

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
---	-----------------------

Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP
--	---

COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	1,193.126	109.426	51.630	40.991	-	40.991	34.428	10.970	6.518	0.986	Continuing	Continuing
3096: Littoral Combat Ship	1,193.126	86.858	28.906	20.841	-	20.841	16.140	9.997	5.537	0.000	0.000	1,361.405
4506: LCS Training	0.000	8.085	22.724	20.150	-	20.150	18.288	0.973	0.981	0.986	Continuing	Continuing
9999: Congressional Adds	0.000	14.483	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.483

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

A. Mission Description and Budget Item Justification

This 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, and reconnaissance (ISR), 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.

B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	91.416	51.630	40.844	-	40.844
Current President's Budget	109.426	51.630	40.991	-	40.991
Total Adjustments	18.010	0.000	0.147	-	0.147
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	0.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	10.000	0.000			
• SBIR/STTR Transfer	-1.990	0.000			
• Program Adjustments	0.000	0.000	-0.201	-	-0.201
• Rate/Misc Adjustments	0.000	0.000	0.348	-	0.348

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy		Date: May 2017	
Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		R-1 Program Element (Number/Name) PE 0603581N I (U)LITTORAL COMBAT SHIP	
• Congressional Directed Reductions Adjustments	10.000	-	-
<u>Congressional Add Details (\$ in Millions, and Includes General Reductions)</u>		FY 2016	FY 2017
Project: 9999: Congressional Adds			
Congressional Add: <i>LCS Training Courseware</i>		14.483	0.000
Congressional Add Subtotals for Project: 9999		14.483	0.000
Congressional Add Totals for all Projects		14.483	0.000
<u>Change Summary Explanation</u> In FY16, \$20.0M was added to Project 3096 for Condition Based Maintenance (\$10M) and Frigate Continuing Resolution (\$10M). \$1.99M was reduced for SBIR (\$1.35M for Project 3096, \$0.122M in Project 4506 and \$0.517M in Project 2736 Congressional Adds).			

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
3096: Littoral Combat Ship	1,193.126	86.858	28.906	20.841	-	20.841	16.140	9.997	5.537	0.000	0.000	1,361.405
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 is comprised of 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 is also comprised of 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.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: LCS System-of-Systems Development, Engineering & Experimentation								16.354	17.997	15.209	0.000	15.209
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 (including ship system design and integration); combat system and C4I design, integration, and test; aviation (manned and unmanned) integration; modular mine countermeasure (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.												

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy				Date: May 2017		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP		Project (Number/Name) 3096 / Littoral Combat Ship		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>FY 2016 Accomplishments: Flight 0+ and FY10 Block Buy Baselines: Provided systems engineering support for FSST preparation, execution, and partial repair efforts on LCS 5 and LCS 6. Provided systems engineering support for TSST, and post-event analysis and engineering for Seaframe and SUW MP DT and Phase II IOT&E on LCS 4. Provided systems engineering support for Seaframe and MCM MP IOT&E on LCS 2. Provided systems engineering for Air Defense test planning for Self Defense Test Ship testing in support of PRA on the IND Variant. Initiated design and fabrication of an INDEPENDENCE variant full ship model in support of testing the hull form for maximum structural loads. Provided systems engineering support to develop conceptual designs of lethality and survivability upgrades for both variants of LCS.</p> <p>Provided Seaframe and Mission Systems engineering support to investigate, design, and develop technical solutions for design scope on both Freedom and Independence Class Ships. Provided Seaframe and Mission Systems engineering support to certify equipment to include oversight of design changes required for any re-certification. Updated technical and performance baseline for future ship procurements based on systems design and testing execution. Continued conducting studies in support of development of future technical and performance baseline design upgrades.</p>						
<p>FY 2017 Plans: Flight 0+ and FY10 Block Buy Baselines: Provide systems engineering support for Seaframe DT on LCS 5 and LCS 6. Complete post-FSST analysis and implement changes based on findings. Provide systems engineering support for Seaframe and ASW MP DT on the Freedom Variant. Provide systems engineering support for Seaframe and SUW MP Incr 3 DT, TECHEVAL, and OT on the Freedom variant. Provide systems engineering support for Air Defense test planning and execution on the Self Defense Test Ship in support of PRA on the IND Variant. Provide systems engineering support for Air Defense test planning on the Self Defense Test Ship in support of PRA on the FRE Variant. Conduct VTUAV Dynamic Interface testing on the Freedom and Independence Variants. Execute tank test of the INDEPENDENCE full ship model. Provide systems engineering support for planning of Calm Water Trials on the Freedom variant.</p> <p>Provide Seaframe and Mission Systems engineering support to investigate, design, and develop technical solutions for design scope on both Freedom and Independence Class Ships. Provide Seaframe and Mission Systems engineering support to certify equipment to include oversight of design changes required for any re-certification. Finalize technical and performance baseline for future ship procurements based on systems</p>						

