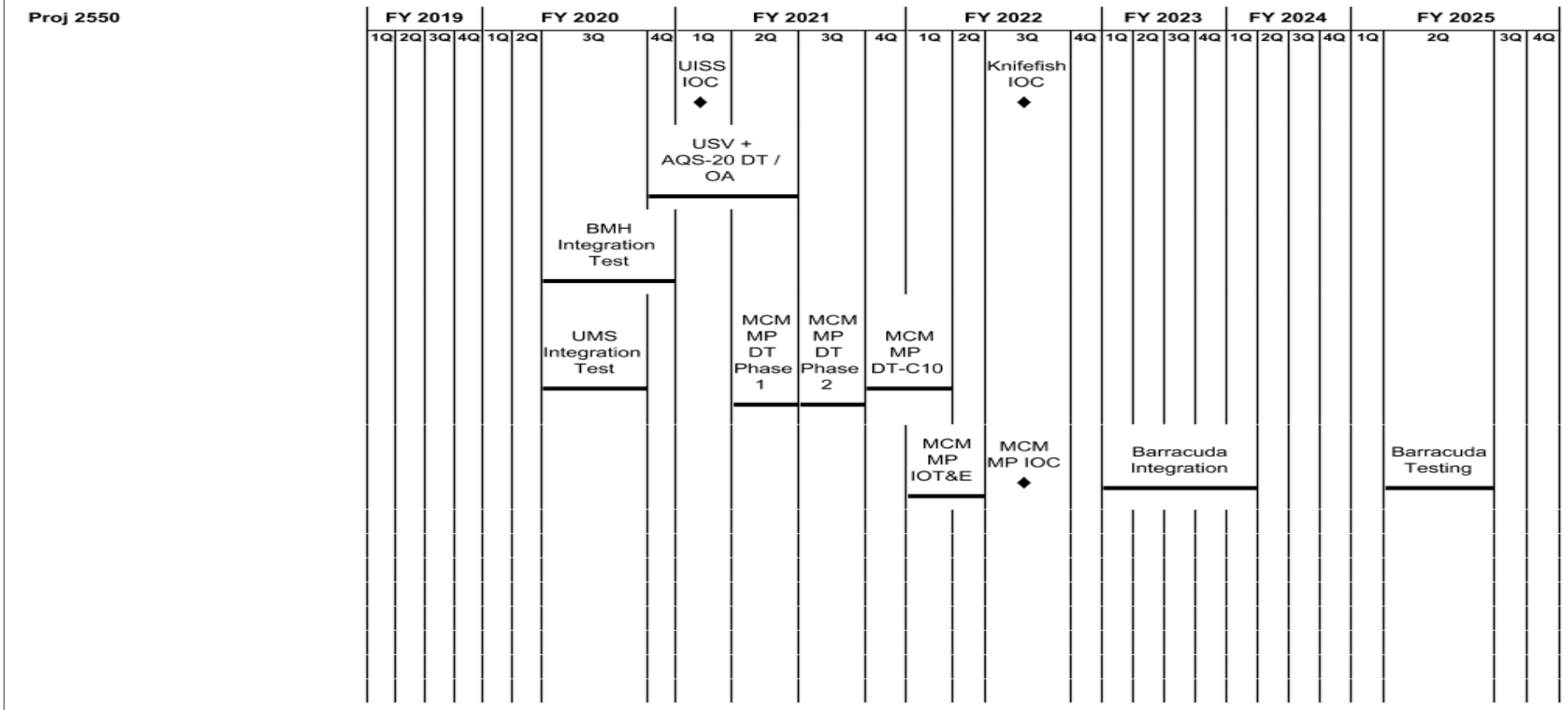
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MCM Program Management	C/CPFF	Booz Allen Hamilton : Washington, DC	0.000	0.400	Oct 2018	0.500	Oct 2019	0.497	Nov 2020	-		0.497	1.680	3.077	-
		Subtotal	0.000	0.400		0.500		0.497		-		0.497	1.680	3.077	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / *LCS Mission Modules*	Project (Number/Name) 2550 / *Mine Countermeasure (MCM) Mission Package*	

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	40.175		39.499		26.895		-		26.895	Continuing	Continuing	N/A

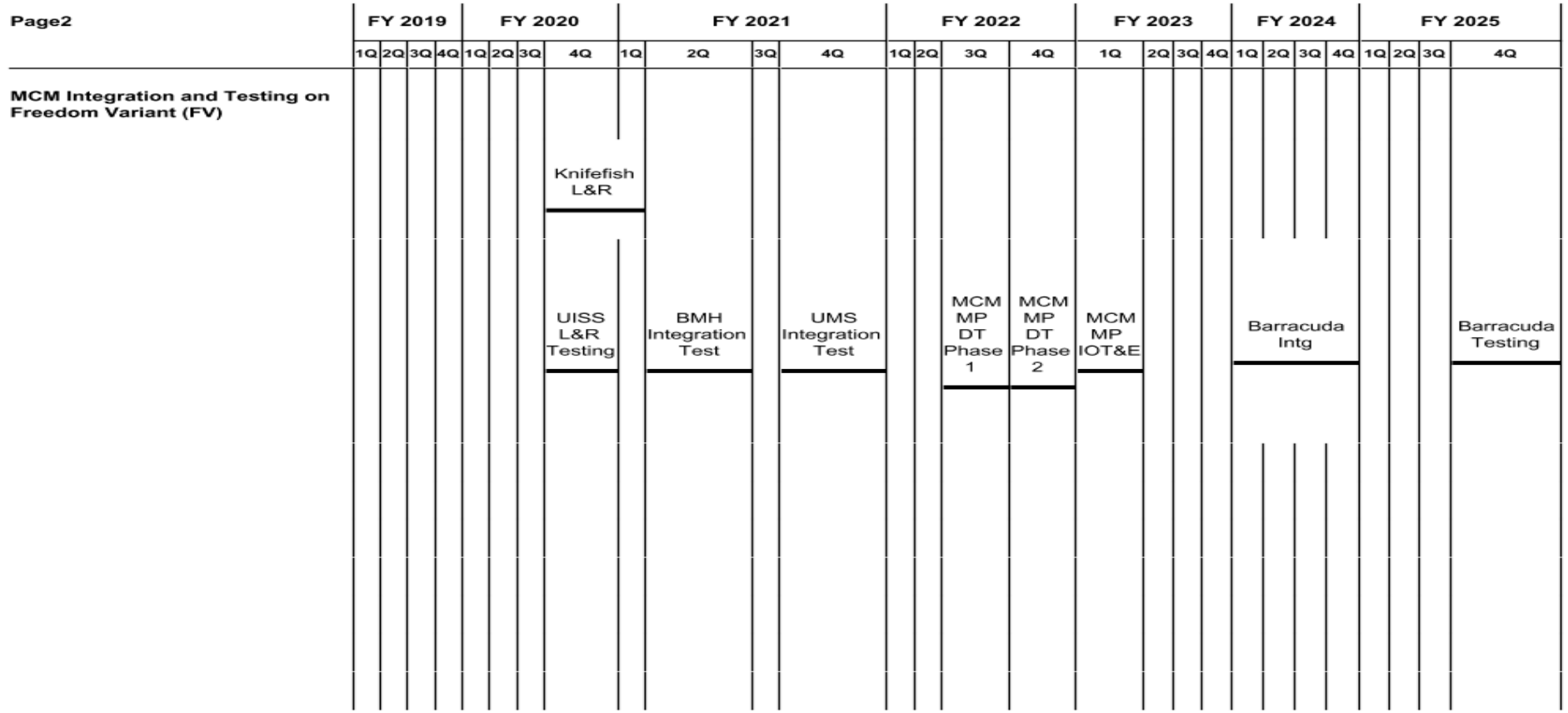
Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2550 / *Mine Countermeasure (MCM) Mission Package*



