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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy										Date: March 2019		
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 (U)LCS Mission Modules							
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	525.214	100.470	103.559	108.505	-	108.505	44.694	45.690	28.349	28.914	Continuing	Continuing
2550: Mine Countermeasure (MCM) Mission Package	0.000	0.000	41.813	39.499	-	39.499	26.419	27.878	10.793	11.009	Continuing	Continuing
2551: Anti-Submarine Warfare (ASW) Mission Package	0.000	0.000	41.553	41.580	-	41.580	9.282	8.884	8.500	8.670	Continuing	Continuing
2552: Surface Warfare (SUW) Mission Package	0.000	0.000	11.368	17.558	-	17.558	0.000	0.000	0.000	0.000	0.000	28.926
3129: LCS Mission Package Development	525.214	100.470	8.825	9.868	-	9.868	8.993	8.928	9.056	9.235	Continuing	Continuing
Program MDAP/MAIS Code: Project MDAP/MAIS Code(s): 443												
A. Mission Description and Budget Item Justification												
<p>This Program Element (PE) provides funds for detailed design, development, issue resolution, certification, integration, and testing of the Littoral Combat Ship (LCS) Mission Modules (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.</p> <p>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.</p> <p>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</p> <p>Prior to FY 2019 all Mission Package funding was in Project 3129.</p>												

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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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget		116.871	103.633	70.548	-	70.548
Current President's Budget		100.470	103.559	108.505	-	108.505
Total Adjustments		-16.401	-0.074	37.957	-	37.957
• Congressional General Reductions		-	-0.074			
• Congressional Directed Reductions		-	-			
• Congressional Rescissions		-	-			
• Congressional Adds		-	-			
• Congressional Directed Transfers		-	-			
• Reprogrammings		-	-			
• SBIR/STTR Transfer		-1.151	0.000			
• Program Adjustments		0.000	0.000	38.265	-	38.265
• Rate/Misc Adjustments		0.000	0.000	-0.308	-	-0.308
• Congressional Directed Reductions		-15.250	-	-	-	-
Adjustments						
Change Summary Explanation						
FY 2020: +\$38.400M due to increased ASW MP and SUW MP test scope as defined in the updated LCS TEMP and provides funding for the ASW ACB/TI development process for the ASW MP's sonar signal processing, -\$0.135M Contractor Services Reform reduction, and -\$0.308M in various rate adjustments.						

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2550: Mine Countermeasure (MCM) Mission Package	0.000	0.000	41.813	39.499	-	39.499	26.419	27.878	10.793	11.009	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 443												
A. Mission Description and Budget Item Justification												
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.												
The LCS MM program employees 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 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) + 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 + Unmanned Surface Sweep System)												

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Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N I (U)LCS Mission Modules	Project (Number/Name) 2550 I Mine Countermeasure (MCM) Mission Package			
<div>- Buried Minehunting (BMH) Module: Knifefish Unmanned Underwater Vehicle (UUV)</div> <div>- Near Surface Mine Neutralization: Barracuda Mine Neutralization System</div>						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Mine Countermeasures (MCM) Mission Modules		0.000	41.813	39.499	0.000	39.499
Articles:		-	-	-	-	-
FY 2019 Plans:						
For the Mine Countermeasures (MCM) Mission Package (MP) Airborne Mine Neutralization (AMN) Module, the program will integrate and conduct at-sea integration/tests on Freedom variant to certify the AMN module for use on the Freedom variant hulls. 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.						
For the MCM MP Near Surface Detection (NSD) Module, the program will integrate and conduct integration/tests on Freedom variant to certify the NSD module for use on the Freedom variant hulls. 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.						
For the MCM MP Coastal Mine Reconnaissance (CMR) Module, the program will integrate the CMR Post Mission Analysis (PMA) workstation and conduct at-sea integration/tests on Freedom variant to certify the CMR module for use on the Freedom variant hulls.						
For the MCM MP Unmanned Minesweeping (UMS) module, the program will begin integration of the Unmanned Influence Sweep System (UISS) into the MCM MP. Will conduct launch and recovery (L&R) capture line mechanism testing on LCS Independence variant. Conduct UISS at-sea IOT&E / UMS DT on LCS Independence variant to support UISS mission system IOC in FY 2019. 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. Testing also requires procurement of test spares and test support equipment. The Program will also deliver and install common Post Mission Analysis (PMA) hardware onto LCS.						
For the MCM MP Buried Minehunting (BMH) Module, the program will begin integration of the Knifefish System into the MCM MP. Conduct pier-side Knifefish Launch and Recovery demonstration. Conduct integration and at-sea Knifefish DT and Knifefish BMH DT on Independence variant to support Knifefish mission system IOC in FY 2019. 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. Testing also requires procurement of						

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
test spares and test support equipment. The Program will also deliver and install common PMA hardware onto LCS.						
For the MCM MP Remote Minehunting (RMH) Module, the program will support integration of the AN/AQS-20C onto the USV in preparation for an User Operational Evaluation System (UOES) employment, developmental test, and an Operational Assessment in FY 2020. Will develop an RMH Module Specification, integrate MVCS v1.2 into the USV, and will support contractor at-sea testing.						
The program will complete development and deliver MPAS Build 2.1. This version of MPAS incorporates correction of software Problem Trouble Reports (PTRs) identified during AMN, NSD, CMR, UMS, and BMH integration/testing. Integrate MPAS v2.1 into the Common Mission Package Trainer (CMPT).						
Continue development of MPAS Build 3.0 to add USV and AN/AQS-20C capability.						
Due to FY 2018 Congressional reduction to training procurements, vendor training for MCM MP crews will be provided until outfitting of LCS Training Facilities is completed in FY 2023, to include crew travel to facilities.						
The tactics team will conduct test analysis for both the Freedom and Independence hull variants and will update the CLASS Tactical Publications and the Integrated Program Execution Guide (IPEG). 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 2020 Base Plans:						
For the MCM MP Remote Minehunting (RMH) Module, the program will support the UOES Employment, conduct at-sea developmental testing, and an Operational Assessment (OA) in preparation for testing the MCM MP on the Independence variant in FY 2021. Testing requires placement and removal of exercise mines in a minefield						

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
along with 24 hour monitoring of the minefield with an at-sea chase boat for the duration of the test event. Testing also requires procurement of test spares and test support equipment.						
The program will complete development and incorporation of PTRs into MCM MPAS Build 3.0 to support formal MCM MP Developmental and Operational Testing. Integrate MPAS Build 3.0 into the Common Mission Package Trainer.						
Due to FY 2018 Congressional reduction to training procurements, 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 program will 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 will continue to conduct test analysis for both the Freedom and Independence hull variants and will update the CLASS Tactical Publications and the Integrated Program Execution Guide (IPEG). 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 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement: The slight decrease from FY 2019 to FY 2020 is a result of completing the development, integration and Module level testing in FY 2019 of Unmanned Minesweeping (UMS) module and the Buried Minehunting (BMH) module. The focus in FY 2020 will be to complete integration of the Remote Minehunting Module into the MCM MP.						
Accomplishments/Planned Programs Subtotals		0.000	41.813	39.499	0.000	39.499

