

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	1,425.047	16.354	42.035	84.924	-	84.924	-	-	-	-	-	-
3096: <i>Littoral Combat Ship</i>	1,345.347	8.492	30.644	78.466	-	78.466	-	-	-	-	-	-
4506: <i>LCS Training</i>	60.402	1.109	1.391	6.458	-	6.458	-	-	-	-	-	-
9999: <i>Congressional Adds</i>	19.298	6.753	10.000	0.000	-	0.000	-	-	-	-	-	-

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 374

A. Mission Description and Budget Item Justification

The FY 2022 funding request was reduced by \$.913M to account for the availability of prior year execution balances.

The Littoral Combat Ship (LCS) Program Element (PE) provides funds for detailed design, development, construction, issue resolution, certification, integration, and testing of the Littoral Combat Ship (LCS). LCS operates with focused-mission packages that deploy manned and unmanned vehicles to execute a variety of missions, including Anti-Submarine Warfare (ASW), Surface Warfare (SUW) and Mine Countermeasures (MCM). LCS also possesses inherent capabilities, regardless of the Mission package installed, including intelligence/surveillance/reconnaissance (ISR), LCS SUW will also include Maritime Interdiction/interception Operations (MIO), Anti-Terrorism/Force Protection (AT/FP), air warfare self-defense, joint littoral mobility and logistic support for movement of personnel and supplies. This relatively small, shallow-draft, high-speed surface combatant complements the U.S. Navy's Surface Fleet by operating in environments where it is impossible or undesirable to employ larger, deeper-draft, multi-mission ships. LCS can deploy independently to overseas littoral regions or remain on station for extended periods of time either with a battle group or through a forward-basing arrangement. LCS will operate with Carrier Strike Groups, Surface Action Groups, or independently as dictated by the mission and environment. Additionally, LCS can operate cooperatively with the U.S. Coast Guard and Allies.

Beginning in FY 2021, this PE also provides funds for the design, development, engineering, implementation, and testing of the combat system modifications for Lethality and Survivability (L&S) for both LCS variants (Independence and Freedom). The L&S upgrades include the development of a common Combat Management System (CMS) and integration and testing of government furnished systems including the Gun Weapon System (GWS), Electronic Warfare (EW) system and Decoy Launching System (DLS) for both LCS Class Variant ships.

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

B. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	16.934	32.178	82.206	-	82.206
Current President's Budget	16.354	42.035	84.924	-	84.924
Total Adjustments	-0.580	9.857	2.718	-	2.718
• Congressional General Reductions	-	-0.143			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	10.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.580	0.000			
• Program Adjustments	0.000	0.000	4.087	-	4.087
• Rate/Misc Adjustments	0.000	0.000	-1.369	-	-1.369

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 9999: *Congressional Adds*

Congressional Add: *Integrated fire control land-based test asset*

Congressional Add: *Defensive Capability Improvements*

Congressional Add Subtotals for Project: 9999

Congressional Add Totals for all Projects

	FY 2020	FY 2021
	6.753	0.000
	0.000	10.000
Congressional Add Subtotals for Project: 9999	6.753	10.000
Congressional Add Totals for all Projects	6.753	10.000

Change Summary Explanation

FY 2022 funding request for project 4506 (LCS training) was increased by \$5.000M for Engineering Training Courseware requirements.
 FY 2022 funding request was reduced by \$2.718 million to account for the availability of prior year execution balances.

FY 2020: -\$2.282M rate/miscellaneous adjustment

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	--------------------------------------------------------------------

COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3096: <i>Littoral Combat Ship</i>	1,345.347	8.492	30.644	78.466	-	78.466	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 374

A. Mission Description and Budget Item Justification

The RDT&E portion of the LCS Program comprises design and development efforts required to field the LCS Class Ships, including integration with the Mission Packages (MCM, ASW and SUW) activities both pre- and post-delivery. It includes the design and development effort required to support the introduction and deployment of a Flight 0+ baseline (LCS 3/4 and Follow) with incorporation of lessons learned from the design and construction of USS FREEDOM (LCS 1) and USS INDEPENDENCE (LCS 2). Additionally, it includes design, development, issue resolution, certification and testing efforts required to support the design baseline for the six year block buy in FY10-15. This baseline will include lessons learned from the LCS 1 through LCS 4.