2021PB - 0603596N - 2550

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2550 / *Mine Countermeasure (MCM) Mission Package*



2021PB - 0603596N - 2550

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2550 / *Mine Countermeasure (MCM) Mission Package*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2550				
UISS Mission System IOC	1	2021	1	2021
Knifefish Mission System IOC	3	2022	3	2022
USV + AN/AQS-20 DT / OA	4	2020	2	2021
BMH Integration Testing	3	2020	4	2020
UMS Integration Testing	3	2020	3	2020
DT-B10 (Phase 1)	2	2021	2	2021
DT-B10 (Phase 2)	3	2021	3	2021
DT-C10 TECHEVAL	4	2021	1	2022
OT-C10 IOT&E	1	2022	2	2022
MCM MP IOC on Independence Variant	3	2022	3	2022
Barracuda Integration	1	2023	1	2024
Barracuda Testing MCM Mission Package	2	2025	2	2025
Page2				
MCM Integration and Testing on Freedom Variant (FV): Knifefish L & R	4	2020	1	2021
MCM Integration and Testing on Freedom Variant (FV): UISS Launch and Recovery Testing	4	2020	4	2020
MCM Integration and Testing on Freedom Variant (FV): BMH Integration Testing	2	2021	2	2021
MCM Integration and Testing on Freedom Variant (FV): UMS Integration Testing	4	2021	4	2021
MCM Integration and Testing on Freedom Variant (FV): DT-B9 (Phase 1)	3	2022	3	2022
MCM Integration and Testing on Freedom Variant (FV): DT-B9 (Phase 2)	4	2022	4	2022
MCM Integration and Testing on Freedom Variant (FV): OT-C9 IOT&E	1	2023	1	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2550 / *Mine Countermeasure (MCM) Mission Package*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MCM Integration and Testing on Freedom Variant (FV): Barracuda Integration	1	2024	4	2024
MCM Integration and Testing on Freedom Variant (FV): Barracuda Testing	4	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / *LCS Mission Modules*	Project (Number/Name) 2551 / *Anti-Submarine Warfare (ASW) Mission Package*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2551: *Anti-Submarine Warfare (ASW) Mission Package*	0.000	39.925	41.580	23.897	-	23.897	17.585	15.796	23.865	14.938	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 443

A. Mission Description and Budget Item Justification

The ASW MP enables LCS to conduct detect-to-engage operations against submarines. Specific ASW capabilities include protecting forces in transit, protecting joint operating areas, and establishing ASW barriers. The ASW MP provides the warfighter capabilities that can be employed for ASW area search as well as high value unit escort missions. Key components of the ASW MP include a Variable Depth Sonar, a Multi-Function Towed Array and sonar signal processing. The individual systems are combined into modules: an ASW Escort Mission Module (EMM) that provides High Value Unit (HVU) escort capability and an Aviation Module that offers airborne threat localization and engagement capability through a MH-60R with MK54 torpedoes.

This project delivered the ASW EMM Pre-Production Test Article (PPTA) and the Aviation Module in Q1 FY 2019. Following the delivery of the PPTA, the ASW MP was installed on board a Freedom variant hull in Q4 FY 2019, to support Developmental Testing (DT) and Initial Operational Test & Evaluation (IOT&E) to support Initial Operational Capability (IOC) in FY 2020. Following integration and testing onboard a Freedom variant, this project will transition to production in FY 2020.

Due to a shift in test platform from LCS 4 to LCS 22, Independence variant ASW MP testing will complete later in FY22 than previously reported. The ASW MP performance will be demonstrated during the Freedom variant testing and will achieve IOC in FY20. Because the ASW MP is embarked with its own sonar signal processing capability, Independence variant testing is focused on the physical integration and employment/recovery.

The ASW MP will take advantage of improvements developed under the submarine Advanced Processing Build (APB), Advanced Surveillance Build (ASB) and Advanced Capability Build (ACB) and will in turn share unique improvements developed under this program with the submarine, surface combatants, and surveillance ASW communities. All programs (ACB, ASB, and APB) are managed under a common development process and titled AxB. While the LCS ASW MP will retains its uniqueness and focus in functional domains essential to mission package success, a premium is placed on development of common capabilities and modular architecture technologies to maximize commonality and cost effectiveness.

The Open System Architecture (OSA) and high performance Commercial Off-The-Shelf (COTS) sonar processing hardware, provided as an adjunct to the Mission Package Computing Environment (MPCE), will be fielded with the ASW MP and will provide an opportunity to integrate emergent, transformational ASW technological improvements that were previously unachievable. The ASW MP will require periodic upgrades to remain effective well into the 21st century and to pace the threat. Software upgrades target capability increases in high interest areas as prescribed by the Fleet and captured in campaign analysis. To achieve this, this project will package and deliver incremental upgrades every four years to the ASW MP baseline via an ACB development process by inserting maturing Undersea Warfare (USW) technologies and addressing hardware technology obsolescence.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2551 / *Anti-Submarine Warfare (ASW) Mission Package*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Anti-Submarine Warfare (ASW) Mission Modules	39.925	41.580	23.897	0.000	23.897
Articles:	-	-	-	-	-
FY 2020 Plans: COMPLETE FORMAL TESTING ON FREEDOM VARIANT: 1.) Conduct and complete DT-B3 Phase I and Phase II 2.) Conduct and complete DT-C3 (TECHEVAL) 3.) Conduct and OT-C3 (IOT&E) 4.) Conduct the Data Analysis Working Group (DAWG) and complete the Test Report 5.) Achieve ASW MP Initial Operational Capability (IOC) based on Freedom Variant testing 6.) Disembark the ASW Mission Package off LCS 3 Following the completion of testing on LCS 3 and debarkation of the ASW MP, perform Find-Fix-Repair efforts on the ASW MP to ensure ready for testing on LCS 22. Refurbish the Dual Array Mode Transmitter (DART) Pre-Production Test Article (PPTA). In support of transitioning EMM to production, will complete System Qualification Testing (SQT), System Verification Review (SVR), Functional Configuration Audit (FCA), Physical Configuration Audit (PCA), and validation of sonar acoustic performance, shipboard interfaces, and launch, handling and recovery. The project will conduct a Production Readiness Review (PRR) in FY 2020. Continue development of the EMM acoustic processing software and hardware (ACB19 software and TI20 sonar signal processing hardware) per IWS 5.0 AxB common development process. Integrate IWS 5.0 software baseline into ASW MPAS 2.2. Install and checkout ASW MPAS 2.2 at the General Dynamics Testing Facility in preparation for Land-Based integration in FY 2021. Continue development of ASW MP operator training materials and course curriculum to support Train to Qualify and Train to Certify requirements. Continue development of component and system level modeling and simulation capabilities to enable high fidelity virtual reality training. Conduct vendor training events in support of formal courseware development. Continue development of Common Skills, ASW Skills, and O&M training to incorporate ASW MP capabilities for delivery to the LCS Training Facility and ASW Fleet Training Center in support of ready for training in FY 2022. Continue to provide initial training to LCS Sailors in support of key test events as well as temporary vendor training to ensure Sailors are receiving adequate ASW MP operation and					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2551 / *Anti-Submarine Warfare (ASW) Mission Package*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
maintenance training until formal Navy training is fully established. Provide travel costs for Sailors to attend initial and vendor training. Perform systems engineering (risk management, information assurance, human systems integration, safety), configuration management, and Integrated Logistics Support (ILS). Develop draft Logistics materials. In support of preparation for Independence variant testing, update the Interface Control Document (ICD), complete the development of Ship Installation Drawings (SIDs) and Ship Change Documents (SCDs), and complete the design of the LCS 22 SHIPALT. ***FY 2021 Base Plans:*** INITIATE INTEGRATION OF THE ASW MP ON INDEPENDENCE VARIANT IN PREPARATION FOR FORMAL TESTING: 1.) Complete ACB 14.13L software baseline changes required to integrate with the LCS 22 Combat System (ICMS 6.2.1.X). Conduct Land-Based integration testing of ACB 14.13L baseline on-site at Lockheed Martin. 2.) Install and checkout ASW MPAS at the General Dynamics Testing Facility and perform Land-Based integration to certify the software for LCS 22. 3.) Perform Find-Fix-Repair efforts on the installation and embarkation material to ensure ready for testing on LCS 22. Modify material to incorporate Independence variant ship design changes. 4.) Conduct ship checks and embark the ASW MP to support formal testing. 5.) Embark the ASW MP onto LCS 22 and conduct Installation and Check Out (INCO) procedures. 6.) Initiate formal developmental testing and conduct DT-B6 Phase 0. 7.) Conduct LCS 22 Crew Training. 8.) Finalize safety analysis of the ASW MP equipment on the Independence variant. 9.) Finalize test objectives, performance prediction modeling, and test plans to support formal testing. Complete development of EMM acoustic processing software and hardware (ACB19 software and TI20 sonar signal processing hardware). Initiate Software Certification of ACB 20.19L, conduct shipboard integration and testing. Conduct Environmental Qualification Testing of the Sonar Signal Processing System (SSPS). Complete the development of ASW MP operator training materials and course curriculum to support Train to Qualify and Train to Certify requirements. Complete development of component and system level modeling and					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2551 / *Anti-Submarine Warfare (ASW) Mission Package*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
simulation capabilities to enable high fidelity virtual reality training. Conduct vendor training events in support of formal courseware development. Complete the development of Common Skills, ASW Skills, and O&M training to incorporate ASW MP capabilities for delivery to the LCS Training Facility and ASW Fleet Training Center in support of ready for training in FY 2022. Continue to provide initial training to LCS Sailors to ensure Sailors are receiving adequate ASW MP operation and maintenance training until formal Navy training is fully established. Provide travel costs for Sailors to attend initial and vendor training. ***FY 2021 OCO Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease between FY2020 and FY2021 reflects the program completing all integration and testing on the Freedom variant and the transition to production.					
Accomplishments/Planned Programs Subtotals	39.925	41.580	23.897	0.000	23.897