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Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package			
C. Other Program Funding Summary (\$ in Millions)											
			<u>FY 2020</u>	<u>FY 2020</u>	<u>FY 2020</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Complete</u>	<u>Total Cost</u>
• OPN 1600: LCS Common Mission Modules Equipment	18.760	33.237	51.553	-	51.553	36.657	55.776	29.787	30.382	727.684	1,424.901
• OPN 1601: LCS MCM Mission Modules	45.146	98.901	197.129	-	197.129	222.831	222.523	233.151	243.503	1,213.078	2,655.367
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.											
E. Performance Metrics											
Program Completed Milestone B January 2014											
Complete MCM MP DT, TECHEVAL, and IOT&E on Independence variant											
Achieve MCM MP Initial Operational Capability (IOC) on Independence variant											
Conduct MCM MP DT, TECHEVAL, and IOT&E on Freedom variant											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MCM MP	WR	NSWC PCD : Panama City, FL	0.000	0.000		21.242	Nov 2018	13.487	Nov 2019	-		13.487	Continuing	Continuing	Continuing
MCM MP	Sub Allot	PMS 406 : Various	0.000	0.000		5.000	Feb 2019	2.650	Nov 2019	-		2.650	6.400	14.050	-
MCM MP	Sub Allot	PMS 495 : Various	0.000	0.000		1.000	Feb 2019	0.000		-		0.000	2.400	3.400	-
MCM MP	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		4.571	Dec 2018	5.000	Mar 2020	-		5.000	12.800	22.371	-
MCM MP	C/CPIF	Northrop Grumman : Bethpage, NY	0.000	0.000		9.600	Jan 2019	3.700	Jan 2020	-		3.700	4.800	18.100	-
Subtotal			0.000	0.000		41.413		24.837		-		24.837	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MCM MP Test Support	WR	NSWC PCD : Panama City, FL	0.000	0.000		0.000		14.162	Nov 2019	-		14.162	0.000	14.162	-
Subtotal			0.000	0.000		0.000		14.162		-		14.162	0.000	14.162	N/A
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
MCM Program Management	C/CPFF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.400	Oct 2018	0.500	Oct 2019	-		0.500	1.680	2.580	-
Subtotal			0.000	0.000		0.400		0.500		-		0.500	1.680	2.580	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		41.813		39.499		-		39.499	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy							Date: March 2019			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules			Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package			
	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract	
Remarks FY 2018 and prior funding in Project 3129.										

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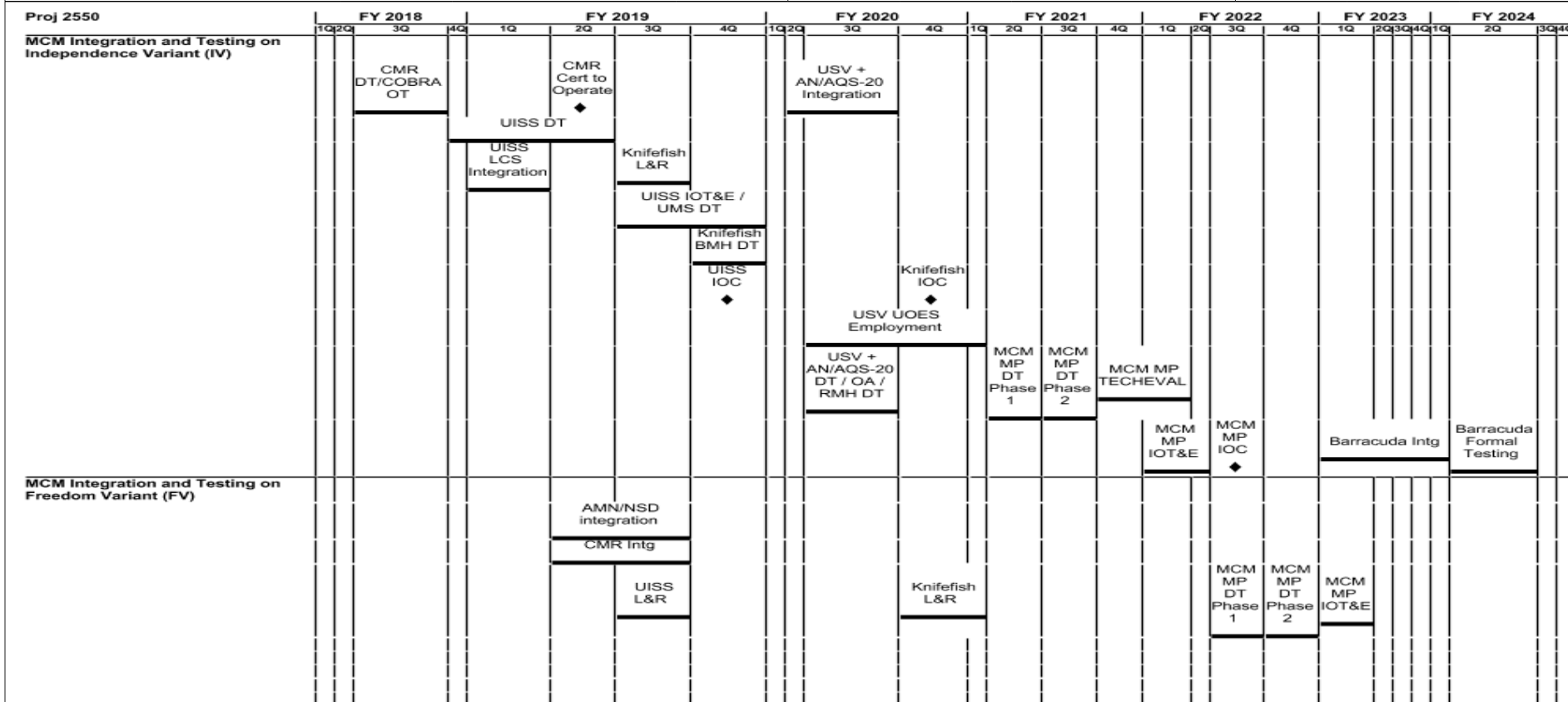
Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy

Date: March 2019

Appropriation/Budget Activity
1319 / 4

R-1 Program Element (Number/Name)
PE 0603596N / (U)LCS Mission Modules

Project (Number/Name)
2550 / Mine Countermeasure (MCM)
Mission Package



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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2550 / Mine Countermeasure (MCM) Mission Package	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2550				
MCM Integration and Testing on Independence Variant (IV): CMR DT/COBRA at-Sea OT	3	2018	3	2018
MCM Integration and Testing on Independence Variant (IV): CMR Mission Module Certified for Operations	2	2019	2	2019
MCM Integration and Testing on Independence Variant (IV): USV + AN/AQS-20 Integration	2	2020	3	2020
MCM Integration and Testing on Independence Variant (IV): UISS Mission System DT	4	2018	2	2019
MCM Integration and Testing on Independence Variant (IV): UISS LCS Integration	1	2019	1	2019
MCM Integration and Testing on Independence Variant (IV): Knifefish L&R	3	2019	3	2019
MCM Integration and Testing on Independence Variant (IV): UISS Mission System IOT&E / UMS DT	3	2019	4	2019
MCM Integration and Testing on Independence Variant (IV): Knifefish Mission System BMH DT	4	2019	4	2019
MCM Integration and Testing on Independence Variant (IV): UISS Mission System IOC	4	2019	4	2019
MCM Integration and Testing on Independence Variant (IV): Knifefish Mission System IOC	4	2020	4	2020
MCM Integration and Testing on Independence Variant (IV): USV + AN/AQS-20 UOES Employment	3	2020	1	2021
MCM Integration and Testing on Independence Variant (IV): USV + AN/AQS-20 DT / OA / RMH DT	3	2020	3	2020
MCM Integration and Testing on Independence Variant (IV): DT-B10 (Phase 1)	2	2021	2	2021
MCM Integration and Testing on Independence Variant (IV): DT-B10 (Phase 2)	3	2021	3	2021
MCM Integration and Testing on Independence Variant (IV): DT-C10 TECHEVAL	4	2021	1	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Date: March 2019		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)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 Independence Variant (IV): OT-C10 IOT&E		1	2022	2	2022
MCM Integration and Testing on Independence Variant (IV): MCM MP IOC on Independence Variant		3	2022	3	2022
MCM Integration and Testing on Independence Variant (IV): Barracuda Integration		1	2023	1	2024
MCM Integration and Testing on Independence Variant (IV): Barracuda Testing MCM Mission Package		2	2024	2	2024
MCM Integration and Testing on Freedom Variant (FV): AMN/NSD integration		2	2019	3	2019
MCM Integration and Testing on Freedom Variant (FV): CMR Integration		2	2019	3	2019
MCM Integration and Testing on Freedom Variant (FV): UISS L&R		3	2019	3	2019
MCM Integration and Testing on Freedom Variant (FV): Knifefish L & R		4	2020	1	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
MCM Integration and Testing on Freedom Variant (FV): Barracuda Integration		1	2023	4	2023
MCM Integration and Testing on Freedom Variant (FV): Barracuda Testing on Indy		4	2024	4	2024