The LCS design and development phases include platform design and development, experimentation, ship system design and integration, hull platform testing, development of Technical Data Packages (TDPs), total ship system engineering and integration, combat systems and warfare systems certification, and planning and conduct of system testing. These efforts include procurement of combat and warfare system elements and/or simulators to support production representative testing in support of design, development, and certification efforts and ordnance in support of testing.

The RDT&E portion of LCS funding also comprises formal Developmental and Operational Assessment testing of the LCS Ships and Mission Packages. Test and Evaluation (T&E) will concentrate on verifying integration and interoperability of employed technologies and systems in the LCS seaframe designs and modular mission packages to achieve the mission capabilities and performance requirements as defined in the LCS program's Flight 0 and Flight 0+ Capabilities Development Documents (CDD). T&E functions will include the evaluation of Critical Technical Parameters (CTP), Measures of Effectiveness (MOE), Measures of Suitability (MOS), and Key Performance Parameters (KPP) for the core seaframe and the focused missions.

Beginning in FY 2021, this budget provides funds for the design, development, engineering, implementation, and testing of the combat system modifications for Lethality and Survivability (L&S) for both LCS variants (Independence and Freedom). The L&S upgrades include the development of a common Combat Management System (CMS) and integration and testing of government furnished systems including the Gun Weapon System (GWS), Electronic Warfare (EW) system, and Decoy Launching System (DLS) for both LCS Class Variants (Independence and Freedom)ships.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: LCS System-of-Systems Development, Engineering & Experimentation	6.696	5.871	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: Provides for LCS program systems engineering in support of Flight 0, Flight 0+, the FY10 Block Buy baseline design, and future procurement baseline design, development, certification, and production					

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>		Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
(including ship system design and integration); combat system and C4I design, integration, and test; aviation (manned and unmanned) integration; Mine Countermeasures (MCM), Anti-Submarine Warfare (ASW) and Surface Warfare (SUW) mission package (MP) integration; logistics product development; and various systems engineering activities required to perform risk analyses of new design and production technology concepts.					
FY 2021 Plans: Provide systems engineering support for MCM DT and MCM TECHEVAL on INDEPENDENCE Variant.					
FY 2022 Base Plans: N/A					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Effort completes in FY2021.					
Title: LCS Test & Evaluation					
Articles:					
	1.796	1.524	3.500	0.000	3.500
	-	-	-	-	-
Description: Execute formal LCS Developmental Testing and Operational Testing (DT/OT), including Live Fire Test & Evaluation (LFT&E), and procurement of T&E Ordnance. Execute DT and C4I integration and testing; aviation integration (manned and unmanned), Mine Countermeasures (MCM), Anti-Submarine Warfare (ASW) and Surface Warfare (SUW) Mission Package (MP) integration.					
FY 2021 Plans: Continue formal LCS Developmental Testing and Operational Testing (DT/OT), including completion of C4I integration and testing. Conduct MCM DT and MCM TECHEVAL on INDEPENDENCE Variant.					
FY 2022 Base Plans: Integrate and validate Combat systems baseline for Lethality and Survivability upgrades					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: Increase due to integration and validation of Combat systems baseline for Lethality and Survivability upgrades.					
Title: LCS Lethality and Survivability					
	0.000	23.249	74.966	0.000	74.966