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPN 1600: *LCS Common Mission Modules Equipment*	33.237	38.730	39.714	-	39.714	72.210	29.929	30.330	30.921	724.161	1,459.057
• OPN 1602: *LCS ASW Mission Modules*	0.000	24.617	61.759	-	61.759	78.112	83.024	10.096	1.799	37.248	296.655

Remarks

D. Acquisition Strategy

The LCS MM Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2551 / *Anti-Submarine Warfare (ASW) Mission Package*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	Various	PEO IWS 5E : Various	0.000	1.500	Nov 2018	0.000		0.150	Jan 2021	-		0.150	0.000	1.650	-
2.0 ASW MP	WR	NUWC NPT : Newport RI	0.000	2.380	Nov 2018	1.600	Nov 2019	1.800	Nov 2020	-		1.800	Continuing	Continuing	Continuing
2.0 ASW MP	WR	NIWC : San Diego, CA	0.000	0.750	Dec 2018	0.000		0.250	Jan 2021	-		0.250	0.000	1.000	-
2.0 ASW MP	C/CPFF	Northrop Grumman : Bethpage, NY	0.000	2.800	Jan 2019	0.000		1.500	Dec 2020	-		1.500	0.000	4.300	-
2.0 ASW MP	Sub Allot	PEO IWS 5A : Various	0.000	13.800	Mar 2019	12.200	Mar 2020	13.400	Mar 2021	-		13.400	Continuing	Continuing	Continuing
2.0 ASW MP	C/CPFF	CACI : Washington, DC	0.000	0.255	Jan 2019	0.000		0.000		-		0.000	0.000	0.255	-
2.0 ASW MP	WR	NSWC DD : Dahlgren, VA	0.000	0.225	Nov 2018	0.000		0.000		-		0.000	0.000	0.225	-
2.0 ASW MP	WR	SUPSHIP Bath : Bath, Me	0.000	1.550	Oct 2018	3.500	Oct 2019	0.000		-		0.000	0.000	5.050	-
2.0 ASW MP	MIPR	NAWC WD : Point Mugu, CA	0.000	0.410	Dec 2018	0.000		0.000		-		0.000	0.000	0.410	-
2.0 ASW MP	C/FFP	Raytheon : Portsmouth, RI	0.000	0.000	Nov 2018	0.000		0.000		-		0.000	0.000	0.000	-
2.0 ASW MP	C/CPFF	Huntington Ingalls Industry : Pascagoula MS	0.000	0.000		0.000		2.200	Jan 2021	-		2.200	0.000	2.200	-
		Subtotal	0.000	23.670		17.300		19.300		-		19.300	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	WR	NUWC KPT : Keyport, Wa	0.000	0.500	Nov 2018	0.800	Nov 2019	0.850	Dec 2020	-		0.850	0.000	2.150	-
		Subtotal	0.000	0.500		0.800		0.850		-		0.850	0.000	2.150	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2551 / *Anti-Submarine Warfare (ASW) Mission Package*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP Test and Evaluation	WR	COMOPTEVFOR : Norfolk, VA	0.000	0.550	Oct 2018	0.550	Oct 2019	0.200	Nov 2020	-		0.200	0.000	1.300	-
2.0 ASW MP Test and Evaluation	WR	NSWC PHD : Port Hueneme, Ca	0.000	1.766	Dec 2018	5.730	Dec 2019	0.300	Dec 2020	-		0.300	0.000	7.796	-
2.0 ASW MP Test and Evaluation	WR	Range Service : Var*	0.000	3.154	Oct 2018	4.300	Oct 2019	0.000		-		0.000	0.000	7.454	-
2.0 ASW MP Test and Evaluation	WR	NUWC NPT : Newport, RI	0.000	5.734	Dec 2018	8.400	Dec 2019	0.800	Nov 2020	-		0.800	0.000	14.934	-
2.0 ASW MP Test and Evaluation	WR	NUWC KPT : Keyport, Wa	0.000	2.600	Nov 2018	2.500	Nov 2019	0.000		-		0.000	0.000	5.100	-
2.0 ASW MP Test and Evaluation	C/CPFF	Raytheon : Portsmouth, RI	0.000	1.400	Jan 2019	1.400	Jan 2020	0.500	Dec 2020	-		0.500	0.000	3.300	-
2.0 ASW MP Test and Evaluation	C/CPFF	Northrop Grumman : Bethpage, NY	0.000	0.000		0.000		1.300	Dec 2020	-		1.300	0.000	1.300	-
		Subtotal	0.000	15.204		22.880		3.100		-		3.100	0.000	41.184	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.551	Jan 2019	0.600	Jan 2020	0.647	Jan 2021	-		0.647	0.000	1.798	-
		Subtotal	0.000	0.551		0.600		0.647		-		0.647	0.000	1.798	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	39.925		41.580		23.897		-		23.897	Continuing	Continuing	N/A

Remarks

FY 2018 and prior funding in Project 3129.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2551 / *Anti-Submarine Warfare (ASW) Mission Package*