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Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2551: Anti-Submarine Warfare (ASW) Mission Package	0.000	0.000	41.553	41.580	-	41.580	9.282	8.884	8.500	8.670	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 443												

A. Mission Description and Budget Item Justification

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

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

Prior to FY 2019 all MP funding was in Project 3129.

Due to an FY 2018 Congressional reduction, all efforts associated with the development, integration, and testing of the Torpedo Defense Module have stopped. The requirement for a torpedo defense capability is currently unfunded and no longer in the ASW MP baseline.

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. These individual systems are combined into modules: an ASW Escort Mission Module (EMM) that provides High Value Unit (HVV) escort capability and an Aviation Module that offers airborne threat localization and engagement capability through a MQ-8B Fire Scout VTUAV and an 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 will be installed on board a Freedom variant hull 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. This project will initiate shipboard integration of the Independence variant in FY 2020.

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. This will contribute to the development of

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019			
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package				
LCS ASW MPs and the Guided Missile Frigate FFG(X) Program. 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 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 production program via an ACB development process by inserting maturing USW technologies and addressing hardware technology obsolescence.						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Anti-Submarine Warfare (ASW) Mission Modules		0.000	41.553	41.580	0.000	41.580
Articles:		-	-	-	-	-
FY 2019 Plans: PREPARE FOR AND CONDUCT FORMAL TESTING ON FREEDOM VARIANT: 1.) Complete Escort Mission Module (EMM) pier-side System Qualification Testing (SQT) 2.) Government acceptance of the EMM Pre-Production Test Article (PPTA) 3.) Conduct end-to-end integration testing at the Land Based Integration Test Site (LBITS) 4.a.) Conduct at-sea end-to-end integration testing of the EMM on a white-ship hull at AUTEC to characterize at-sea acoustic performance 4.b.) While conducting white-ship testing, execute Ship Alteration (SHIPALT) on LCS 3 to support formal testing 5.) Conduct Crew Training 6.) Embark and conduct Installation Check Out (INCO) procedures for the ASW MP onto LCS 3 7.) Finalize safety analysis of the ASW equipment on the Freedom variant 8.) Conduct ASW MP Weapon System Explosives Safety Review Board (WSESRB) to support ASW MP certification 9.) Conduct ASW MP Readiness Assessment (MPRA) /Mission Readiness Assessment (MRA) and certify the package to start formal testing on Freedom variant 10.) Continue development of ASW MP logistics products 11.) Finalize testing objectives, performance prediction modeling, and test plans to support ASW MP testing 12.) Conduct developmental testing (DT-B3 Phase I) on LCS 3 to support ASW MP Initial Operational Capability (IOC) in FY 2020						

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules		Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<p>Continue development of EMM acoustic processing software and hardware (ACB-19 software and TI-18 sonar signal processing hardware) which is a four-year cycle to address both software and hardware obsolescence.</p> <p>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. Provide initial training to LCS Sailors in support of key test events 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.</p> <p>Complete the development of the Torpedo Defense Module (TDM) in Q1 FY 2019. Due to FY 2018 Budget Enactment all efforts associated with the integration and testing of the TDM have stopped. The requirement for a Torpedo Defense capability is unfunded and no longer in the ASW MP IOC baseline.</p> <p>FY 2020 Base Plans: COMPLETE FORMAL TESTING ON FREEDOM VARIANT: 1.) Complete DT-B3 Phase II, DT-C3 (TECHEVAL), and OT-C3 (IOT&E) to achieve ASW MP IOC 2.) Complete development of ASW MP logistics products</p> <p>INITIATE INTEGRATION OF ASW MP ON INDEPENDENCE VARIANT IN PREPARATION FOR FORMAL TESTING: 1.) Develop requirements for the Independence variant SHIPALT 2.) Complete the Ship Installation Drawings (SIDs) and Ship Change Documents (SCDs) 3.) Conduct ship checks 4.) Complete development of ASW MP SHIPALT for Independence variant in preparation for MP embark/debark 5.) Execute SHIPALT on LCS 4 to support formal testing 6.) Conduct Crew Training 7.) Embark and conduct Installation Check Out (INCO) procedures for the ASW MP onto LCS 4 8.) Finalize safety analysis of the ASW equipment on the Independence variant 9.) Conduct ASW MP Weapon System Explosives Safety Review Board (WSESRB) to support ASW MP certification</p>						

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: March 2019		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules		Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
10.) Finalize testing objectives, performance prediction modeling, and test plans to support ASW MP testing 11.) Conduct at-sea end-to-end integration testing on Independence variant hull to include ASW MP and combat system performance validation testing 12.) Prepare for formal developmental and operational testing beginning in FY 2021 Due to FY 2019 Budget Enactment for Common and ASW MP procurement funds (BLI 1600 and BLI 1602), program has moved from fielding ACB-19 / TI-18 to ACB-19 / TI-20 to allow the program to procure and field a common sonar signal processing baseline across the eight ASW division ships. This is a four-year cycle to address both software and hardware obsolescence. 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 Q2 FY 2020. 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 maintenance training until formal Navy training is fully established. Provide travel costs for Sailors to attend initial and vendor training. FY 2020 OCO Plans: N/A FY 2019 to FY 2020 Increase/Decrease Statement: Increase from FY 2019 to FY 2020 due to completion of development of the ASW MP in FY 2019 to support a transition to formal testing on the Freedom variant and initiation of integration and testing on the Independence variant hull in FY 2020.						
Accomplishments/Planned Programs Subtotals		0.000	41.553	41.580	0.000	41.580