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p align="right">Articles:</p> <p>Description: Provides engineering support to develop a common combat management system, leveraging a common source library, for installation on both LCS variants (Independence and Freedom). The Combat Systems baseline will be compatible with Program of Record (PoR) combat systems replacing Contractor Furnished Equipment (CFE) and integrate Over the Horizon (OTH) missile system. Funding includes logistic product development, Engineering Change Proposals (ECPs), ship structural analysis, development of an integrated test plan and cyber analysis to accomplish Risk Management Framework authorization.</p> <p>FY 2021 Plans: Designed and developed a common combat system for installation on both LCS variants (Independence and Freedom). The new baseline will interface with Program of Record Government Furnished Equipment(GFE) systems that will replace Contractor Furnished Equipment (CFE).</p> <p>FY 2022 Base Plans: Final design and detailed development of a common combat system for installation on both LCS variants (Independence and Freedom). The new baseline will interface with Program of Record Government Furnished Equipment(GFE) systems that will replace Contractor Furnished Equipment (CFE). Procurement of initial test assets to begin integration efforts will also begin.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: Funding increase to support procurement of first article test equipment to begin test and evaluation in LCS Warfare Engineering Capability (LWEC) land-based test site.</p>	-	-	-	-	-
Accomplishments/Planned Programs Subtotals	8.492	30.644	78.466	0.000	78.466

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• SCN/2127: <i>LCS Ship</i>	14.000	0.000	44.860	-	44.860	-	-	-	-	-	-
• 1604: <i>LCS In-Service Modernization</i>	0.000	42.968	55.049	-	55.049	-	-	-	-	-	-

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy	Date: May 2021
--------------------------------------------------------------------	-----------------------

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	--------------------------------------------------------------------

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
------------------	----------------	----------------	-------------------------------	------------------------------	--------------------------------	----------------	----------------	----------------	----------------	-----------------------------------	-------------------

Remarks

BLI 1604 supports Lethality and Survivability efforts on the LCS Ships

D. Acquisition Strategy

The LCS program takes an evolutionary approach to acquisition that emphasizes competition as a key to achieving affordability. Initially, two industry teams competed against each other with two distinctly different LCS designs. The decision produced two flights with a vessel from each design: Flight 0 (LCS 1 and LCS 2); and Flight 0+ (LCS 3 and out). The Flight 0+ baseline incorporates lessons learned from the design, construction, and testing of the Flight 0 ships. The Navy conducted a limited competition amongst the existing LCS industry teams or team participants for the award of a contract for the construction of a block buy of up to ten (10) LCS Flight 0+ Class ships, with an objective of competitively awarding a single contract to a single industry team.

By Acquisition Decision Memorandum of December 23, 2010, the USD (AT&L) authorized execution of an alternative acquisition strategy for the FY 2010 through FY 2015 procurement of 20 seaframes through two ten-ship block buy contracts. On December 29, 2010, the Navy awarded two contracts for block buys of up to ten ships, beginning with the award to each contractor of one FY 2010 ship and associated non-recurring engineering, the development of the Technical Data Package (TDP), core class services, and associated data. This was followed by the contractual funding of one ship to each contractor in FY 2011 and two ships each funded in FY 2012 through FY 2014.

On October 17, 2014 USD(AT&L) approved the Navy's plan to procure three ships in FY 2015 and three ships in FY 2016 by modifying the current block buy contracts. The modification to each of the block buy contracts completed the previously approved 20 ship block buy procurement and added options for two FY 2016 ships for a total of 26 LCS ships. The Navy's Acquisition strategy supported the procurement of three LCS ships in FY17, FY18, and FY19.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	--------------------------------------------------------------------

Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
L&S Product Development	SS/CPPIF	LM : Moorestown, NJ	0.000	0.000		14.107	Nov 2020	50.000	Nov 2021	-		50.000	-	-	-
Product Development Summary	Various	Various : Various	479.868	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			479.868	0.000		14.107		50.000		-		50.000	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Engineering Support	WR	NSWC/DD : Dahlgren, VA	74.733	1.056	Nov 2019	1.174	Nov 2020	0.000		-		0.000	-	-	-
Government Engineering Support	WR	NSWC/PC : Panama City, FL	27.987	0.000		0.000		0.000		-		0.000	-	-	-
Government Engineering Support	WR	NUWC/N : Newport, RI	10.302	0.122	Nov 2019	0.000		0.000		-		0.000	-	-	-
Government Engineering Support	WR	NAWC/AD : Pax River, MD	25.062	0.000		0.000		0.000		-		0.000	-	-	-
Government Engineering Support	WR	NSWC/CR : Crane, IN	17.722	0.000		0.000		0.000		-		0.000	-	-	-
Government Engineering Support	WR	NSWC/PD : Philadelphia, PA	76.950	1.105	Nov 2019	1.237	Nov 2020	0.000		-		0.000	-	-	-
Government Engineering Support	Various	Government Activities : Various	56.457	1.180	Nov 2019	0.000		0.000		-		0.000	-	-	-
Contractor Engineering Support	C/CPAF	Alion/CSC : Arlington, VA	49.802	0.000		0.000		0.000		-		0.000	-	-	-
Contractor Engineering Support	C/CPAF	Various : Various	26.319	1.070	Mar 2020	0.698	Nov 2020	1.596	Oct 2021	-		1.596	-	-	-
Need Item Tel&S Government Engineering Supportxtl	WR	NSWC/PHD : Port Hueneme, CA	0.000	0.000		0.000		2.303	Oct 2021	-		2.303	-	-	-
L&S Government Engineering Support	WR	NSWC/DD : Dahlgren, VA	0.000	0.000		5.099	Oct 2020	10.856	Oct 2021	-		10.856	-	-	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	--------------------------------------------------------------------

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
L&S Government Engineering Support	WR	NSWC/CR : Crane, IN	0.000	0.000		0.451	Oct 2020	1.250	Oct 2021	-		1.250	-	-	-
L&S Government Engineering Support	WR	NSWC/PD : Philadelphia, PA	0.000	0.000		0.259	Oct 2020	0.750	Oct 2021	-		0.750	-	-	-
L&S Government Engineering Support	WR	Government Activities : Various	0.000	0.000		0.936	Oct 2020	2.500	Oct 2021	-		2.500	-	-	-
Government Engineering Support	WR	NSWC/CD : Bethesda, MD	16.836	1.044	Nov 2019	1.373	Nov 2020	0.000		-		0.000	-	-	-
Government Engineering Support	WR	PEO IWS : Various	8.320	1.071	Mar 2020	0.000		0.000		-		0.000	-	-	-
Contractor Engineering Support	WR	General Dynamics Bath Iron Works : Bath, ME	0.933	0.000		0.000		0.000		-		0.000	-	-	-
Condition Based Maintenance	WR	NSWC/PHD : Port Hueneme, CA	5.180	0.000		0.000	Nov 2020	0.000		-		0.000	-	-	-
Government Engineering Support	WR	NSWC/PHD : Port Hueneme, CA	2.060	0.048	Nov 2019	1.718	Nov 2020	0.000		-		0.000	-	-	-
Frigate Government Engineering Support	WR	NSWC/CD : Carderock, MD	1.179	0.000		0.000		0.000		-		0.000	-	-	-
Frigate Government Engineering Support	WR	NSWC/PD : Philadelphia, PA	0.468	0.000		0.000		0.000		-		0.000	-	-	-
Frigate Contractor Engineering Support	C/CPAF	Alion : Arlington, VA	0.973	0.000		0.000		0.000		-		0.000	-	-	-
Frigate Contractor Engineering Support	C/CPAF	Booz Allen Hamilton : McLean, VA	0.345	0.000		0.000		0.000		-		0.000	-	-	-
L&S Government Engineering Support	WR	NSWC/PHD : Port Hueneme, CA	0.000	0.000		0.000		3.436	Oct 2021	-		3.436	-	-	-
Subtotal			401.628	6.696		12.945		22.691		-		22.691	-	-	N/A

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	--------------------------------------------------------------------