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017			
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP		Project (Number/Name) 3096 / Littoral Combat Ship		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
design and testing execution. Continue conducting studies in support of development of future technical and performance baseline design upgrades. FY 2018 Base Plans: Analyze data from the full ship model test of the INDEPENDENCE hull and provide technical evaluations of results. Provide systems engineering support for Air Defense test planning and execution on the Self Defense Test Ship in support of PRA on the Freedom variant. Conduct analyses to qualify a lower cost, lighter weight thermal insulation on the Independence variant. Complete VTUAV Dynamic Interface testing on the Freedom and Independence Variants. Provide Seaframe and Mission Systems engineering support to investigate, design, and develop technical solutions for design scope on both Freedom and Independence Class Ships. Provide Seaframe and Mission Systems engineering support to certify equipment to include oversight of design changes required for any re-certification. Finalize technical and performance baseline for future ship procurements based on systems design and testing execution. Continue conducting studies in support of development of future technical and performance baseline design upgrades. FY 2018 OCO Plans: N/A						
Title: LCS Test & Evaluation Articles: Description: Execute formal LCS Developmental Testing and Operational Testing (DT/OT), including Live Fire Test and Evaluation (LFT&E), and procurement of T&E Ordnance. Execute DT and C4I integration and testing; aviation (manned and unmanned) integration; and modular mine countermeasure (MCM), anti-submarine warfare (ASW), and surface warfare (SUW) mission package (MP) integration. FY 2016 Accomplishments: Flight 0+ Baseline: Conducted the LCS 4 Total Ship Survivability Trials (TSST). Conducted SUW Phase II DT, TECHEVAL and IOT&E on LCS 4. Started Air Defense test execution for Self Defense Test Ship testing in support of PRA on the IND Variant. Planned for and executed LCS 5 and LCS 6 Full Ship Shock Trials (FSSTs). Completed Phase 2 of Multi-Compartment Surrogate testing. Completed the Detailed Design Integrated Survivability Assessment		50.504 -	10.909 -	5.632 -	0.000 -	5.632 -

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy				Date: May 2017		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP		Project (Number/Name) 3096 / Littoral Combat Ship		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Report (DDISAR) for LCS Freedom variant. Continued developing the DDISAR for LCS Independence variant. Development of the final Survivability Assessment Report (SAR) was started. FY 2017 Plans: Flight 0+ Baseline: Continue planning for Air Defense test planning and execution for Self Defense Test Ship, and Seaframe testing in support of PRA on the IND Variant. Conduct Vertical Take-off and Landing Unmanned Aerial Vehicle (VTUAV) Dynamic Interface testing on the Independence variant. Complete Seaframe and SUW MP Increment 3 DT on the Freedom variant. Start planning for SUW MP TECHEVAL and OT on the Freedom variant. Complete post FSST availability on LCS 5 and LCS 6. Complete DDISAR for LCS Independence Variant. Continue work on Survivability Assessment Report (SAR). AW testing on the Independence variant. Begin planning for Calm Water Trials on the Freedom Variant. FY 2018 Base Plans: Complete Air Defense test planning and execution for Self Defense Test Ship, and Seaframe testing in support of PRA on the IND Variant. Conduct Vertical Take-off and landing Unmanned Aerial Vehicle (VTUAV) Dynamic Interface testing on the Freedom variant. Conduct SUW SSMM MP DT, TECHEVAL, and OT on the Freedom variant. Conduct SUW SSMM MP DT, TECHEVAL, and OT on the Independence variant. Continue work on Survivability Assessment Report (SAR). Conduct MCM L&R DT on Freedom variant. FY 2018 OCO Plans: N/A						
Title: Condition Based Maintenance <div>Articles:</div> Description: This line realigns Condition Based Maintenance funding from LCS Mission Modules RDTEN to LCS Hull RDTEN to align with congressional intent. FY 2016 Accomplishments: Funds procured the development of the Adaptive Diagnostic Electronic Portable Test (ADEPT) Distance Support Sensor Suite (ADSSS) system for the Littoral Combat Ship (LCS). The ADSSS is hardware that is connected to Combat System relevant sensor points for continuous monitoring and is connected to the shipboard network for		10.000 -	0.000 -	0.000 -	0.000 -	0.000 -

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy				Date: May 2017		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP		Project (Number/Name) 3096 / Littoral Combat Ship		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
data upload. This provides Combat Systems (CS) Condition Based Maintenance (CBM) and Distance Support (DS) capability for the Navy. FY 2017 Plans: N/A FY 2018 Base Plans: N/A FY 2018 OCO Plans: N/A						
Title: Frigate (Modified LCS) Articles: Description: The Frigate (FF) will be a multi-mission ship that will leverage the existing Littoral Combat Ship (LCS) designs, and focuses on anti-surface warfare and anti-submarine warfare capabilities (SUW/ASW) to increase lethality and survivability. The Frigate adds capability while maximizing the LCS investments made to date in the small surface combatant force. Modifications will include over-the-horizon surface-to-surface missile system, upgraded Air Defense weapons and sensors, advanced electronic warfare system and improved decoys, and all elements of the SUW and ASW mission packages (horizon surface-to-surface missile system, 30mm guns, variable depth sonar, towed array and torpedo defense). This line accounts for funding transferred from the newly established Frigate PE (0603599N PU 3086) back to LCS PE to account for funding already allocated and obligated during the FY 2016 Continuing Resolution. FY 2016 Accomplishments: Conduct design activities to support HM&E layout and arrangements associated with additional FF capability. Conduct system engineering efforts to support system requirements review (SRR) and prepare for future preliminary design review (PDR), including decomposing CDD requirements into system and warfare system element specifications, defining logical and physical interfaces, finalizing warfare system element selections, and conducting analyses to refine acquisition and contracting approaches for the FF systems. Conduct aviation and C4I integration activities.		10.000 -	0.000 -	0.000 -	0.000 -	0.000 -