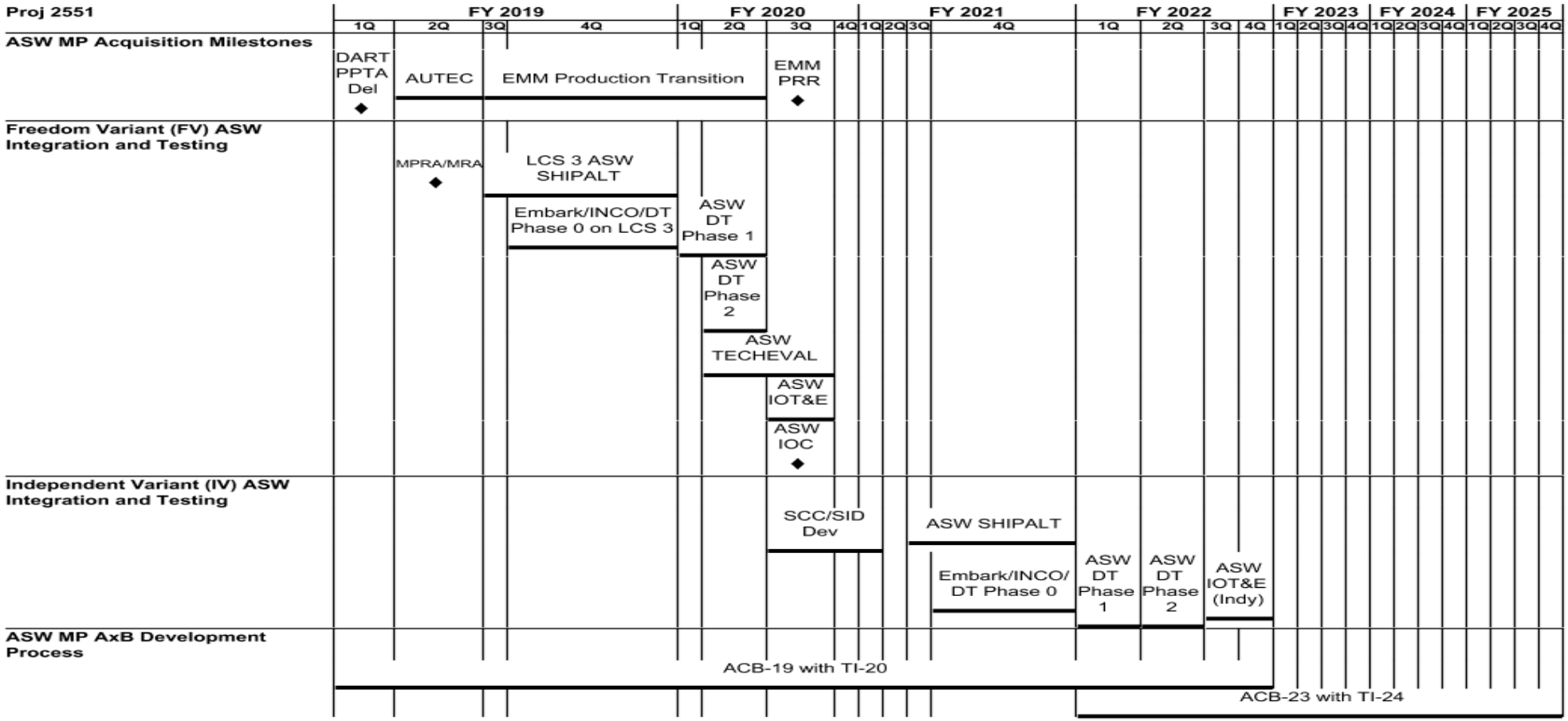


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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2551 / *Anti-Submarine Warfare (ASW) Mission Package*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2551				
ASW MP Acquisition Milestones: DART Pre-Production Test Article Delievery	1	2019	1	2019
ASW MP Acquisition Milestones: White Ship Testing AUTEC	2	2019	2	2019
ASW MP Acquisition Milestones: EMM Production Transition	3	2019	2	2020
ASW MP Acquisition Milestones: EMM Production Readiness Review	3	2020	3	2020
Freedom Variant (FV) ASW Integration and Testing: ASW MP SHIPALT Execution on LCS 3	3	2019	4	2019
Freedom Variant (FV) ASW Integration and Testing: ASW MP Readiness Assessment (MPRA)/Mission Readiness Assessment	2	2019	2	2019
Freedom Variant (FV) ASW Integration and Testing: ASW MP Embark, INCO, DT Phase 0 on LCS 3	4	2019	4	2019
Freedom Variant (FV) ASW Integration and Testing: ASW MP DT-B3 Phase 1	1	2020	2	2020
Freedom Variant (FV) ASW Integration and Testing: ASW MP DT-B3 Phase 2	2	2020	2	2020
Freedom Variant (FV) ASW Integration and Testing: ASW MP DT/IT-C3 TECHEVAL	2	2020	3	2020
Freedom Variant (FV) ASW Integration and Testing: ASW MP OT-C3	3	2020	3	2020
Freedom Variant (FV) ASW Integration and Testing: ASW MP IOC	3	2020	3	2020
Independent Variant (IV) ASW Integration and Testing: ASW Mission Package SCD/ SID Development for Indepencence Variant	3	2020	1	2021
Independent Variant (IV) ASW Integration and Testing: ASW MP SHIPALT Execution	3	2021	4	2021
Independent Variant (IV) ASW Integration and Testing: ASW MP Embark, INCO, DT Phase 0	4	2021	4	2021
Independent Variant (IV) ASW Integration and Testing: ASW MP DT-B6 Phase 1	1	2022	1	2022
Independent Variant (IV) ASW Integration and Testing: ASW MP DT-B6 Phase 2	2	2022	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2551 / *Anti-Submarine Warfare (ASW) Mission Package*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Independent Variant (IV) ASW Integration and Testing: ASW MP OT-C6	3	2022	4	2022
ASW MP AxB Development Process: ACB-19 with TI-20	1	2019	4	2022
ASW MP AxB Development Process: ACB-23 with TI-24	1	2022	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy			Date: February 2020
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / *LCS Mission Modules*	Project (Number/Name) 2552 / *Surface Warfare (SUW) Mission Package*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
2552: *Surface Warfare (SUW) Mission Package*	0.000	10.923	17.558	8.115	-	8.115	0.000	0.000	0.000	0.000	0.000	36.596
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 443

A. Mission Description and Budget Item Justification

The SUW MP increases firepower and offensive/defensive capabilities against large numbers of highly maneuverable, fast, small craft threats, giving LCS the ability to protect the sea lanes and move a force quickly through a choke point or other strategic waterway. The SUW MP is composed of several modules including the Gun Mission Module (GMM), the Aviation Module, the Maritime Security Module (MSM), and the Surface-to-Surface Missile Module (SSMM). The GMM is comprised of two high velocity 30mm cannons and is augmented with the ship's 57mm gun to counter close in to mid-range threats. The Aviation Module uses the embarked MH-60R helicopter with Hellfire missile and the MQ-8B Fire Scout VTUAV for the detection, identification, and classification of surface contacts and to engage long range threats. The MSM supports the embarkation of a Visit, Board, Search, and Seizure (VBSS) team. The SSMM is a self-contained module consisting of 2 Missile Exhaust Containment Structures (MECS), integrated articulating hatch covers, a fire control system, and 12 two-rail MK 210 launchers to support load out and firing of 24 Longbow Hellfire missiles. SSMM provides missile coverage for mid-range threats and small boats.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Surface Warfare (SUW) Mission Modules	10.923	17.558	8.115	0.000	8.115
Articles:	-	-	-	-	-
FY 2020 Plans: Complete integration of SSMM with Independence variant Combat Management System (CMS), obtain Weapon Systems Explosives Safety Review Board/Software Systems Safety Technical Review Panel (WSESRB/ SSSTRP) approvals, and IA approvals necessary for formal shipboard testing on Independence variant. Assess performance envelope capabilities. Completed formal DT-B12 Phase I/II, and completed IT-C12 on Independence variant. Conducting the Data Analysis Working Group (DAWG) and completing the Test Report for SSMM testing on the Independence variant. Complete Combat System Certification in support of Deployment on Freedom Variant.					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2552 / *Surface Warfare (SUW) Mission Package*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Initiate Cyber Security Test planning in preparation of Cyber Security testing in FY21. Update SSMM MPAS to incorporate testing findings. (Find-fix-Repair) Completed the nomenclature change for the SSMM Launcher from Army (M299) to Navy (MK 210). Redline the preliminary ILS and Training materials during testing to capture deltas between Freedom and Independence variant: 1.) Preliminary interim Training for Independence 2.) Preliminary Combat Systems Operational Sequencing System (CSOSS) manuals 3.) Preliminary SSMM Operators Manual 4.) Preliminary Technical Manual for MK 210 launcher 5.) Preliminary SSMM MPAS integration with CMPT					
FY 2021 Base Plans: Conduct Cyber Security Testing on Freedom and Independence Variant Complete Combat System Certification in support of Deployment on Independence Variant. Update Longbow Hellfire Tactical Software based on testing findings Incorporate all Independence test findings and finalize all ILS and Training material in support of SSMM fielding and deployments on Independence Variant: 1.) Interim Training for Independence 2.) Combat Systems Operational Sequencing System (CSOSS) manuals 3.) SSMM Operators Manual 4.) Technical Manual for MK 210 launcher 5.) SSMM MPAS integration with CMPT					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2552 / *Surface Warfare (SUW) Mission Package*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
The decrease from FY2020 to FY2021, reflects the program completing formal testing and transitioning from development to Production and Sustainment. The efforts in FY2021 product development include find-fix-repair of test findings, conducting Cyber Security testing and complete final revision of Logistic and training support products.					
Accomplishments/Planned Programs Subtotals	10.923	17.558	8.115	0.000	8.115