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test & Evaluation	C/CPAF	Alion/CSC : Arlington, VA	31.844	0.000		0.000		0.000		-		0.000	-	-	-
Test & Evaluation	WR	NSWC/PHD : Port Hueneme, CA	58.151	0.126	Nov 2019	0.140	Nov 2020	0.000		-		0.000	-	-	-
Test & Evaluation	WR	NSWC/PD : Philadelphia, PA	67.169	0.000		0.000		0.000		-		0.000	-	-	-
Test & Evaluation	WR	NSWC/PC : Panama City, FL	16.473	0.000		0.000		0.000		-		0.000	-	-	-
Test & Evaluation	WR	COMOPTEVFOR : Norfolk, VA	15.650	0.000		0.000		0.000		-		0.000	-	-	-
Test & Evaluation	WR	NSWC/COR : Corona, CA	18.537	0.401	Nov 2019	0.202	Jan 2021	0.000		-		0.000	-	-	-
Test & Evaluation	WR	Government Activities : Various	71.782	0.096	Mar 2020	0.341	Nov 2020	0.000		-		0.000	-	-	-
Test & Evaluation	C/CPAF	LM/GD/Austal : Various	81.066	0.173	Mar 2020	0.341	Nov 2020	0.000		-		0.000	-	-	-
Test & Evaluation	WR	PEO C4I : Charleston, SC	11.562	0.000		0.000		0.000		-		0.000	-	-	-
T&E Ordnance/ Ammunition	WR	PEO IWS : Various	22.544	0.000		0.000		0.000		-		0.000	-	-	-
L&S Test & Evaluation	WR	NSWC/DD : Dahlgren, VA	0.000	0.000		0.500	Nov 2020	3.500	Nov 2021	-		3.500	-	-	-
FSST Support	WR	NAVAIR : Patuxent River, MD	4.487	0.000		0.000		0.000		-		0.000	-	-	-
Range Support	WR	NAWC/WD : Pt. Mugu, CA	3.468	0.000		0.000		0.000		-		0.000	-	-	-
Test & Evaluation	WR	NSWC/CD : Bethesda, MD	23.784	1.000	Nov 2019	0.000		0.000		-		0.000	-	-	-
FSST Support	C/BA	National Science Foundation : Arlington, VA	2.671	0.000		0.000		0.000		-		0.000	-	-	-
FSST Support	C/BA	NAVFAC Atlantic : Virginia Beach, VA	0.759	0.000		0.000		0.000		-		0.000	-	-	-

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	--------------------------------------------------------------------

FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

Proj 3096																												
SUW DT: Surface Warfare Developmental Testing - INDEPENDENCE Variant	█																											
ASW DT: Anti-Submarine Warfare Developmental Test - FREEDOM Variant	██████																											
ASW TECHEVAL: Anti-Submarine Warfare Technical Evaluation - FREEDOM Variant	██████████																											
ASW IOT&E: Anti-Submarine Warfare Mission Package Initial Operational Test and Evaluation - FREEDOM Variant	██																											
DT MCM: Mine Countermeasures Mission Package Developmental Testing - INDEPENDENCE Variant	██████████																											
L&S IPR 1: LCS Lethality & Survivability In Progress Review	████																											
MCM TECHEVAL: Mine Countermeasures Mission Package Technical Evaluation - INDEPENDENCE Variant	████																											
L&S IPR 2: LCS Lethality & Survivability In Progress Review	████																											
L&S IPR 3: LCS Lethality & Survivability In Progress Review	████																											

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 3096 / <i>Littoral Combat Ship</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	--------------------------------------------------------------------

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 3096</i>				
SUW DT: Surface Warfare Developmental Testing - INDEPENDENCE Variant	1	2020	1	2020
ASW DT: Anti-Submarine Warfare Developmental Test - FREEDOM Variant	1	2020	2	2020
ASW TECHEVAL: Anti-Submarine Warfare Technical Evaluation - FREEDOM Variant	2	2020	3	2020
ASW IOT&E: Anti-Submarine Warfare Mission Package Initial Operational Test and Evaluation - FREEDOM Variant	3	2020	3	2020
DT MCM: Mine Countermeasures Mission Package Developmental Testing - INDEPENDENCE Variant	2	2021	3	2021
L&S IPR 1: LCS Lethality & Survivability In Progress Review	4	2021	4	2021
MCM TECHEVAL: Mine Countermeasures Mission Package Technical Evaluation - INDEPENDENCE Variant	4	2021	4	2021
L&S IPR 2: LCS Lethality & Survivability In Progress Review	2	2022	2	2022
L&S IPR 3: LCS Lethality & Survivability In Progress Review	4	2022	4	2022