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package			
C. Other Program Funding Summary (\$ in Millions)											
			<u>FY 2020</u>	<u>FY 2020</u>	<u>FY 2020</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Complete</u>	<u>Total Cost</u>
• OPN 1600: LCS Common Mission Modules Equipment	18.760	33.237	51.553	-	51.553	36.657	55.776	29.787	30.382	727.684	1,424.901
• OPN 1602: LCS ASW Mission Modules	0.000	0.000	27.754	-	27.754	63.181	34.104	34.777	35.473	149.221	344.510
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.											
E. Performance Metrics											
Program Completed Milestone B January 2014											
Complete ASW MP DT, TECHEVAL, and IOT&E on Freedom variant											
Achieve ASW MP IOC on Freedom variant											
Complete ASW MP DT and IOT&E on Independence variant											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	Sub Allot	PEO IWS 5E : Various	0.000	0.000		1.500	Nov 2018	0.000		-		0.000	0.000	1.500	-
2.0 ASW MP	WR	NUWC NPT : Newport RI	0.000	0.000		2.380	Nov 2018	1.600	Nov 2019	-		1.600	Continuing	Continuing	Continuing
2.0 ASW MP	WR	SSC PAC : San Diego, CA	0.000	0.000		0.750	Dec 2018	0.000		-		0.000	0.000	0.750	-
2.0 ASW MP	WR	NUWC KPT : Keyport, Wa	0.000	0.000		0.500	Nov 2018	0.800	Nov 2019	-		0.800	0.000	1.300	-
2.0 ASW MP	C/CPFF	Northrop Grumman : Bethpage, NY	0.000	0.000		2.800	Jan 2019	0.000		-		0.000	0.000	2.800	-
2.0 ASW MP	Sub Allot	PEO IWS 5A : Various	0.000	0.000		13.800	Mar 2019	12.200	Mar 2020	-		12.200	Continuing	Continuing	Continuing
2.0 ASW MP	C/CPFF	CSRA : Washington, DC	0.000	0.000		0.255	Jan 2019	0.000		-		0.000	0.000	0.255	-
2.0 ASW MP	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.225	Nov 2018	0.000		-		0.000	0.000	0.225	-
2.0 ASW MP	WR	SUPSHIP Bath : Bath, Me	0.000	0.000		1.550	Oct 2018	3.500	Oct 2019	-		3.500	0.000	5.050	-
2.0 ASW MP	MIPR	NAWC WD : Point Mugu, CA	0.000	0.000		0.410	Dec 2018	0.000		-		0.000	0.000	0.410	-
2.0 ASW MP	C/FFP	Raytheon : Portsmouth, RI	0.000	0.000		0.000	Nov 2018	0.000		-		0.000	0.000	0.000	-
Subtotal			0.000	0.000		24.170		18.100		-		18.100	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP Test and Evaluation (Freedom)	WR	COMOPTEVFOR : Norfolk, VA	0.000	0.000		0.550	Oct 2018	0.550	Oct 2019	-		0.550	0.000	1.100	-
2.0 ASW MP Test and Evaluation (Freedom)	WR	NSWC PHD : Port Hueneme, Ca	0.000	0.000		1.766	Dec 2018	5.730	Dec 2019	-		5.730	0.000	7.496	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package					
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP Test and Evaluation (Freedom)	WR	Range Service : Var*	0.000	0.000		3.154	Oct 2018	4.300	Oct 2019	-		4.300	0.000	7.454	-
2.0 ASW MP Test and Evaluation (Freedom)	WR	NUWC NPT : Newport, RI	0.000	0.000		7.362	Dec 2018	8.400	Dec 2019	-		8.400	0.000	15.762	-
2.0 ASW MP Test and Evaluation (Freedom)	WR	NUWC KPT : Keyport, Wa	0.000	0.000		2.600	Nov 2018	2.500	Nov 2019	-		2.500	0.000	5.100	-
2.0 ASW MP Test and Evaluation (Freedom)	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		1.400	Jan 2019	1.400	Jan 2020	-		1.400	0.000	2.800	-
Subtotal			0.000	0.000		16.832		22.880		-		22.880	0.000	39.712	N/A
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.551	Jan 2019	0.600	Jan 2020	-		0.600	0.000	1.151	-
Subtotal			0.000	0.000		0.551		0.600		-		0.600	0.000	1.151	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	0.000		41.553		41.580		-		41.580	Continuing	Continuing	N/A
Remarks FY 2018 and prior funding in Project 3129.															

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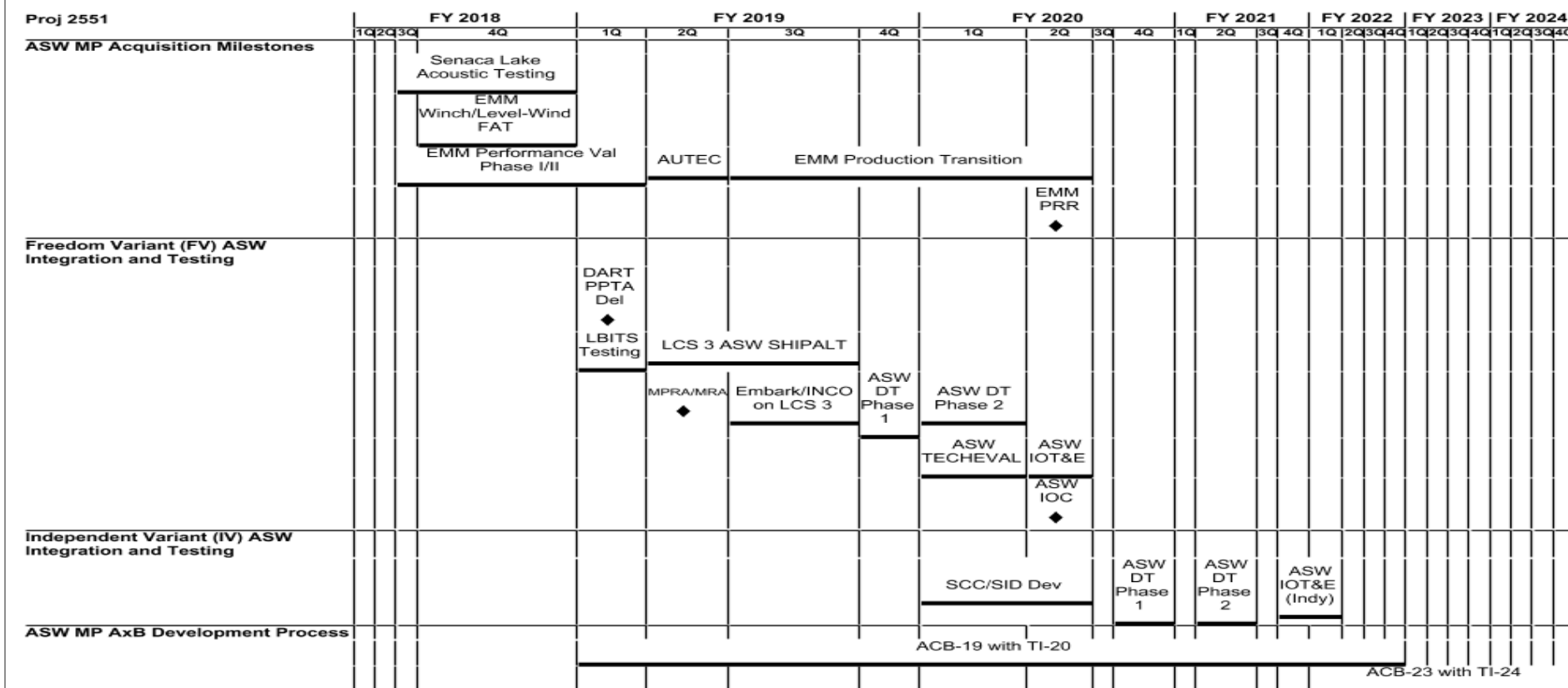
Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy

Date: March 2019

Appropriation/Budget Activity
1319 / 4

R-1 Program Element (Number/Name)
PE 0603596N / (U)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 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2551 / Anti-Submarine Warfare (ASW) Mission Package	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2551				
ASW MP Acquisition Milestones: EMM Acoustic Characterization Seneca Lake	3	2018	4	2018
ASW MP Acquisition Milestones: EMM Winch and Level-Wind First Article Test	4	2018	4	2018
ASW MP Acquisition Milestones: EMM Component and System Level Performance Validation Dock Side Testing	3	2018	1	2019
ASW MP Acquisition Milestones: White Ship Testing AUTECH	2	2019	2	2019
ASW MP Acquisition Milestones: EMM Production Transition	3	2019	2	2020
ASW MP Acquisition Milestones: EMM Production Readiness Review	2	2020	2	2020
Freedom Variant (FV) ASW Integration and Testing: DART Pre-Production Test Article Delivery	1	2019	1	2019
Freedom Variant (FV) ASW Integration and Testing: ASW MP Land Based Integration and Testing	1	2019	1	2019
Freedom Variant (FV) ASW Integration and Testing: ASW MP SHIPALT Execution on LCS 3	2	2019	3	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 and INCO on LCS 3	3	2019	3	2019
Freedom Variant (FV) ASW Integration and Testing: ASW MP DT-B3 Phase 1	4	2019	4	2019
Freedom Variant (FV) ASW Integration and Testing: ASW MP DT-B3 Phase 2	1	2020	1	2020
Freedom Variant (FV) ASW Integration and Testing: ASW MP DT/IT-C3 TECHEVAL	1	2020	1	2020
Freedom Variant (FV) ASW Integration and Testing: ASW MP OT-C3	2	2020	2	2020
Freedom Variant (FV) ASW Integration and Testing: ASW MP IOC	2	2020	2	2020

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Date: March 2019		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)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 Mission Package SCD/ SID development for LCS 4		1	2020	2	2020
Independent Variant (IV) ASW Integration and Testing: ASW MP SHIPALT Execution on LCS 4		3	2020	3	2020
Independent Variant (IV) ASW Integration and Testing: ASW MP Embark and INCO on LCS 4		3	2020	3	2020
Independent Variant (IV) ASW Integration and Testing: ASW MP DT-B6 Phase 1		4	2020	4	2020
Independent Variant (IV) ASW Integration and Testing: ASW MP DT-B6 Phase 2		2	2021	2	2021
Independent Variant (IV) ASW Integration and Testing: ASW MP OT-C6		4	2021	1	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	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
2552: Surface Warfare (SUW) Mission Package	0.000	0.000	11.368	17.558	-	17.558	0.000	0.000	0.000	0.000	0.000	28.926
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 443												
A. Mission Description and Budget Item Justification												
Beginning in FY 2019, Mission Package funding is realigned into four (4) projects:												
2550 Mine Countermeasures (MCM) Mission Package (MP)												
2551 Anti-Submarine Warfare (ASW) MP												
2552 Surface Warfare (SUW) MP												
3129 LCS MP Development												
Prior to FY 2019 all MP funding was in Project 3129.												
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 comprised 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 M299 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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	
Title: Surface Warfare (SUW) Mission Modules							0.000	11.368	17.558	0.000	17.558	
							Articles: -	-	-	-	-	
FY 2019 Plans:												
Complete IOT&E and establish IOC of the Surface-to-Surface Missile Module in Q2 FY 2019.												

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy							Date: March 2019				
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules			Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Conduct Find, Fix, Repair efforts of SSMM EDM-2 to resolve issues found during Freedom variant testing and complete test reports.											
Continue integration of SSMM with Independence variant Combat Management System (CMS), obtain WSESRB/SSSTRP approvals, and IA approvals necessary for formal shipboard testing on Independence variant. Conduct developmental testing (DT-B12 Phase I) on Independence variant.											
Conduct analysis of test objectives and associated Measures of Effectiveness (MOEs) targeted for SSMM testing onboard Independence variant in support of developmental testing.											
Complete updates to Common Skills, SUW Skills, and O&M training to incorporate SSMM and VTUAV capabilities in support of ready for training in FY 2020.											
FY 2020 Base Plans: Complete integration of SSMM with Independence variant Combat Management System (CMS), obtain WSESRB/SSSTRP approvals, and IA approvals necessary for formal shipboard testing on Independence variant.											
Complete formal DT-B12 Phase II, DT-C12 (TECHEVAL), and OT-C12 (IOT&E) on the Independence variant.											
FY 2020 OCO Plans: N/A											
FY 2019 to FY 2020 Increase/Decrease Statement: Increases from FY 2019 to FY 2020 is to fund the completion of shipboard integration, Combat System Certification, and formal shipboard developmental and operational testing on the Independence variant.											
Accomplishments/Planned Programs Subtotals							0.000	11.368	17.558	0.000	17.558
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPN 1600: LCS Common Mission Module Equipment	18.760	33.237	51.553	-	51.553	36.657	55.776	29.787	30.382	727.684	1,424.901

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package			
C. Other Program Funding Summary (\$ in Millions)											
			<u>FY 2020</u>	<u>FY 2020</u>	<u>FY 2020</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Complete</u>	<u>Total Cost</u>
• OPN 1603: LCS SUW Mission Module	20.925	13.025	26.566	-	26.566	15.342	15.711	28.711	4.961	32.604	278.669
• WPN 4221: LCS Module Weapons	10.610	11.350	0.000	14.585	14.585	14.417	13.825	14.103	14.385	37.555	133.606
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.											
E. Performance Metrics											
Program Completed Milestone B January 2014											
Complete SUW MP DT, TECHEVAL, and IOT&E on Freedom variant											
Complete SUW MP DT, TECHEVAL, and IOT&E on Independence variant											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules						Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package			
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	MIPR	JAMS PO : Various	0.000	0.000		1.350	Jan 2019	0.400	Jan 2020	-		0.400	0.000	1.750	-
3.0 SUW MP	WR	NSWC DD : Dahlgren, VA	0.000	0.000		5.098	Nov 2018	3.100	Nov 2019	-		3.100	0.000	8.198	-
3.0 SUW MP	C/CPIF	Northrop Grumman : Bethpage, NY	0.000	0.000		0.800	Dec 2018	0.000		-		0.000	0.000	0.800	-
Subtotal			0.000	0.000		7.248		3.500		-		3.500	0.000	10.748	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	Sub Allot	NSWC PHD : Port Hueneme, CA	0.000	0.000		1.970	Jan 2019	3.058	Jan 2020	-		3.058	0.000	5.028	-
3.0 SUW MP	WR	NSWC Corona : Corona, CA	0.000	0.000		0.950	Jan 2019	1.000	Jan 2020	-		1.000	0.000	1.950	-
3.0 SUW MP	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.750	Jan 2019	9.500	Jan 2020	-		9.500	0.000	10.250	-
Subtotal			0.000	0.000		3.670		13.558		-		13.558	0.000	17.228	N/A
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
3.0 SUW MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.000		0.450	Jan 2019	0.500	Jan 2020	-		0.500	0.000	0.950	-
Subtotal			0.000	0.000		0.450		0.500		-		0.500	0.000	0.950	N/A
Project Cost Totals			0.000	0.000		11.368		17.558		-		17.558	0.000	28.926	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy							Date: March 2019			
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules			Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package			
	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract	
Remarks										

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy	Date: March 2019
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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package
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Proj 2552	FY 2018				FY 2019				FY 2020				FY 2021	FY 2022	FY 2023	FY 2024
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Acquisition Milestones						SSMM PRR ◆										
SUW Testing on Freedom Variant		SSMM DT-B11 Phase 1														
		Debark LCS 5 ◆														
		Embark LCS 7 ◆		SSMM DT-B11 Phase 2												
				SSMM CT-B11 (TECHEVAL)												
				SSMM OT-C11 (IOT&E)	SSMM IOC ◆											
SUW Testing on Independence Variant					SSMM TRACKEX ◆	SSMM STF ◆	SSMM DT-B12 Phase 1	SSMM DT-B12 Phase 2	SSMM DT/IT-C12 TECHEVAL	SSMM IOT&E OT-C12						