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPN 1600: *LCS Common Mission Module Equipment*	33.237	38.730	39.714	-	39.714	72.210	29.929	30.330	30.921	724.161	1,459.057
• OPN 1603: *LCS SUW Mission Module*	13.025	14.598	24.412	-	24.412	25.240	28.858	0.924	0.920	22.070	271.796
• WPN 4221: *LCS Module Weapons*	11.350	10.998	4.253	-	4.253	3.961	4.039	4.120	4.268	54.190	110.565

Remarks

D. Acquisition Strategy

The LCS MM Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2552 / *Surface Warfare (SUW) Mission Package*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	MIPR	JAMS PO : Various	0.000	1.350	Jan 2019	0.400	Jan 2020	0.500	Feb 2021	-		0.500	0.000	2.250	-
3.0 SUW MP	WR	NSWC DD : Dahlgren, VA	0.000	4.653	Nov 2018	3.100	Nov 2019	0.400	Nov 2020	-		0.400	0.000	8.153	-
		Subtotal	0.000	6.003		3.500		0.900		-		0.900	0.000	10.403	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	C/CPIF	Northrop Grumman : Bethpage, NY	0.000	0.800	Dec 2018	0.000		1.800	Nov 2020	-		1.800	0.000	2.600	-
3.0 SUW MP	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.000		2.000	Dec 2020	-		2.000	0.000	2.000	-
		Subtotal	0.000	0.800		0.000		3.800		-		3.800	0.000	4.600	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP CYBER Testing	Sub Allot	NSWC PHD : Port Hueneme, CA	0.000	1.970	Jan 2019	3.058	Jan 2020	0.750	Dec 2020	-		0.750	0.000	5.778	-
3.0 SUW MP CYBER Testing	WR	NSWC Corona : Corona, CA	0.000	0.950	Jan 2019	1.000	Jan 2020	0.000		-		0.000	0.000	1.950	-
3.0 SUW MP CYBER Testing	WR	NSWC DD : Dahlgren, VA	0.000	0.750	Jan 2019	8.900	Jan 2020	2.015	Jan 2021	-		2.015	0.000	11.665	-
3.0 SUW MP CYBER Testing	WR	COMOPTEVFOR : Norfolk, VA	0.000	0.000		0.600	Jan 2020	0.200	Dec 2020	-		0.200	0.000	0.800	-
		Subtotal	0.000	3.670		13.558		2.965		-		2.965	0.000	20.193	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2552 / *Surface Warfare (SUW) Mission Package*

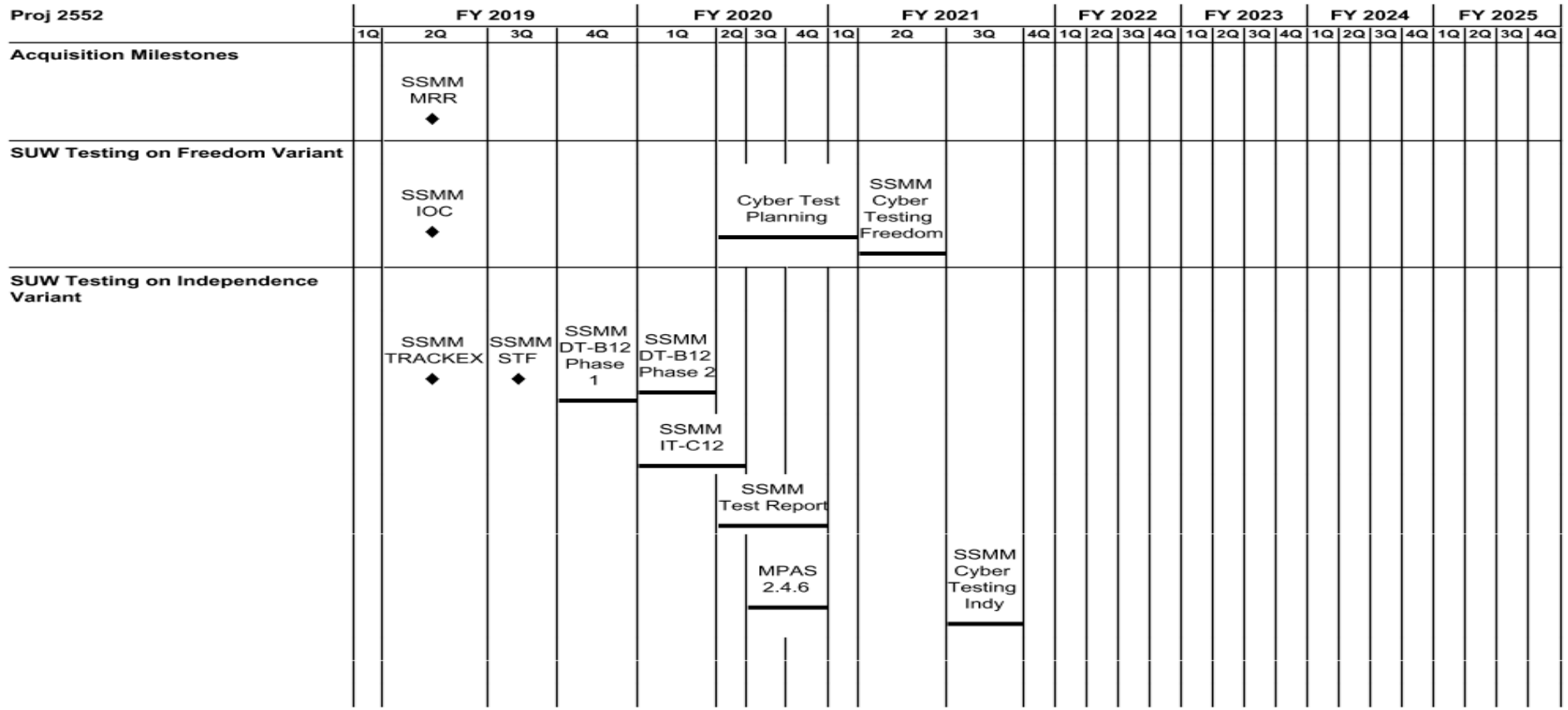
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.450	Jan 2019	0.500	Jan 2020	0.450	Jan 2021	-		0.450	0.000	1.400	-
		Subtotal	0.000	0.450		0.500		0.450		-		0.450	0.000	1.400	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	10.923		17.558		8.115		-		8.115	0.000	36.596	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2552 / *Surface Warfare (SUW) Mission Package*