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Remaining FY 2016 Accomplishments and Schedule are in PE 0603599N, PU 3086												
FY 2017 Plans: FY 2017 Plans are in PE 0603599N, PU 3086												
FY 2018 Base Plans: FY 2018 Plans are in PE 0603599N, PU 3086												
FY 2018 OCO Plans: N/A												
Accomplishments/Planned Programs Subtotals								86.858	28.906	20.841	0.000	20.841
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
• SCN/2127: Littoral Combat Ship (LCS)	1,414.265	1,211.625	663.011	-	663.011	758.194	1,235.410	1,155.019	2,061.188	8,770.151	27,655.663	
• OPN/1600: LCS Common Mission Modules Equipment	23.061	27.840	34.666	-	34.666	29.388	30.221	24.282	24.666	806.332	1,381.443	
• OPN/0944: LCS Class Support Equipment	39.349	54.823	47.955	-	47.955	75.882	77.029	65.380	66.683	0.000	512.436	
• OPN/1601: LCS MCM Mission Modules	67.451	57.146	55.870	-	55.870	73.903	75.373	158.293	188.844	1,406.438	2,165.302	
• OPN/1603: LCS SUW Mission Modules	35.228	22.466	52.960	-	52.960	56.556	30.093	12.454	42.929	415.399	732.617	
• OPN/1605: Remote Minehunting System (RMS)	53.077	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	53.077	
• RD TEN/3129: LCS Mission Package Development	188.872	160.058	116.871	-	116.871	78.302	52.996	32.560	22.721	Continuing	Continuing	
• OPN/1602: LCS ASW Mission Modules	0.000	31.952	0.000	-	0.000	82.188	54.553	90.354	61.808	140.673	461.528	
• RD TEN/3086: Frigate	18.965	84.900	143.450	-	143.450	141.599	73.415	76.460	71.098	Continuing	Continuing	
• OPN/1604: LCS In-Service Modernization	0.000	0.000	74.426	-	74.426	61.755	47.317	61.361	66.667	0.000	311.526	

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017	
Appropriation/Budget Activity 1319 / 4				R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship			
C. Other Program Funding Summary (\$ in Millions)											
			<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Complete</u>	<u>Total Cost</u>
Remarks											
D. Acquisition Strategy											
<p>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.</p> <p>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.</p> <p>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 supports procurement of LCS ships from FY17 through FY19 as currently budgeted. The PB 18 procurement profile was modified to procure two ships in FY17, one ship in FY18, and one ship in FY19.</p>											
E. Performance Metrics											
<p>The LCS Program achieved Milestone A and Program Initiation in May 2004 and Milestone B in February 2011. The LCS program conducts annual Defense Acquisition Board In-Process Reviews (DAB IPRs). The first Seaframe and Mission Module integrated program DAB IPR was conducted in January 2013 and is held in September thereafter.</p>											