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>				Project (Number/Name) 4506 / <i>LCS Training</i>			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
4506: <i>LCS Training</i>	60.402	1.109	1.391	6.458	-	6.458	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 374

Note

The \$5M of additional funding supports the Scenario Development Station (SDS) which is required to support training for the 5th and 6th Integrated Tactical Trainers (ITT) (3 trainers per coast) delivering to CSCS in late 2021. This funding also automates the development and maintenance of navigation (ship driving) and warfare scenarios with each new version of VShip or as combat system baselines are updated. As Fleet training needs increase and additional LCS ships are delivered, SDS funding in FY22 will ensure the LCS ITTs are available to support crew training.

A. Mission Description and Budget Item Justification

As a minimally-manned ship, the LCS uses a Train-to-Qualify (T2Q)/Train-to-Certify (T2C) training process in an off-ship/shore-based virtual ship trainer environment. These simulators and blended training solutions focus on tactical, equipment operations, and maintenance training. When completely developed and procured, the LCS shore-based training capability will satisfy individual, team, unit, and force training, with an objective of meeting Capability Development Document (CDD) T2Q/T2C Key Performance Parameter (KPP) requirements.

FY 2021 funding will develop upgrades of the Surface Training Advanced Virtual Environment (STAVE) courseware and associated simulators to achieve the training objectives. Additionally, after fielding more of the systems and courseware, out-year funding will be utilized to upgrade training to maintain conformity with LCS configurations and approved operational technical manuals and procedures, as well as test and evaluate training devices to verify compliance with requirements.

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: LCS Total System Training Architecture	1.109	1.391	6.458	0.000	6.458
Articles:	-	-	-	-	-
FY 2021 Plans: FY21 funding provides the development of additional Surface Training Advanced Virtual Environment (STAVE) courseware and associated simulators to achieve the training objectives. Additionally, after fielding these systems and courseware, RDT&E funds will be utilized to upgrade training to maintain conformity with LCS configurations and approved operational technical manuals and procedures. This funding also provides program management oversight while LCS deck operations (both variants) are completed, combat systems IVSE courseware and the combat systems part task trainer efforts are continued. (NAWC TSD will continue the development of the VTUAV visual display trainer, oversee performance of the development effort, while					

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy	Date: May 2021
--------------------------------------------------------------------	-----------------------

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 4506 / <i>LCS Training</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	------------------------------------------------------------

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p>providing additional support efforts to the program). This funding also supports continued efforts preparing for additional small ship homeports required by the Strategic Laydown plan.</p> <p>FY 2022 Base Plans: FY22 funding provides for the development of additional Surface Training Advanced Virtual Environment (STAVE) courseware and simulators to achieve training objectives. Additionally, after fielding these systems and courseware, RDT&E funds will be utilized to upgrade training to maintain conformity with LCS configurations and approved operational technical manuals and procedures. This funding also provides government oversight for courseware contracts under execution and continued LCS simulator upgrades (MBT, VTUAV). This funding support award of LCS STAVE Engineering courseware for LCS-16 and follows variants. This funding also supports continued efforts preparing for additional small ship homeports required by the Strategic Laydown Plan.</p> <p>FY 2022 OCO Plans: N/A</p> <p>FY 2021 to FY 2022 Increase/Decrease Statement: The \$5M of additional funding supports the Scenario Development Station (SDS) which is required to support training for the 5th and 6th Integrated Tactical Trainers (ITT) (3 trainers per coast) delivering to CSCS in late 2021. This funding also automates the development and maintenance of navigation (ship driving) and warfare scenarios with each new version of VShip or as combat system baselines are updated. As Fleet training needs increase and additional LCS ships are delivered, SDS funding in FY22 will ensure the LCS ITTs are available to support crew training.</p>					
Accomplishments/Planned Programs Subtotals	1.109	1.391	6.458	0.000	6.458