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 2552 / Surface Warfare (SUW) Mission Package	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 2552				
Acquisition Milestones: Production Readiness Review (PRR) for SSMM	2	2019	2	2019
SUW Testing on Freedom Variant: SSMM DT-B11 Phase 1	3	2018	3	2018
SUW Testing on Freedom Variant: Debark on LCS 5	3	2018	3	2018
SUW Testing on Freedom Variant: Embark LCS 7	3	2018	3	2018
SUW Testing on Freedom Variant: SSMM DT-B11 Phase 2	4	2018	1	2019
SUW Testing on Freedom Variant: SSMM CT-B11 (TECHEVAL)	1	2019	1	2019
SUW Testing on Freedom Variant: SSMM OT-B11 (IOT&E)	1	2019	1	2019
SUW Testing on Freedom Variant: SSMM IOC	2	2019	2	2019
SUW Testing on Independence Variant: SSMM TRACKEX	2	2019	2	2019
SUW Testing on Independence Variant: SSMM Structural 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 TECHEVAL DT-C12	2	2020	3	2020
SUW Testing on Independence Variant: SSMM IOT&E OT-C12	4	2020	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
3129: LCS Mission Package Development	525.214	100.470	8.825	9.868	-	9.868	8.993	8.928	9.056	9.235	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 443												

A. Mission Description and Budget Item Justification

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

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

Prior to FY 2019 all MP funding was in Project 3129.

FY 2018 and Prior:

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 comprised 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 augments 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 provides the crew with the ability to perform Visit, Board, Search, and Seizure (VBSS) missions. 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 M299 launchers to support load out and firing of 24 longbow hellfire missiles. SSMM provides missile coverage for mid-range threats and small boats.

The ASW MP enables LCS to conduct detect-to-engage operations against modern submarines that pose a threat. 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 Light Weight Tow torpedo countermeasure, a Variable Depth Sonar, and a Multi-Function Towed Array. These individual systems are combined into three modules: Torpedo Defense Module; an ASW Escort Mission Module that provides High value unit escort capability; and an Aviation Module that offers airborne threat localization and engagement capability through a MQ-8B Fire Scout VTUAV and an MH-60R with MK54 torpedoes.

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development
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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 and 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 off-board vehicles, and support equipment/containers. The MCM MP consists of the following modules:

- Remote Minehunting (RMH) Module: MCM Unmanned Surface Vehicle (USV) + 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 Sweep System (UISS) (USV + Unmanned Surface Sweep System)
- Buried Minehunting (BMH) Module: Knifefish Unmanned Underwater Vehicle (UUV)
- Near-Surface Mine Neutralization: Barracuda Mine Neutralization

FY 2019 and outyear funding includes:

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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Mine Countermeasure (MCM) Mission Package	21.849	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2019 Plans: Funded under Project 2550 for FY 2019.					
FY 2020 Base Plans: Funded under Project Unit 2550 for FY 2020.					
FY 2020 OCO Plans: N/A					
Title: Anti-Submarine Warfare (ASW) Mission Package	34.618	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules		Project (Number/Name) 3129 / LCS Mission Package Development	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Articles: FY 2019 Plans: Funded under Project Unit 2551 for FY 2019. FY 2020 Base Plans: Funded under Project 2551 for FY 2020. FY 2020 OCO Plans: N/A	-	-	-	-	-
Title: Surface Warfare (SUW) Mission Package Articles: FY 2019 Plans: Funded under Project 2552 for FY 2019. FY 2020 Base Plans: Funded under Project 2552 for FY 2020. FY 2020 OCO Plans: N/A	16.499 -	0.000 -	0.000 -	0.000 -	0.000 -
Title: Command, Control, Communication, Computers, Cyber and Intelligence (C5I) and Mission Package Tactical Team Trainers Articles: FY 2019 Plans: Mission Package Computing Environment (MPCE) - AN/SYK-32: Initiate development and establish a baseline for MPCE v2.0, which provides a technology refresh of fielded MPCE HW and MPCE Software (MPS /MPOE) in preparation for production in FY 2021. Conduct Preliminary Design Review (PDR) and Critical Design Review (CDR) for MPCE v2.0. Develop a production test article to support element level testing in FY 2019. Multi-Vehicle Communications System (MVCS) - AN/SYC-31: Develop and install solution to provide SIPRNet access to MP watch stations aboard the Freedom variant.	10.100 -	8.825 -	9.868 -	0.000 -	9.868 -

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules		Project (Number/Name) 3129 / LCS Mission Package Development		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Finalize the design and complete development of MVCS v1.2.X to implement the Cross Domain Solution (CDS) hardware replacement due to the existing solution reaching end of life and the implementation of the IPS-250 Inline Encryptor. Complete development to update the Ship Configuration Agent (SCA) as part of the MVCS 1.2.X baseline due to integration with the Knifefish, UISS and MCM USV. Complete the development of the Anti-Jam MAGIC SHIELD solution for procurement and integration into the RT-1944A/U. Complete development required to support the MVCS v1.2.X for Integration and Test.						
Continue efforts to define and develop MVCS v1.3 which will provide an Extended Line of Site (ELOS) and a Beyond Line of Site (BLOS) capability. Fabricate 3 Engineering Development Models (EDMs), adding Emission Control (EMCON), providing spectrum and topside analysis support, begin adaptive noise cancelling firmware development, complete Performance Monitor Fault Location (PMFL) and Built In Test (BIT) design and implementation, conduct an Electromagnetic Interference (EMI) test, perform an initial Anti-Jam antenna and signal assessment, begin test fixture software for production, provide support for MVCS/Seaframe integration and CDS rule-set reprogramming, initiate Freedom variant and USV/UISS Noise assessment, and conduct an Engineering Sea test. Continued development of the Unmanned Aerial Relay (UMAR) Rapid Innovation Fund effort to provide an ELOS capability.						
Continue to conduct Tech Refresh/Insertion studies needed to sustain incremental MVCS capability upgrades.						
Develop MVCS differences training and deliver for inclusion in LCS Combat Systems courses.						
Common Mission Package Trainer (CMPT): Continue to integrate updated software with Freedom and Independence variant Combat Management System Trainers and conduct standalone and integrated team training at LTF for detachments.						
Continue to compile system data to support Reliability and Maintainability (RAM-C) data to support reliability engineering and analysis. Continue FRACAS effort.						
FY 2020 Base Plans: Mission Package Computing Environment (MPCE) - AN/SYK-32 Complete Development of MPCE v2.0. Lock the Mission Package Software (MPS) and Mission Package Operating Environment (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,						

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy				Date: March 2019		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules		Project (Number/Name) 3129 / LCS Mission Package Development		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
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:						
Following the completion of development of MVCS 1.2.x, 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 2020 OCO Plans: N/A						
FY 2019 to FY 2020 Increase/Decrease Statement: Increase from FY 2019 to FY 2020 is to support MPCE Technology Refresh efforts required to address hardware obsolescence.						
Title: System Engineering and Program Acquisition		17.404	0.000	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2019 Plans: Systems Engineering, Program Management, and Training efforts will be funded under mission package specific project units in FY 2019.						
FY 2020 Base Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Systems Engineering, Program Management, and Training efforts will be funded under mission package specific project units in FY 2020.												
FY 2020 OCO Plans: N/A												
Accomplishments/Planned Programs Subtotals								100.470	8.825	9.868	0.000	9.868
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost	
• OPN 1600: LCS Common Mission Modules Equipment	18.760	33.237	51.553	-	51.553	36.657	55.776	29.787	30.382	727.684	1,424.901	
• OPN 1601: LCS MCM Mission Modules	45.146	98.901	197.129	-	197.129	222.831	222.523	233.151	243.503	1,213.078	2,655.367	
• OPN 1602: LCS ASW Mission Modules.	0.000	0.000	27.754	-	27.754	63.181	34.104	34.777	35.473	149.221	344.510	
• OPN 1603: LCS SUW Mission Modules	20.925	13.025	26.566	-	26.566	15.342	15.711	28.711	4.961	32.604	278.669	
• WPN 4221: LCS Module Weapons	10.610	11.350	0.000	14.585	14.585	14.417	13.825	14.103	14.385	37.555	133.606	
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.												
E. Performance Metrics												
Program Completed Milestone B January 2014												
Complete SUW MP DT, TECHEVAL, and IOT&E on Freedom variant (Refer to Project 2552)												
Achieve SUW MP Initial Operational Capability (IOC) on Freedom variant (Refer to Project 2552)												
Achieve MCM MP IOC on Independence variant (Refer to Project 2550)												
Achieve ASW MP IOC on Freedom variant (Refer to Project 2551)												