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
LCS 1 & 2 Shore Trainers	C/CPAF	LM, BIW : Various	56.536	0.000		0.000		0.000		-		0.000	0.000	56.536	-
Program Office Support	Various	Various : Various	20.540	0.000		0.000		0.000		-		0.000	0.000	20.540	-
Training Development - Support	WR	NAWC/TSD : Orlando, FL	23.174	0.000		0.000		0.000		-		0.000	0.000	23.174	-
LCS1 & LCS2 Bridge Part Task Trainers	SS/FFP	Computer Sciences Corp. (CSC) : Falls Church, VA	4.578	0.000		0.000		0.000		-		0.000	0.000	4.578	-
LCS1 & LCS2 TAO Trainers	C/CPFF	Northrop Grumman Corp. : Falls Church, VA	6.204	0.000		0.000		0.000		-		0.000	0.000	6.204	-
LCS Mission Bay Trainer	C/FFP	Cubic Corp : Orlando, FL	28.283	0.000		0.000		0.000		-		0.000	0.000	28.283	-
Training Development - Support	WR	Various : Various	13.471	0.000		0.000		0.000		-		0.000	0.000	13.471	-
Training Development - Industry	C/CPAF	Lockheed Martin : Various	13.300	0.000		0.000		0.000		-		0.000	0.000	13.300	-
Training Operations	WR	NSWC DD/CSCS : Various	6.010	0.000		0.000		0.000		-		0.000	0.000	6.010	-
Distance Support	WR	NAWC TSD : Orlando, FL	4.900	0.000		0.000		0.000		-		0.000	0.000	4.900	-
Virtual Ship Training System (VSTS)	C/FFP	TBD : TBD	10.575	0.000		0.000		0.000		-		0.000	0.000	10.575	-
Deck IVSE	C/FFP	TBD : TBD	8.317	0.000		0.000		0.000		-		0.000	0.000	8.317	-
Combat Systems IVSE	C/FFP	TBD : TBD	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Readiness Control Officer LCS 1 IVSE	C/FFP	Cubic Corp : Orlando, FL	2.772	0.000		0.000		0.000		-		0.000	0.000	2.772	-
Readiness Control Officer LCS 2 IVSE	C/FFP	Cubic Corp : Orlando, FL	2.803	0.000		0.000		0.000		-		0.000	0.000	2.803	-
Mission Bay Trainer Haptics IVSE	C/FFP	Cubic Corp : Orlando, FL	4.596	0.000		0.000		0.000		-		0.000	0.000	4.596	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Engineering Plant Technician (EPT) LCS 1 IVSE	C/FFP	Cubic Corp : Orlando, FL	15.733	0.000		0.000		0.000		-		0.000	0.000	15.733	-
Engineering Plant Technician (EPT) LCS 2 IVSE	C/FFP	Cubic Corp : Orlando, FL	15.524	0.000		0.000		0.000		-		0.000	0.000	15.524	-
Condition Based Maintenance	SS/FFP	MIKROS : Wash, DC	0.000	4.820	Jul 2016	0.000		0.000		-		0.000	0.000	4.820	-
Frigate Warfare Systems Development	C/CPAF	Raytheon : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Class Design Services	SS/CPAF	LM, GD : Various	48.340	0.000		0.000		0.000		-		0.000	0.000	48.340	-
Final Design(Flight 0)	C/CPAF	LM, BIW : Various	175.263	0.000		0.000		0.000		-		0.000	0.000	175.263	-
Flight 0 C41	WR	PEO C41 : Various	5.506	0.000		0.000		0.000		-		0.000	0.000	5.506	-
SH-60B Datalink	C/CPAF	LM, BIW : Various	2.435	0.000		0.000		0.000		-		0.000	0.000	2.435	-
Frigate Ship Design Modifications	C/CPAF	LM : Various	0.000	1.821	Nov 2015	0.000		0.000		-		0.000	0.000	1.821	-
Frigate Ship Design Modifications	C/CPAF	Austal : Mobile, AL	0.000	1.524	Nov 2015	0.000		0.000		-		0.000	0.000	1.524	-
Frigate Aviation Integration Development	WR	NAWC AD : Patuxent, MD	0.000	0.088	Nov 2015	0.000		0.000		-		0.000	0.000	0.088	-
Frigate C4I Development	WR	PEO C4I : San Diego, CA	0.000	0.253	Nov 2015	0.000		0.000		-		0.000	0.000	0.253	-
Frigate C4I Development	WR	SPAWAR : San Diego, CA	0.000	0.100	Nov 2015	0.000		0.000		-		0.000	0.000	0.100	-
Frigate C4I Development	WR	SPAWAR : Charleston, SC	0.000	0.276	Nov 2015	0.000		0.000		-		0.000	0.000	0.276	-
Frigate Common Combat Management System Development (CMS)	C/CPAF	LM : Various	0.000	0.105	Nov 2015	0.000		0.000		-		0.000	0.000	0.105	-
Frigate Common Combat Management System Development (CMS)	WR	NSWC PHD : Port Hueneme, CA	0.000	0.072	Nov 2015	0.000		0.000		-		0.000	0.000	0.072	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Frigate Warfare Systems Development	WR	NSWC DD : Dahlgren, VA	0.000	1.565	Nov 2015	0.000		0.000		-		0.000	0.000	1.565	-
Frigate Warfare Systems Development	WR	Various : Various	0.000	0.170	Nov 2015	0.000		0.000		-		0.000	0.000	0.170	-
Frigate Warfare Systems Development	C/CPAF	Raytheon : Various	0.000	0.112	Dec 2015	0.000		0.000		-		0.000	0.000	0.112	-
Frigate Over the Horizon (OTH) Missile Development	WR	Various : Various	0.000	0.102	Dec 2015	0.000		0.000		-		0.000	0.000	0.102	-
Subtotal			468.860	11.008		0.000		0.000		-		0.000	0.000	479.868	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Government Engineering Support	WR	NSWC/DD : Dahlgren, VA	64.740	3.340	Feb 2016	2.387	Apr 2017	2.023	Nov 2017	-		2.023	4.083	76.573	-
Government Engineering Support	WR	NSWC/PC : Panama City, FL	27.987	0.000	Feb 2016	0.000		0.000		-		0.000	0.000	27.987	-
Government Engineering Support	WR	NUWC/N : Newport, RI	9.674	0.185	Feb 2016	0.180	Apr 2017	0.153	Nov 2017	-		0.153	0.000	10.192	-
Government Engineering Support	WR	NAWC/AD : Pax River, MD	25.062	0.000		0.000		0.000		-		0.000	0.000	25.062	-
Government Engineering Support	WR	NSWC/CR : Crane, IN	17.722	0.000		0.000		0.000		-		0.000	0.000	17.722	-