C. Other Program Funding Summary (\$ in Millions)										
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete Total Cost
• OPN/5664: <i>Surface Training Equipment</i>	222.647	168.730	127.814	-	127.814	-	-	-	-	-
Remarks	PEO USC funding accounts for only a portion of the OPN 5664 line: FY20 \$37.789, FY21 \$4.076, FY22 \$ 4.890									

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy Date: May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 4506 / <i>LCS Training</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	------------------------------------------------------------

D. Acquisition Strategy

Per the combined LCS Navy Training System Plan (NTSP), the LCS core crew training concept will meet Train to Qualify (T2Q) and Train to Certify (T2C) requirements incrementally, with expected completion in FY21. In the interim, individual qualifications for LCS crew members will be accomplished through a combination of vendor training, existing Navy training, new LCS courses and trainers that are presently online, and Under Instruction (U/I) time aboard LCS ships, prior to reporting for duty. Shore-based training requirements cannot be fully met with the interim LCS training strategy. Full realization will be achieved with the completed standup of the San Diego and Mayport, LCS Training Facilities (LTF), which include the Integrated Tactical Trainers, Bridge, Readiness Control Officer (RCO), Combat Systems and Mission Package Training System (MPTS) part-task trainers, the Common Mission Package Trainer (CMPT), Mission Bay Trainer and Virtual Reality Labs to support the Train to Qualify operations and maintenance pipeline courses.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 4506 / <i>LCS Training</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	------------------------------------------------------------

Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Deck/Mission Bay Courseware	C/FFP	Cubic : Orlando, FL	1.878	0.150	Nov 2019	0.225	Nov 2020	0.225	Nov 2021	-		0.225	-	-	-
Combat Systems Courseware	C/FFP	Cubic : Orlando, FL	28.176	0.150	Nov 2019	0.225	Nov 2020	0.000		-		0.000	-	-	-
Eng. Training Courseware	C/FFP	Cubic : Orlando, FL	1.092	0.000		0.000		4.906	Nov 2021	-		4.906	-	-	-
Training Development - Support	WR	NAWC/TSD : Orlando, FL	11.712	0.251	Oct 2019	0.338	Oct 2020	0.300	Oct 2021	-		0.300	-	-	-
VTUAV/MH60	C/FFP	TBD : TBD	0.000	0.178	Nov 2019	0.186	Nov 2020	0.200	Nov 2021	-		0.200	-	-	-
Combat System Part Task Trainer	C/FP	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	-	-	-
Mission Bay Trainer	C/CPAF	Cubic : Orlando, FL	1.523	0.000		0.000		0.000		-		0.000	-	-	-
Subtotal			44.381	0.729		0.974		5.631		-		5.631	-	-	N/A

Support (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Human Systems Integration	WR	NSWC, DD : Dahlgren Virginia	0.934	0.030	Nov 2019	0.065	Nov 2020	0.300	Nov 2021	-		0.300	-	-	-
Information Assurance	WR	NSWC, DN : Dam Neck, VA	4.414	0.000		0.000		0.000		-		0.000	-	-	-
Training ISEA	WR	NSWC/PHD : Port Huenum, CA	1.534	0.150	Nov 2019	0.120	Nov 2020	0.277	Nov 2021	-		0.277	-	-	-
Warfare Center SME/ NAVFAC	WR	VARIOUS : VARIOUS	2.797	0.050	Nov 2019	0.108	Nov 2020	0.125	Nov 2021	-		0.125	-	-	-
Subtotal			9.679	0.230		0.293		0.702		-		0.702	-	-	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Support	C/CPAF	Various : Various	6.342	0.150	Nov 2019	0.124	Nov 2020	0.125	Nov 2021	-		0.125	-	-	-