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.1 System Engineering	WR	NSWC PCD : Panama City, FL	0.000	0.275	Oct 2017	0.000		0.000		-		0.000	0.000	0.275	-
6.1 System Engineering	WR	NSWC DD : Dahlgren, VA	1.031	0.753	Oct 2017	0.000		0.000		-		0.000	0.000	1.784	-
6.1 System Engineering	WR	NAVSEALOGCEN : Norfolk, VA	1.351	0.169	Jan 2018	0.000		0.000		-		0.000	0.000	1.520	-
6.1 System Engineering	C/CPFF	Northrop Grumman : Bethpage, NY	13.435	1.107	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
6.1 System Engineering	WR	NSWC Carderock : Bethesda, MD	2.530	0.080	Dec 2017	0.000		0.000		-		0.000	0.000	2.610	-
6.1 System Engineering	WR	NSWC PHD : Port Hueneme, CA	1.458	0.110	Dec 2017	0.000		0.000		-		0.000	0.000	1.568	-
6.1 System Engineering	WR	SPAWAR PAC : San Diego, CA	7.431	0.229	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
6.1 System Engineering	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.355	Jan 2018	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	1.250	0.680	Jan 2018	0.000		0.000		-		0.000	0.000	1.930	-
6.4 Integration, Assembly, Test and Checkout	WR	NSWC DD : Dahlgren, VA	0.000	0.203	Oct 2017	0.000		0.000		-		0.000	0.000	0.203	-
6.4 Integration, Assembly, Test and Checkout	WR	NSWC PC : Panama City, FL	0.000	0.075	Oct 2017	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	7.977	0.648	Jan 2018	0.000		0.000		-		0.000	0.000	8.625	-
6.4 Integration, Assembly, Test and Checkout	C/CPFF	PMS 501 : Various	0.000	1.075	Feb 2018	0.000		0.000		-		0.000	0.000	1.075	-
6.4 Integration, Assembly, Test and Checkout	WR	SPAWAR PAC : San Diego, CA	1.330	0.527	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.4 Integration, Assembly, Test and Checkout	WR	NSWC PHD : Port Hueneme, CA	1.203	0.109	Nov 2017	0.000		0.000		-		0.000	0.000	1.312	-
6.4 Integration, Assembly, Test and Checkout	C/CPIF	Booz Allen Hamilton : Washington, DC	0.525	0.425	Jan 2018	0.000		0.000		-		0.000	0.000	0.950	-
6.4 Integration, Assembly, Test and Checkout	WR	NAVAIR : Lakehurst	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	12.961	2.302	Mar 2018	2.500	Jan 2019	2.928	Jan 2020	-		2.928	0.000	20.691	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NAWC TSD : Orlando, FL	0.750	0.354	Jan 2018	0.550	Dec 2018	0.650	Dec 2019	-		0.650	0.000	2.304	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPFF	Northrop Grumman : Bethpage, NY	2.022	0.578	Feb 2018	0.990	Jan 2019	0.892	Jan 2020	-		0.892	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NSWC PC : Panama City, FL	8.747	4.123	Dec 2017	2.203	Nov 2018	2.187	Nov 2019	-		2.187	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	NUWC NPT : Newport, RI	1.574	0.500	Nov 2017	0.550	Nov 2018	0.450	Nov 2019	-		0.450	Continuing	Continuing	Continuing
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	C/CPIF	Booz Allen Hamilton : Washington, DC	1.121	0.348	Dec 2017	0.820	Dec 2018	0.836	Dec 2019	-		0.836	0.000	3.125	-
4.0 Command, Control, Communication, Computers, Collaboration and Intelligence (C5I)	WR	SPAWAR PACIFIC : San Diego, CA	2.799	1.150	Jan 2018	0.469	Nov 2018	1.175	Nov 2019	-		1.175	0.000	5.593	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	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	1.942	0.727	Nov 2017	0.743	Nov 2018	0.750	Dec 2019	-		0.750	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	56.897	14.400	Dec 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
1.0 MCM MP	Sub Allot	PMS 406 : Various	38.861	3.900	Nov 2017	0.000		0.000		-		0.000	0.000	42.761	-
1.0 MCM MP	Sub Allot	PMS 495 : Various	0.000	0.249	Feb 2018	0.000		0.000		-		0.000	0.000	0.249	-
1.0 MCM MP	WR	NSWC PHD : Port Hueneme, CA	0.000	2.300	Dec 2017	0.000		0.000		-		0.000	0.000	2.300	-
1.0 MCM MP	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.400	Dec 2017	0.000		0.000		-		0.000	0.000	0.400	-
1.0 MCM MP	C/CPFF	Northrop Grumman : Bethpage, NY	1.289	0.603	Jan 2018	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	38.490	2.604	Dec 2017	0.000		0.000		-		0.000	0.000	41.094	-
2.0 ASW MP	WR	NUWC NPT : Newport, RI	23.763	5.557	Nov 2017	0.000		0.000		-		0.000	0.000	29.320	-
2.0 ASW MP	WR	SSC PAC : San Diego, CA	4.233	0.734	Dec 2017	0.000		0.000		-		0.000	0.000	4.967	-
2.0 ASW MP	WR	CDSA Dam Neck : Virginia Beach, VA	9.887	1.258	Nov 2017	0.000		0.000		-		0.000	0.000	11.145	-
2.0 ASW MP	C/CPFF	Northrop Grumman : Bethpage, NY	8.564	2.350	Feb 2018	0.000		0.000		-		0.000	0.000	10.914	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
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Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
2.0 ASW MP	WR	PEO IWS 5A : Various	0.601	8.700	Mar 2018	0.000		0.000		-		0.000	0.000	9.301	-
2.0 ASW MP	C/CPFF	SPA : Washington, DC	1.437	0.250	Apr 2018	0.000		0.000		-		0.000	0.000	1.687	-
2.0 ASW MP	WR	NSWC DD : Dahlgren, VA	0.446	0.425	Dec 2017	0.000		0.000		-		0.000	0.000	0.871	-
2.0 ASW MP	WR	NUWC KPT : Keyport, WA	0.595	0.500	Feb 2018	0.000		0.000		-		0.000	0.000	1.095	-
2.0 ASW MP	WR	NSWC PHD : Port Hueneme, CA	0.000	1.550	Nov 2017	0.000		0.000		-		0.000	0.000	1.550	-
2.0 ASW MP	C/FPIF	Booz Allen Hamilton : Washington, DC	0.000	0.500	Dec 2017	0.000		0.000		-		0.000	0.000	0.500	-
2.0 ASW MP	WR	NAWC WD : Point Mugu, CA	5.030	0.400	Mar 2018	0.000		0.000		-		0.000	0.000	5.430	-
2.0 ASW MP	C/CPFF	Various : Various	3.307	0.450	Nov 2017	0.000		0.000		-		0.000	0.000	3.757	-
2.0 ASW MP	Sub Allot	Raytheon : Portsmouth, RI	33.868	8.188	Jan 2018	0.000		0.000		-		0.000	0.000	42.056	-
3.0 SUW MP	C/CPFF	JAMS PO : Various	6.480	1.500	Mar 2018	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	58.524	2.000	Feb 2018	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	0.745	0.950	Jan 2018	0.000		0.000		-		0.000	0.000	1.695	-
3.0 SUW MP	WR	NSWC DD : Dahlgren, VA	52.919	7.397	Jan 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
3.0 SUW MP	WR	NSWC PHD : Port Hueneme, CA	24.637	5.800	Nov 2017	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			466.584	89.867		8.825		9.868		-		9.868	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N I (U)LCS Mission Modules				Project (Number/Name) 3129 I LCS Mission Package Development					
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.5 Training Systems Development	WR	NAWC TSD : Orlando, FI	0.555	0.354	Oct 2017	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
6.5 Training Systems Development	WR	NSWC PHD : Port Hueneme, CA	0.000	0.390	Oct 2017	0.000		0.000		-		0.000	0.000	0.390	-
6.5 Training Systems Development	C/CPIF	Booz Allen Hamilton : Washington, DC	0.000	0.268	Dec 2017	0.000		0.000		-		0.000	0.000	0.268	-
6.5 Training Systems Development	C/CPAF	Northrop Grumman : Bethpage, NY	0.000	0.575	Jan 2018	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			5.255	1.587		0.000		0.000		-		0.000	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
6.3 System Test and Evaluation	WR	NSWC PHD : Port Hueneme, CA	26.248	1.715	Nov 2017	0.000		0.000		-		0.000	0.000	27.963	-
6.3 System Test and Evaluation	WR	COMOPTEVFOR : Norfolk, VA	4.294	0.650	Jan 2018	0.000		0.000		-		0.000	0.000	4.944	-
6.3 System Test and Evaluation	WR	NSWC Corona : Corona, Ca	0.000	0.500	Nov 2017	0.000		0.000		-		0.000	0.000	0.500	-
6.3 System Test and Evaluation	WR	SPAWAR PAC : 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	0.000	0.750	Jan 2018	0.000		0.000		-		0.000	0.000	0.750	-
Subtotal			35.800	3.615		0.000		0.000		-		0.000	0.000	39.415	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules				Project (Number/Name) 3129 / LCS Mission Package Development					
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	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	1.937	2.758	Dec 2017	0.000		0.000		-		0.000	0.000	4.695	-
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 : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
6.2 Program Management	C/CPFF	Northrop Grumman : Bethpage, NY	3.511	1.466	Feb 2018	0.000		0.000		-		0.000	0.000	4.977	-
6.2 Program Management	C/CPFF	NSWC Crane : Various	1.750	1.177	Nov 2017	0.000		0.000		-		0.000	0.000	2.927	-
Subtotal			17.575	5.401		0.000		0.000		-		0.000	0.000	22.976	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			525.214	100.470		8.825		9.868		-		9.868	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.															