2021PB - 0603596N - 2552

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 2552 / *Surface Warfare (SUW) Mission Package*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2552				
Acquisition Milestones: Manufacturing actoring Readiness Review (MRR) for SSMM	2	2019	2	2019
SUW Testing on Freedom Variant: SSMM IOC	2	2019	2	2019
SUW Testing on Freedom Variant: SSMM Cyber Test Planning	2	2020	1	2021
SUW Testing on Freedom Variant: Conduct Cyber Security Testing Freedom Variant	2	2021	2	2021
SUW Testing on Independence Variant: SSMM TRACKEX	2	2019	2	2019
SUW Testing on Independence Variant: SSMM Structual Test Fire (STF)	3	2019	3	2019
SUW Testing on Independence Variant: SSMM DT-B12 Phase I	4	2019	4	2019
SUW Testing on Independence Variant: SSMM DT-B12 Phase II	1	2020	1	2020
SUW Testing on Independence Variant: SSMM IT-C12	1	2020	2	2020
SUW Testing on Independence Variant: Conduct the DAWG and Complete SSMM Test Report	2	2020	4	2020
SUW Testing on Independence Variant: MPAS 2.4.6 Updates to Incorporated Testing Findings	3	2020	4	2020
SUW Testing on Independence Variant: Cyber Security Testing Independence Variant	3	2021	3	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy											Date: February 2020	
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / *LCS Mission Modules*				Project (Number/Name) 3129 / *LCS Mission Package Development*			
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
3129: *LCS Mission Package Development*	625.684	8.705	9.868	8.968	-	8.968	8.894	9.019	9.198	9.382	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 443

A. Mission Description and Budget Item Justification

The LCS MM Common Equipment consists of enabling products required by all MPs to provide common hardware interfaces, computer operating environment, communications systems, aviation interface systems, and portable development & integration test-sets. Common hardware interfaces include definition, installation, and control of mechanical, electrical, and cooling requirements common to all mission packages. The Mission Package Computing Environment (MPCE) provides common services and Operating Environment to support all Mission Package Application Software and Open Architecture Products. The Multi-Vehicle Communications System (MVCS) enables the control and data exchange of simultaneous unmanned mission vehicles and the Ship. Aviation interface systems include integration and management of data communications, data processing, and physical hardware interfaces such as common equipment and containers used by all mission packages. Development and integration test-sets provide a mobile operating environment installed in the Mission Package Portable Control Stations (MPPCS) to serve as a surrogate Ship during mission package development and integration test events at test ranges.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Command, Control, Communication, Computers, Cyber and Intelligence (C5I) and Mission Package Tactical Team Trainers	8.705	9.868	8.968	0.000	8.968
Articles:	-	-	-	-	-
FY 2020 Plans: Mission Package Computing Environment (MPCE) - AN/SYK-31 Complete Tech Refresh development of MPCE v2.0 and start Mission Package integration. Complete patching updates to Mission Package Software (MPS) and Mission Package Operating Environment (MPOE) to meet cybersecurity requirements. Establish updated MPS and MPOE baselines and conduct Government Factory Acceptance Test (GFAT). Integrate Mission Package Application Software for each of the three mission packages into MPCE v2.0, conduct element level testing at the Mission System Integration Center (MSIC) and the Distributed Integration Facility (DIF), and complete certification for use on LCS. Transition MPCE v2.0 for deployment and sustainment. Multi-Vehicle Communications System (MVCS) - AN/SYC-31:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Complete Tech Refresh development of MVCS 1.2.1 and support formal shipboard integration and testing with the MCM Mission Package. Continue development of MVCS v1.3. Start integration and testing of MVCS 1.3 into the off-board vehicles (UISS, MCM USV and Knifefish), and validate the Anti-Jam capabilities between the off-board vehicles and ship. Complete development and begin fielding of the Tech Refreshed MVCS on MCM division LCS ships. Common Mission Package Trainer (CMPT): Following the completion of the MPCE Technology Refresh, integration the updated hardware into the test platform for CMPT and certify the baseline for installation into the LTFs. Continue to compile system data to support Reliability and Maintainability (RAM-C) data to support reliability engineering and analysis. Continue FRACAS effort.					
FY 2021 Base Plans: Mission Package Computing Environment (MPCE) - AN/SYK-31 Complete MPCE v2.0 integration and certification for use with each of the Mission Package Application Software. Update and Certify all Logistic documentation to incorporate all MPCE v2.0 changes. Update the MPCE Training material in support of MPCE v2.0 Multi-Vehicle Communication System (MVCS) - AN/SYC-31: Begin integration of MVCE v1.3 into the MCM Mission Package. The integration and testing of MVCS v1.3 will initiate in FY 2021 and complete in FY 2023 and will incorporate Beyond Line Of Sight (BLOS) capability. Common Mission Package Trainer (CMPT): Complete the Technology Refresh of CMPT in alignment with MPCE v2.0. Continue to compile system data to support Reliability and Maintainability (RAM-C) data to support reliability engineering and analysis. Continue FRACAS effort.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 3129 / *LCS Mission Package Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY2021 decreased funding reflects the required level of support of Technology Refresh of the MPCE, MVCS and CMPT. These systems are on a four year refresh cycle to minimize obsolescence.					
Accomplishments/Planned Programs Subtotals	8.705	9.868	8.968	0.000	8.968

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPN 1600: *LCS Common Mission Modules Equipment*	33.237	38.730	39.714	-	39.714	72.210	29.929	30.330	30.921	724.161	1,459.057
• OPN 1601: *LCS MCM Mission Modules*	98.901	64.789	218.822	-	218.822	222.754	234.330	243.187	247.949	1,111.812	2,666.795
• OPN 1602: *LCS ASW Mission Modules.*	0.000	24.617	61.759	-	61.759	78.112	83.024	10.096	1.799	37.248	296.655
• OPN 1603: *LCS SUW Mission Modules*	13.025	14.598	24.412	-	24.412	25.240	28.858	0.924	0.920	22.070	271.796
• WPN 4221: *LCS Module Weapons*	11.350	10.998	4.253	-	4.253	3.961	4.039	4.120	4.268	54.190	110.565