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date: May 2021**

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 4506 / <i>LCS Training</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	------------------------------------------------------------

Proj 4506	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Combat System Courseware Development																													
Surface Training Advanced Virtual Environment (STAVE)																													
	Combat System Courseware Development																												
	DECK STAVE Development																												
DECK STAVE- Development																													
VTUAV/MH60 Development																													
	Training Development - Support																												
	Contract Award ▲																												
Training Development																													
Combat System Part Task Trainer																													
	Contract Award ▲																												
	Combat Systems Part Task Trainer - Development																												
Training Development																													
	VTUAV/MH60 Development																												

2022DON - 0603581N - 4506

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 4506 / <i>LCS Training</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	------------------------------------------------------------

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 4506				
Surface Training Advanced Virtual Environment (STAVE): Combat System Courseware Development	1	2020	4	2022
Surface Training Advanced Virtual Environment (STAVE): DECK STAVE - Development	1	2020	4	2022
Surface Training Advanced Virtual Environment (STAVE): VTUAV/MH60 Development: Training Development - Support	1	2020	4	2022
Surface Training Advanced Virtual Environment (STAVE): VTUAV/MH60 Development: VTUAV/MH60 Contract Award	2	2020	2	2020
Combat System Part Task Trainer: Combat Systems Part Task Trainer - Contract Award	2	2020	2	2020
Combat System Part Task Trainer: Combat Systems Part Task Trainer - Development	2	2020	2	2022
Combat System Part Task Trainer: Training Development: VTUAV/MH60 Development	2	2020	4	2022

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603581N / Littoral Combat Ship				Project (Number/Name) 9999 / Congressional Adds			
COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
9999: Congressional Adds	19.298	6.753	10.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional Add funding will be used to develop Surface Training Advanced Virtual Environment (STAVE) courseware (previously titled Immersive Virtual Ship Environment (IVSE)), and associated simulators to achieve the training objectives. Funding will continue the courseware development efforts of the LCS STAVE Deck Operations (both variants FREEDOM / INDEPENDENCE), and LCS STAVE Combat Systems Trouble Shooting Courseware (both variants FREEDOM / INDEPENDENCE).

FY21 Congressional add funds procurement of a Ceros 200 Fire Control Radar test asset, cyber, and systems engineering in analyzing for Littoral Combat Ship (LCS) Lethality and Survivability.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2020	FY 2021
Congressional Add: Integrated fire control land-based test asset <i>FY 2020 Accomplishments:</i> N/A <i>FY 2021 Plans:</i> N/A	6.753	0.000
Congressional Add: Defensive Capability Improvements <i>FY 2020 Accomplishments:</i> N/A <i>FY 2021 Plans:</i> C604 Defensive Capability Improvements is a Congressional Add that funds continued testing, engineering, and evaluation of a Ceros 200 Fire Control Radar test asset which will allow the US Navy to accelerate the fielding of this critical system to LCS class ships	0.000	10.000
Congressional Adds Subtotals	6.753	10.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	------------------------------------------------------------------

Proj 9999	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
LCS Surface Training Advanced Virtual Environment (STAVE)																												
LCS STAVE Congressional Add																												
LCS STAVE Deck Operations Development																												
LCS STAVE Combat Systems Trouble Shooting Courseware Development																												
Integrated Fire Control Land Based Test Asset																												

2021PB - 0603581N - 9999

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy **Date:** May 2021

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / <i>Littoral Combat Ship</i>	Project (Number/Name) 9999 / <i>Congressional Adds</i>
--------------------------------------------------	---------------------------------------------------------------------------------------	------------------------------------------------------------------

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Proj 9999</i>				
LCS Surface Training Advanced Virtual Environment (STAVE): Integrated Fire Control Land Based Test Asset: Integrated Fire Control Land Based Test Asset	2	2020	4	2021