Government Engineering Support	WR	NSWC/PD : Philadelphia, PA	66.908	3.973	Feb 2016	2.245	Apr 2017	1.906	Nov 2017	-		1.906	3.941	78.973	-
Government Engineering Support	Various	Government Activities : Various	48.020	2.396	Feb 2016	2.359	Apr 2017	2.000	Nov 2017	-		2.000	4.136	58.911	-
Contractor Engineering Support	C/CPAF	Alion/CSC : Arlington, VA	48.423	1.379	Apr 2016	0.000		0.000		-		0.000	0.000	49.802	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship					
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Contractor Engineering Support	C/CPAF	Various : Various	18.473	2.144	Mar 2016	2.198	Apr 2017	1.863	Feb 2018	-		1.863	3.759	28.437	-
Government Engineering Support	WR	NSWC/CD : Bethesda, MD	2.880	1.763	Mar 2016	5.470	Apr 2017	4.592	Nov 2017	-		4.592	9.558	24.263	-
Government Engineering Support	WR	PEO IWS : Various	0.000	0.300	Mar 2016	3.088	Jan 2017	2.613	Dec 2017	-		2.613	5.310	11.311	-
Contractor Engineering Support	WR	General Dynamics Bath Iron Works : Bath, ME	0.000	0.933	Dec 2015	0.000		0.000		-		0.000	0.000	0.933	-
Condition Based Maintenance	WR	NSWC/PHD : Port Hueneme, CA	0.000	5.180	Jun 2016	0.000		0.000		-		0.000	0.000	5.180	-
Government Engineering Support	C/BA	NSWC/PHD : Port Hueneme, CA	0.000	0.788	Jun 2016	0.070	Apr 2017	0.059	Nov 2017	-		0.059	0.000	0.917	-
FY17 Continuing Resolution	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Frigate Government Engineering Support	WR	NSWC/CD : Carderock, MD	0.000	1.179	Nov 2015	0.000		0.000		-		0.000	0.000	1.179	-
Frigate Government Engineering Support	WR	NSWC/PD : Philadelphia, PA	0.000	0.468	Nov 2015	0.000		0.000		-		0.000	0.000	0.468	-
Frigate Contractor Engineering Support	C/CPAF	Alion : Arlington, VA	0.000	0.973	Dec 2015	0.000		0.000		-		0.000	0.000	0.973	-
Frigate Contractor Engineering Support	C/CPAF	Booz Allen Hamilton : McLean, VA	0.000	0.345	Dec 2015	0.000		0.000		-		0.000	0.000	0.345	-
Subtotal			329.889	25.346		17.997		15.209		-		15.209	30.787	419.228	-
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Test & Evaluation	C/CPAF	Alion/CSC : Arlington, VA	31.844	0.000		0.000		0.000		-		0.000	0.000	31.844	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship					
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Test & Evaluation	WR	NSWC/PHD : Port Hueneme, CA	55.378	1.500	Feb 2016	0.677	Apr 2017	0.416	Nov 2017	-		0.416	0.000	57.971	-
Test & Evaluation	WR	NSWC/PD : Philadelphia, PA	59.228	6.200	Feb 2016	0.916	Apr 2017	0.825	Nov 2017	-		0.825	0.000	67.169	-
Test & Evaluation	WR	NSWC/PC : Panama City, FL	16.328	0.086	Feb 2016	0.059	Apr 2017	0.000		-		0.000	0.000	16.473	-
Test & Evaluation	WR	COMOPTEVFOR : Norfolk, VA	14.134	0.429	Feb 2016	0.330	Apr 2017	0.000		-		0.000	0.000	14.893	-
Test & Evaluation	WR	NSWC/COR : Corona, CA	16.990	0.756	Feb 2016	0.440	Apr 2017	0.245	Nov 2017	-		0.245	0.000	18.431	-
Test & Evaluation	WR	Government Activities : Various	68.776	2.096	Feb 2016	0.194	Apr 2017	0.500	Feb 2018	-		0.500	0.000	71.566	-
Test & Evaluation	C/CPAF	LM/GD/Austal : Various	64.270	14.056	May 2016	1.850	Nov 2016	0.890	Jan 2018	-		0.890	0.000	81.066	-
Test & Evaluation	WR	PEO C4I : Charleston, SC	11.562	0.000		0.000		0.000		-		0.000	0.000	11.562	-
T&E Ordnance/ Ammunition	WR	PEO IWS : Various	16.507	5.395	Mar 2016	0.642	Apr 2017	0.000		-		0.000	0.000	22.544	-
FSST Support	WR	NAVAIR : Patuxent River, MD	0.000	3.872	Feb 2016	0.615	Jan 2017	0.000		-		0.000	0.000	4.487	-
Range Support	WR	NAWC/WD : Pt. Mugu, CA	0.000	2.693	Mar 2016	0.775	Feb 2017	0.000		-		0.000	0.000	3.468	-
Test & Evaluation	WR	NSWC/CD : Bethesda, MD	6.555	9.587	Mar 2016	3.716	Jan 2017	2.756	Nov 2017	-		2.756	0.000	22.614	-
FSST Support	C/BA	National Science Foundation : Arlington, VA	0.000	2.321	Feb 2016	0.350	Apr 2017	0.000		-		0.000	0.000	2.671	-
FSST Support	C/BA	NAVFAC Atlantic : Virginia Beach, VA	0.000	0.759	May 2016	0.000		0.000		-		0.000	0.000	0.759	-
Test & Evaluation	C/BA	Naval Research Laboratory : Washington, DC	0.000	0.754	Mar 2016	0.345	Apr 2017	0.000		-		0.000	0.000	1.099	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy													Date: May 2017		
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 3096 / Littoral Combat Ship					
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
FY17 Continuing Resolution	Various	Various : Various	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			361.572	50.504		10.909		5.632		-		5.632	0.000	428.617	-
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Program Management Support- SEAPORT	C/CPAF	Alion/CSC : Arlington, VA	20.593	0.000		0.000		0.000		-		0.000	0.000	20.593	-
Program Management Support	Various	Various : Various	12.212	0.000		0.000		0.000		-		0.000	0.000	12.212	-
Subtotal			32.805	0.000		0.000		0.000		-		0.000	0.000	32.805	-
			Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			1,193.126	86.858		28.906		20.841		-		20.841	30.787	1,360.518	-
Remarks															