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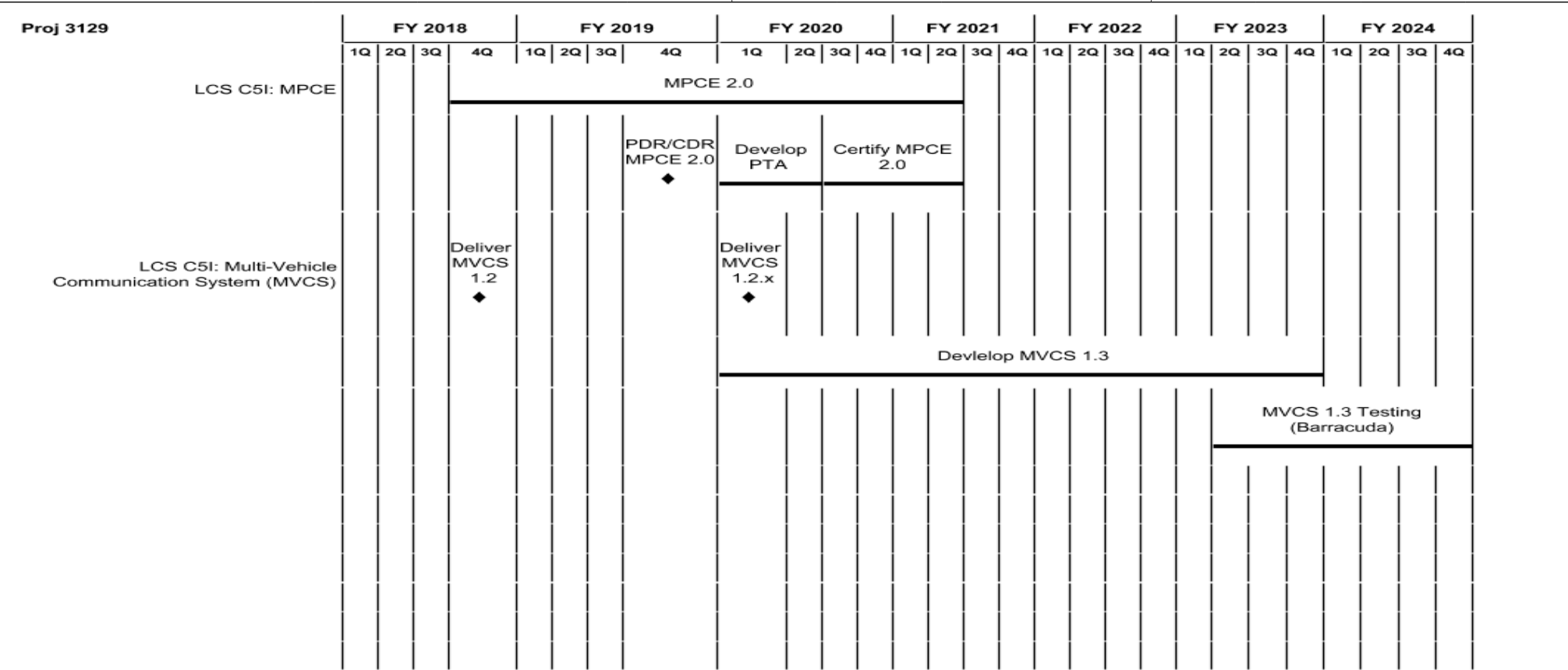
Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy

Date: March 2019

Appropriation/Budget Activity
1319 / 4

R-1 Program Element (Number/Name)
PE 0603596N / (U)LCS Mission Modules

Project (Number/Name)
3129 / LCS Mission Package Development



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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603596N / (U)LCS Mission Modules	Project (Number/Name) 3129 / LCS Mission Package Development	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3129				
LCS C5I: MPCE: Develop and establish baseline for MPCE v2.0	4	2018	2	2021
LCS C5I: MPCE: Conduct PDR and CDR for MPCE v2.0 (AN/SYK-31)	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: Multi-Vehicle Communication System (MVCS): Deliver MVCS v1.2 and transition to sustainment	4	2018	4	2018
LCS C5I: Multi-Vehicle Communication System (MVCS): Deliver MVCS v1.2.X	1	2020	1	2020
LCS C5I: Multi-Vehicle Communication System (MVCS): Development of MVCS 1.3	1	2020	4	2023
LCS C5I: Multi-Vehicle Communication System (MVCS): MVCS 1.3 Testing with Barracuda	2	2023	4	2024