Remarks

D. Acquisition Strategy

The LCS Mission Module Acquisition Strategy is employing an incremental procurement approach to allow for the rapid introduction of additional capabilities as system technology matures. This phased plan provides incremental fielding of capability through the introduction of mature programs of record into the respective Mission Packages until the full baseline capability defined in the Capability Development Document (CDD) is reached.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
6.1 System Engineering	WR	NSWC PCD : Panama City, FL	0.275	0.000		0.000		0.000		-		0.000	0.000	0.275	-
6.1 System Engineering	WR	NSWC DD : Dahlgren, VA	1.784	0.000		0.000		0.000		-		0.000	0.000	1.784	-
6.1 System Engineering	WR	NAVSEALOGCEN : Norfolk, VA	1.520	0.000		0.000		0.000		-		0.000	0.000	1.520	-
6.1 System Engineering	C/CPFF	Northrop Grumman : Bethpage, NY	14.542	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
6.1 System Engineering	WR	NSWC Carderock : Bethesda, MD	2.610	0.000		0.000		0.000		-		0.000	0.000	2.610	-
6.1 System Engineering	WR	NSWC PHD : Port Hueneme, CA	1.568	0.000		0.000		0.000		-		0.000	0.000	1.568	-
6.1 System Engineering	WR	NIWC : San Diego, CA	7.660	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
6.1 System Engineering	C/CPIF	Booz Allen Hamilton : Washington, DC	0.355	0.000		0.000		0.000		-		0.000	0.000	0.355	-
6.4 Integration, Assembly, Test and Checkout	Sub Allot	CECOM Bldg 1207 : Various	1.092	0.000		0.000		0.000		-		0.000	0.000	1.092	-
6.4 Integration, Assembly, Test and Checkout	WR	NAWC AD : Patuxent River, MD	1.930	0.000		0.000		0.000		-		0.000	0.000	1.930	-
6.4 Integration, Assembly, Test and Checkout	WR	NSWC DD : Dahlgren, VA	0.203	0.000		0.000		0.000		-		0.000	0.000	0.203	-
6.4 Integration, Assembly, Test and Checkout	WR	NSWC PC : Panama City, FL	0.075	0.000		0.000		0.000		-		0.000	0.000	0.075	-
6.4 Integration, Assembly, Test and Checkout	C/CPFF	Northrop Grumman : Bethpage, NY	1.498	0.000		0.000		0.000		-		0.000	0.000	1.498	-
6.4 Integration, Assembly, Test and Checkout	WR	NSWC Carderock : Bethesda, MD	8.625	0.000		0.000		0.000		-		0.000	0.000	8.625	-
6.4 Integration, Assembly, Test and Checkout	C/CPFF	PMS 501 : Various	1.075	0.000		0.000		0.000		-		0.000	0.000	1.075	-
6.4 Integration, Assembly, Test and Checkout	WR	NIWC : San Diego, CA	1.857	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
6.4 Integration, Assembly, Test and Checkout	WR	NSWC PHD : Port Hueneme, CA	1.312	0.000		0.000		0.000		-		0.000	0.000	1.312	-
6.4 Integration, Assembly, Test and Checkout	C/CPIF	Booz Allen Hamilton : Washington, DC	0.950	0.000		0.000		0.000		-		0.000	0.000	0.950	-
6.4 Integration, Assembly, Test and Checkout	WR	NAVAIR : Lakehurst, NJ	0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPFF	AAC : Uniontown, PA	15.263	2.500	Jan 2019	2.928	Jan 2020	2.635	Jan 2021	-		2.635	0.000	23.326	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NAWC TSD : Orlando, FL	1.104	0.550	Dec 2018	0.650	Dec 2019	0.000		-		0.000	0.000	2.304	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPFF	Northrop Grumman : Bethpage, NY	2.600	0.990	Jan 2019	0.892	Jan 2020	0.800	Nov 2020	-		0.800	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NSWC PC : Panama City, FL	12.870	2.083	Nov 2018	2.187	Nov 2019	1.943	Nov 2020	-		1.943	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NUWC NPT : Newport, RI	2.074	0.550	Nov 2018	0.450	Nov 2019	0.205	Dec 2020	-		0.205	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPIF	Booz Allen Hamilton : Washington, DC	1.469	0.820	Dec 2018	0.836	Dec 2019	0.802	Nov 2020	-		0.802	0.000	3.927	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NIWC : San Diego, CA	3.949	0.469	Nov 2018	1.175	Nov 2019	1.058	Jan 2021	-		1.058	0.000	6.651	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NSWC DD : Dahlgren, VA	2.669	0.743	Nov 2018	0.750	Dec 2019	0.675	Dec 2020	-		0.675	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	PMW 760 : Various	0.889	0.000		0.000		0.000		-		0.000	0.000	0.889	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPFF	Progeny : Manassas, VA	1.730	0.000		0.000		0.000		-		0.000	0.000	1.730	-
1.0 MCM MP	WR	NSWC PC : Panama City, FL	71.297	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
1.0 MCM MP	Sub Allot	PMS 406 : Various	42.761	0.000		0.000		0.000		-		0.000	0.000	42.761	-
1.0 MCM MP	Sub Allot	PMS 495 : Various	0.249	0.000		0.000		0.000		-		0.000	0.000	0.249	-
1.0 MCM MP	WR	NSWC PHD : Port Hueneme, CA	2.300	0.000		0.000		0.000		-		0.000	0.000	2.300	-
1.0 MCM MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
1.0 MCM MP	C/CPFF	Northrop Grumman : Bethpage, NY	1.892	0.000		0.000		0.000		-		0.000	0.000	1.892	-
1.0 MCM MP	WR	Various : Various	1.124	0.000		0.000		0.000		-		0.000	0.000	1.124	-
2.0 ASW MP	Sub Allot	PEO IWS5E : Various	41.094	0.000		0.000		0.000		-		0.000	0.000	41.094	-
2.0 ASW MP	WR	NUWC NPT : Newport, RI	29.320	0.000		0.000		0.000		-		0.000	0.000	29.320	-
2.0 ASW MP	WR	SSC PAC : San Diego, CA	4.967	0.000		0.000		0.000		-		0.000	0.000	4.967	-
2.0 ASW MP	WR	CDSA Dam Neck : Virginia Beach, VA	11.145	0.000		0.000		0.000		-		0.000	0.000	11.145	-
2.0 ASW MP	C/CPFF	Northrop Grumman : Bethpage, NY	10.914	0.000		0.000		0.000		-		0.000	0.000	10.914	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Navy			Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	WR	PEO IWS 5A : Various	9.301	0.000		0.000		0.000		-		0.000	0.000	9.301	-
2.0 ASW MP	C/CPFF	SPA : Washington, DC	1.687	0.000		0.000		0.000		-		0.000	0.000	1.687	-
2.0 ASW MP	WR	NSWC DD : Dahlgren, VA	0.871	0.000		0.000		0.000		-		0.000	0.000	0.871	-
2.0 ASW MP	WR	NUWC KPT : Keyport, WA	1.095	0.000		0.000		0.000		-		0.000	0.000	1.095	-
2.0 ASW MP	WR	NSWC PHD : Port Hueneme, CA	1.550	0.000		0.000		0.000		-		0.000	0.000	1.550	-
2.0 ASW MP	C/FPIF	Booz Allen Hamilton : Washington, DC	0.500	0.000		0.000		0.000		-		0.000	0.000	0.500	-
2.0 ASW MP	WR	NAWC WD : Point Mugu, CA	5.430	0.000		0.000		0.000		-		0.000	0.000	5.430	-
2.0 ASW MP	C/CPFF	Various : Various	3.757	0.000		0.000		0.000		-		0.000	0.000	3.757	-
2.0 ASW MP	Sub Allot	Raytheon : Portsmouth, RI	42.056	0.000		0.000		0.000		-		0.000	0.000	42.056	-
3.0 SUW MP	C/CPFF	JAMS PO : Various	7.980	0.000		0.000		0.000		-		0.000	0.000	7.980	-
3.0 SUW MP	WR	NAWC WD : Ridgecrest, CA	7.826	0.000		0.000		0.000		-		0.000	0.000	7.826	-
3.0 SUW MP	C/CPFF	Northrop Grumman : Bethpage, NY	60.524	0.000		0.000		0.000		-		0.000	0.000	60.524	-
3.0 SUW MP	WR	NSWC CD : Crane, IN	0.396	0.000		0.000		0.000		-		0.000	0.000	0.396	-
3.0 SUW MP	WR	NSWC Corona : Corona, CA	1.695	0.000		0.000		0.000		-		0.000	0.000	1.695	-
3.0 SUW MP	WR	NSWC DD : Dahlgren, VA	60.316	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
3.0 SUW MP	WR	NSWC PHD : Port Hueneme, CA	30.437	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
3.0 SUW MP	Sub Allot	PEO IWS 3 : Various	9.819	0.000		0.000		0.000		-		0.000	0.000	9.819	-
		Subtotal	556.451	8.705		9.868		8.118		-		8.118	Continuing	Continuing	N/A