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy

Date: May 2017

Appropriation/Budget Activity
1319 / 4

R-1 Program Element (Number/Name)
PE 0603581N / (U)LITTORAL COMBAT
SHIP

Project (Number/Name)
3096 / Littoral Combat Ship



LCS Seaframe Program Schedule



PB 2018		FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Ship Procurement Profile		3	3	2(3)	1	1			
Hull Number		21-22, 24	23, 25-26	27-29	30	31			
Flight 0+	LCS 4 (GD)	Deployed						Seaframe: Contract Award/ Annual Funding Delivery OWLD Mission Package: SUW MP Fill = Complete	
Lockheed Martin Block Buy (Flight 0+)	LCS 5	Delivery							
	LCS 7AF								
Austal USA Block Buy (Flight 0+)	LCS 6	Delivery							
	LCS 8AF								
FY16 Priced Options									

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 3096 / Littoral Combat Ship	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3096				
TSST - LCS 4: Total Ship Survivability Trial (TSST) LCS 4	2	2016	2	2016
FSST - LCS 5: LCS 5 FSST	4	2016	4	2016
FSST - LCS 6: LCS 6 FSST	3	2016	4	2016
DDISAR - FRE: Detailed Design Integrated Survivability Assessment Report (DDISAR) - Freedom	1	2016	2	2017
DDISAR - IND: Detailed Design Integrated Survivability Assessment Report (DDISAR) - Independence	3	2016	4	2017
TECHEVAL SUW Phase II - LCS 4: Technical Evaluation (TECHEVAL) Phase II with SUW MP	2	2016	3	2016
IOT&E PSUW hase II - LCS 4: Initial Operational Test and Evaluation (IOT&E) Phase II with SUW MP	3	2016	3	2016
IOT&E PSUW hase II - LCS 4: Self Defense Test Ship (SDTS) Testing - IND	4	2016	1	2018
LCS SAR: LCS Survivability Assessment Report (SAR)	2	2016	1	2019
Multi-Compartment Surrogate Test: LFT&E Testing	1	2016	3	2016
Seaframe PRA Testing (IND): Seaframe Probability of Raid Annihilation (PRA) Testing	4	2017	1	2018
VTUAV Dynamic Interface Testing - IND: Vertical Take-off and Landing Unmanned Aerial Vehicle (VTUAV) Dynamic Interface Testing	2	2017	2	2017
TECHEVAL SUW - FRE: Technical Evaluation (TECHEVAL) SUW SSMM MP - Freedom variant	1	2018	1	2018
IOT&E SUW - FRE: Initial Operational Test and Evaluation (IOT&E) SUW SSMM MP - Freedom variant	1	2018	2	2018
TECHEVAL MCM - FRE: Technical Evaluation (TECHEVAL) with MCM MP - Freedom variant	4	2018	4	2018

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy			Date: May 2017		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP		Project (Number/Name) 3096 / Littoral Combat Ship	
		Start		End	
Events by Sub Project		Quarter	Year	Quarter	Year
DT MCM - FRE: Developmental Testing (DT) with MCM MP - Freedom variant		4	2018	4	2018
DT SUW - FRE: Surface Warfare (SUW) Developmental Test (DT) - Freedom variant		4	2017	4	2017
DT SUW - IND: Surface Warfare (SUW) Developmental Test (DT) - Independence variant		1	2018	2	2018
TECHEVAL SUW - IND: Technical Evaluation (TECHEVAL) SUW SSMM MP - Independence variant		3	2018	3	2018
IOT&E SUW - IND: Initial Operational Test and Evaluation (IOT&E) SUW SSMM MP		4	2018	4	2018
AW - IND: Air Warfare (AW) testing - Independence variant		4	2018	4	2018
AW - IND: Anti-Submarine Warfare (ASW) Developmental Test (DT) - Independence Variant		4	2018	4	2018
VTUAV Dynamic Interface Testing - FRE: Vertical Take-off and Landing Unmanned Aerial Vehicle (VTUAV) Dynamic Interface Testing		1	2018	1	2018

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 4506 / LCS Training			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
4506: LCS Training	0.000	8.085	22.724	20.150	-	20.150	18.288	0.973	0.981	0.986	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 374												
A. Mission Description and Budget Item Justification												
LCS is a minimally-manned ship, and the small crew does not contain trainee sailors to receive on-the-job training. Consequently, LCS uses a Train-to-Qualify (T2Q)/Train-to-Certify (T2C) training process in an off-ship/shore-based virtual ship trainer environment, using simulators and blended training solutions focused 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 Key Performance Parameter (KPP) requirements.												
RDT&E funds are used to develop advanced Immersive Virtual Ship Environments (IVSE), or Virtual Reality (VR) courseware and associated simulators to achieve the training objectives. Additionally, after fielding these systems and courseware, RDTE funds will be utilized to upgrade training to maintain conformity with LCS configurations and approved operational technical manuals and procedures. RDTE funds are also used to test and evaluate training devices to verify compliance with requirements.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: LCS Total System Training Architecture								8.085	22.724	20.150	0.000	20.150
								-	-	-	-	-
Description: LCS is a minimally-manned ship, and the small crew does not contain trainee sailors to receive on-the-job training. Consequently, LCS uses a Train-to-Qualify (T2Q)/Train-to-Certify (T2C) training process in an off-ship/shore-based virtual ship trainer environment, using simulators and blended training solutions focused 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 Key Performance Parameter (KPP) requirements.												
RDT&E funds are used to develop advanced Immersive Virtual Ship Environments (IVSE), or Virtual Reality (VR) courseware and associated simulators to achieve the training objectives. Additionally, after fielding these systems and courseware, RDTE funds will be utilized to upgrade training to maintain conformity with LCS configurations and approved operational technical manuals and procedures. RDTE funds are also used to test and evaluate training devices to verify compliance with requirements.												