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
6.5 Training Systems Development	WR	NAWC TSD : Orlando, Fl	0.909	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
6.5 Training Systems Development	WR	NSWC PHD : Port Hueneme, CA	0.390	0.000		0.000		0.000		-		0.000	0.000	0.390	-
6.5 Training Systems Development	C/CPIF	Booz Allen Hamilton : Washington, DC	0.268	0.000		0.000		0.000		-		0.000	0.000	0.268	-
6.5 Training Systems Development	C/CPAF	Northrop Grumman : Bethpage, NY	0.575	0.000		0.000		0.000		-		0.000	0.000	0.575	-
6.5 Training Systems Development	Sub Allot	Various : Various	3.221	0.000		0.000		0.000		-		0.000	0.000	3.221	-
6.5 Training Systems Development	WR	JHU/APL : Laurel, MD	1.479	0.000		0.000		0.000		-		0.000	0.000	1.479	-
		Subtotal	6.842	0.000		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
6.3 System Test and Evaluation	WR	NSWC PHD : Port Hueneme, CA	27.963	0.000		0.000		0.000		-		0.000	0.000	27.963	-
6.3 System Test and Evaluation	WR	COMOPTEVFOR : Norfolk, VA	4.944	0.000		0.000		0.000		-		0.000	0.000	4.944	-
6.3 System Test and Evaluation	WR	NSWC Corona : Corona, CA	0.500	0.000		0.000		0.000		-		0.000	0.000	0.500	-
6.3 System Test and Evaluation	WR	NIWC : San Diego, CA	5.258	0.000		0.000		0.000		-		0.000	0.000	5.258	-
6.3 System Test and Evaluation	C/CPIF	Booz Allen Hamilton : Washington, DC	0.750	0.000		0.000		0.000		-		0.000	0.000	0.750	-
		Subtotal	39.415	0.000		0.000		0.000		-		0.000	0.000	39.415	N/A

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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
6.2 Program Management	C/CPFF	CACI : Fairfax, VA	7.698	0.000		0.000		0.000		-		0.000	0.000	7.698	-
6.2 Program Management	C/CPIF	Booz Allen Hamilton : Washington DC	4.695	0.000		0.000		0.850	Nov 2020	-		0.850	0.000	5.545	-
6.2 Program Management	FFRDC	Mitre : McLean, VA	2.679	0.000		0.000		0.000		-		0.000	0.000	2.679	-
6.2 Program Management	FFRDC	JHU/APL : Laurel, MD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
6.2 Program Management	C/CPFF	Northrop Grumman : Bethpage, NY	4.977	0.000		0.000		0.000		-		0.000	0.000	4.977	-
6.2 Program Management	C/CPFF	NSWC Crane : Various	2.927	0.000		0.000		0.000		-		0.000	0.000	2.927	-
		Subtotal	22.976	0.000		0.000		0.850		-		0.850	0.000	23.826	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	625.684	8.705		9.868		8.968		-		8.968	Continuing	Continuing	N/A

Remarks

Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:

2550 Mine Countermeasures (MCM) Mission Package
2551 Anti-Submarine Warfare (ASW) Mission Package
2552 Surface Warfare (SUW) Mission Package
3129 LCS Mission Package Development

Prior to FY 2019 all Mission Package funding was in Project 3129.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 3129 / *LCS Mission Package Development*

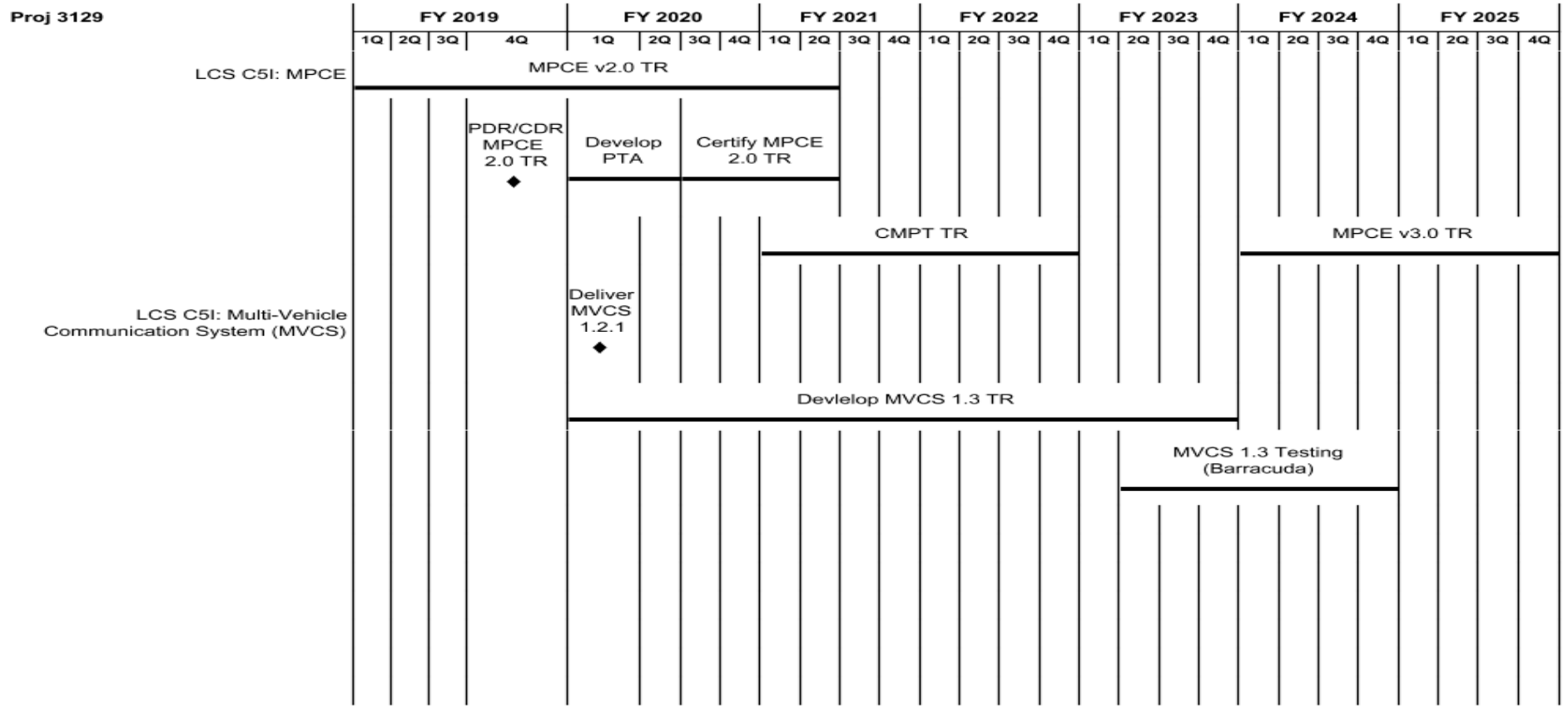

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Navy		Date: February 2020
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603596N / *LCS Mission Modules*	**Project (Number/Name)** 3129 / *LCS Mission Package Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3129				
LCS C5I: MPCE: Develop and establish baseline for MPCE v2.0 Technology Refresh (TR)	1	2019	2	2021
LCS C5I: MPCE: Conduct PDR and CDR for MPCE v2.0 (AN/SYK-31) TR	4	2019	4	2019
LCS C5I: MPCE: Develop two Production Test Articles (PTA) to support testing/ certification	1	2020	2	2020
LCS C5I: MPCE: Conduct testing and certification of MPCE v2.0 HW/SW	3	2020	2	2021
LCS C5I: MPCE: CMPT Technology Refresh	1	2021	4	2022
LCS C5I: MPCE: Technology Refresh MPCE and establish MPCE v3.0	1	2024	4	2025
LCS C5I: Multi-Vehicle Communication System (MVCS): Deliver MVCS v1.2.1	1	2020	1	2020
LCS C5I: Multi-Vehicle Communication System (MVCS): Development of MVCS 1.3 TR	1	2020	4	2023
LCS C5I: Multi-Vehicle Communication System (MVCS): MVCS 1.3 Testing with Barracuda	2	2023	4	2024