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy				Date: May 2017		
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP		Project (Number/Name) 4506 / LCS Training		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p>FY 2016 Accomplishments:</p> <p>RDTE funding provided to Naval Air Warfare Center Training Systems Division (NAWCTSD) supports program management, contracting, research and engineering, test and evaluation, logistics and industrial ops, finance management support and travel requirements, as the LCS Training System Executive Agent. Funding is provided to develop and oversee Immersive Virtual Ship Environments (IVSE) courseware for LCS EPT, RCO, and deck operations; and complete Mission Bay Trainer and VSTS development.</p> <p>This funding ensures support of the LTF San Diego DoD Information Assurance Certification and Accreditation Package (DIACAP), as well as NAVFAC efforts preparing for additional LCS homeports required by the Strategic Laydown Plan.</p> <p>Delivered Freedom and Independence Tactical Action Officer Trainers to SWOS, Newport. Delivered Engineering Plant technician IVSE Courseware, Mission Bay Trainer to Freedom and Independence training cranes and VSTS to the San Diego Training Facility (LTF). also, began the development of the first phase of the Deck and Combat Systems IVSE Ops and Maintenance courseware and continued RCO IVSE courseware development.</p> <p>FY 2017 Plans:</p> <p>FY17 funding increase directly supports the development of various training courseware to provide the fleet with these needed training capabilities as LCS hull deliveries increase. RDTE funding provides Naval Air Warfare Center Training Systems Division (NAWCTSD) program management, contracting, research and engineering, test and evaluation, logistics and industrial ops, finance management support and travel requirements, as the LCS Training System Executive Agent. Funding is provided to oversee completion of IVSE courseware development for LCS deck operations and phase two of IVSE combat systems courseware, oversee performance of the development effort, and provide other functions in support of the LCS Fleet Introduction Program Office (PMS 505). Phase two of IVSE combat system includes the development of 4 courses: Navigation Systems, Radio Communications Subsystem, Search Radar, and Weapon Systems.</p> <p>FY 2018 Base Plans:</p> <p>Funding provides for the development and testing of various training courseware to provide the fleet with these needed training capabilities as LCS hull deliveries increase. RDTE funding provides Naval Air Warfare Center Training Systems Division (NAWCTSD) program management, contracting, research and engineering, test and evaluation, logistics and industrial ops, finance management support and travel requirements, as</p>						

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy							Date: May 2017				
Appropriation/Budget Activity 1319 / 4			R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP			Project (Number/Name) 4506 / LCS Training					
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
the LCS Training System Executive Agent. Funding is provided to oversee completion of IVSE courseware development for LCS deck operations and phase two of IVSE combat systems courseware and VTUAV/MH-60 courseware, oversee performance of the development effort, and provide other functions in support of the LCS Fleet Introduction Program Office (PMS 505). Phase two of IVSE combat system includes the development of 4 courses: Navigation Systems, Radio Communications Subsystem, Search Radar, and Weapon Systems. This funding also supports continued NAVFAC efforts preparing for additional LCS homeports required by the Strategic Laydown plan.											
FY 2018 OCO Plans: N/A											
Accomplishments/Planned Programs Subtotals							8.085	22.724	20.150	0.000	20.150
C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• 1320: LCS Training	54.851	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 5664: Surface Training Equipment	0.000	19.136	12.788	-	12.788	31.566	18.253	10.000	0.000	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
Per the combined LCS Navy Training System Plan (NTSP), the LCS core crew training concept will meet Train to Qualify and Train to Certify requirements incrementally, with expected completion in FY19. 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 LCS Training Facility (LTF), which includes 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.											
E. Performance Metrics											
T2Q will succeed and support mission accomplishment in the long run only if commanders have confidence that the output is valid, reliable, and standardized. To justify that confidence, training outcomes must mirror, and therefore predict, critical mission outcomes. To achieve that result a set of objective, performance-based measures, metrics, and standards is being developed for each watch station and billet requirement. For qualifications to be truly predictive, they must be guaranteed by the application of objective measures that vary little between evaluators. New courses such as the Surface Warfare Officers School (SWOS) LCS Officer of the Deck											

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 4506 / LCS Training

(OOD), Junior Officer of the Deck (JOOD) and the LCS Shore-Based Trainer Capstone courses have been designed to meet T2Q standards. Ultimately, success of the training acquisition strategy will be objectively validated by accomplishment of PQS by the sailors as determined by the IVSE and achievement of all requirements in the LCS Training Manual (TRAMAN) as assessed by LCS Squadrons and appropriate Afloat Training Groups (ATG).

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017			
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 4506 / LCS Training					
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Deck/Mission Bay Courseware	C/FFP	Cubic : Orlando, FL	0.000	1.878	Feb 2016	3.450	Feb 2017	0.000		-		0.000	0.000	5.328	-
Combat Systems Courseware	C/FFP	Cubic : Orlando, FL	0.000	0.000		9.665	Mar 2017	10.145	Mar 2018	-		10.145	7.800	27.610	-
VSTS	C/FFP	Triton JV, LLC : Orlando, FL	0.000	0.600	Feb 2016	0.000	Feb 2017	0.000		-		0.000	0.000	0.600	-
Training Development - Support	WR	NAWC/TSD : Orlando, FL	0.000	4.547	Nov 2015	3.612	Nov 2016	4.000	Nov 2017	-		4.000	Continuing	Continuing	Continuing
VTUAV/MH60	C/FFP	TBD : TBD	0.000	0.000		0.000	Mar 2017	0.000	Mar 2018	-		0.000	6.270	6.270	-
Subtotal			0.000	7.025		16.727		14.145		-		14.145	-	-	-
Remarks															
Years prior to FY2016 are reflected in 3096 Project Unit.															
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Human Systems Integration	WR	NSWC, DD : Dahlgren Virginia	0.000	0.320	Nov 2015	0.204	Nov 2016	0.180	Nov 2017	-		0.180	Continuing	Continuing	Continuing
Information Assurance	WR	NSWC, DN : Dam Neck, VA	0.000	0.400	Feb 2016	1.214	Feb 2017	1.500	Nov 2017	-		1.500	Continuing	Continuing	Continuing
Training ISEA	WR	NSWC/PHD : Port Huenuma, CA	0.000	0.200	Feb 2016	0.541	Nov 2016	0.500	Nov 2017	-		0.500	Continuing	Continuing	Continuing
Warfare Center SME	WR	NAVFAC : Washington, DC	0.000	0.000		0.000	Mar 2017	0.170	Nov 2017	-		0.170	Continuing	Continuing	Continuing
Subtotal			0.000	0.920		1.959		2.350		-		2.350	-	-	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy												Date: May 2017		
Appropriation/Budget Activity 1319 / 4						R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 4506 / LCS Training				

Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
Program Office Support	C/CPAF	Various : Various	0.000	0.140	Mar 2016	4.038	Mar 2017	3.655	Mar 2018	-		3.655	Continuing	Continuing	Continuing
Subtotal			0.000	0.140		4.038		3.655		-		3.655	-	-	-

Remarks
Years prior to FY2016 are reflected in 3096 Project Unit.

	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	8.085	22.724	20.150	-	20.150	-	-	-

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy

Date: May 2017

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603581N / (U)LITTORAL COMBAT SHIP

Project (Number/Name)

4506 / LCS Training

Proj 4506	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
VIRTUAL SHIP TRAINING SYSTEM																												
VIRTUAL SHIP TRAINING SYSTEM	VSTS Development																											
Interactive Virtual Shipboard Environment																												
DECK IVSE- Development																												
Combat System Courseware Development																												
VTUAV/MH60 Development																												
Training Development																												
Training Development	Training Development - Support																											

2018PB - 0603581N - 4506

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 4506 / LCS Training	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 4506				
VIRTUAL SHIP TRAINING SYSTEM: VIRTUAL SHIP TRAINING SYSTEM: VSTS Development	1	2016	2	2018
Interactive Virtual Shipboard Environment: DECK IVSE- Development: DECK IVSE- Development	3	2016	4	2018
Interactive Virtual Shipboard Environment: Combat System Courseware Development: Combat System Courseware Contract Award	3	2017	3	2017
Interactive Virtual Shipboard Environment: Combat System Courseware Development: Combat System Courseware Development	3	2017	4	2020
Interactive Virtual Shipboard Environment: VTUAV/MH60 Development: VTUAV/MH60 Contract Award	3	2018	3	2018
Interactive Virtual Shipboard Environment: VTUAV/MH60 Development: VTUAV/MH60 Development	3	2018	4	2020
Training Development: Training Development: Training Development - Support	1	2016	4	2021

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy										Date: May 2017		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP				Project (Number/Name) 9999 / Congressional Adds			
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
9999: Congressional Adds	0.000	14.483	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	14.483
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
LCS is a minimally-manned ship, and the small crew does not contain trainee sailors to receive on-the-job training. Consequently, LCS uses a Train-to-Qualify (T2Q)/ Train-to-Certify (T2C) training process in an off-ship/shore-based virtual ship trainer environment, using simulators and blended training solutions focused 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 Key Performance Parameter (KPP) requirements.												
RDT&E funds are used to develop advanced Immersive Virtual Ship Environments (IVSE) courseware and associated simulators to achieve the training objectives. Additionally, after fielding these systems and courseware, RDTE funds will be utilized to upgrade training to maintain conformity with LCS.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2016	FY 2017			
Congressional Add: LCS Training Courseware								14.483	0.000			
FY 2016 Accomplishments: RDTE funding provided to Cubic Corporation via Naval Air Warfare Center Training Systems Division (NAWCTSD) in support of research and engineering, test and evaluation, logistics and industrial ops. Funding is provided to complete student and instructor guides, instructor IVSE system support guides, and phase one of IVSE combat system courseware development. Phase one includes the development of four courses: Command & Control Systems, Electronic Warfare Subsystems (EWS), Global Command & Control Systems (GCCS) and Total Ships Computing Environment (TSCE).												
FY 2017 Plans: N/A												
Congressional Adds Subtotals								14.483	0.000			
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost	
• 1320: LCS Training	54.851	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing	
• 5664: Surface Training Equipment	0.000	38.272	7.410	-	7.410	23.279	19.369	0.000	0.000	Continuing	Continuing	
Remarks												

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 9999 / Congressional Adds
<p>D. Acquisition Strategy</p> <p>T2Q will succeed and support mission accomplishment in the long run only if commanders have confidence that the output is valid, reliable, and standardized. To justify that confidence, training outcomes must mirror, and therefore predict, critical mission outcomes. To achieve that result a set of objective, performance-based measures, metrics, and standards is being developed for each watch station and billet requirement. For qualifications to be truly predictive, they must be guaranteed by the application of objective measures that vary little between evaluators. New courses such as the Surface Warfare Officers School (SWOS) LCS Officer of the Deck (OOD), Junior Officer of the Deck (JOOD) and the LCS Shore-Based Trainer Capstone courses have been designed to meet T2Q standards. Ultimately, success of the training acquisition strategy will be objectively validated by accomplishment of PQS by the sailors as determined by the IVSE and achievement of all requirements in the LCS Training Manual (TRAMAN) as assessed by LCS Squadrons and appropriate Afloat Training Groups (ATG).</p> <p>E. Performance Metrics</p> <p>T2Q will succeed and support mission accomplishment in the long run only if commanders have confidence that the output is valid, reliable, and standardized. To justify that confidence, training outcomes must mirror, and therefore predict, critical mission outcomes. To achieve that result a set of objective, performance-based measures, metrics, and standards is being developed for each watch station and billet requirement. For qualifications to be truly predictive, they must be guaranteed by the application of objective measures that vary little between evaluators. New courses such as the Surface Warfare Officers School (SWOS) LCS Officer of the Deck (OOD), Junior Officer of the Deck (JOOD) and the LCS Shore-Based Trainer Capstone courses have been designed to meet T2Q standards. Ultimately, success of the training acquisition strategy will be objectively validated by accomplishment of PQS by the sailors as determined by the IVSE and achievement of all requirements in the LCS Training Manual (TRAMAN) as assessed by LCS Squadrons and appropriate Afloat Training Groups (ATG).</p>		