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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy I BA 4: Advanced Component Development & Prototypes (ACD&P)					R-1 Program Element (Number/Name) PE 0603581N I (U)LITTORAL COMBAT SHIP							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,288.069	50.806	40.991	27.997	-	27.997	12.577	7.571	0.893	0.915	Continuing	Continuing
3096: Littoral Combat Ship	1,279.984	28.690	20.841	12.220	-	12.220	10.424	5.823	0.000	0.000	0.000	1,357.982
4506: LCS Training	8.085	22.116	20.150	15.777	-	15.777	2.153	1.748	0.893	0.915	Continuing	Continuing
Program MDAP/MAIS Code: Project MDAP/MAIS Code(s): 374												
A. Mission Description and Budget Item Justification												
The FY 2019 funding request was reduced by \$3.154 million to account for the availability of prior year execution balances.												
The FY 2019 funding request was reduced by \$0.267 million to reflect the Department of Navy's effort to support the Office of Management and Budget directed reforms for Efficiency and Effectiveness that include a lean, accountable, more efficient government.												
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/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.												

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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
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B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	51.630	40.991	34.428	-	34.428
Current President's Budget	50.806	40.991	27.997	-	27.997
Total Adjustments	-0.824	0.000	-6.431	-	-6.431
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.824	0.000			
• Program Adjustments	0.000	0.000	-6.003	-	-6.003
• Rate/Misc Adjustments	0.000	0.000	-0.428	-	-0.428

Change Summary Explanation

In FY19, \$2.582M was reduced for Surface to Surface Mission Module (SSMM) Testing Support and \$3.154M was reduced from the FY19 funding request to account for the availability of prior year execution. Additional adjustments include \$0.267M for process improvement to increase efficiency in military spending and rate adjustments.

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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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
3096: Littoral Combat Ship	1,279.984	28.690	20.841	12.220	-	12.220	10.424	5.823	0.000	0.000	0.000	1,357.982
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.

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

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: LCS System-of-Systems Development, Engineering & Experimentation	17.780	15.209	9.792	0.000	9.792
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.					

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>FY 2018 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 Probability of Raid Annihilation (PRA) on the Independence Variant. Provide systems engineering support for MCM integration testing on the Freedom and Independence Variants. Conduct analyses to qualify a lower cost, lighter weight thermal insulation on the Independence Variant.</p> <p>Provide systems engineering support for VTUAV Initial Operational Test & Evaluation (IOT&E) on Independence Variant and complete VTUAV Dynamic Interface testing on the Freedom Variant. Provide Seaframe and Mission Systems engineering support to investigate, design, and develop technical solutions for design scope on both Freedom and Independence Variants. 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.</p> <p>FY 2019 Base Plans: Provide systems engineering support for Seaframe and MCM integration testing and DT on the Independence Variant. Provide systems engineering support for MCM DT on the Independence Variant. Provide systems engineering support for Seaframe and ASW MP DT TECHEVAL & IOT&E on the Freedom Variant. Provide systems engineering support for Torpedo Defense Mission Module (TDMM) integration testing on the Freedom and Independence Variants. Provide systems engineering support for Gun Missile Module (GMM), Surface to Surface Mission Module (SSMM) TECHEVAL, and Operation Test (OT) on the Freedom Variant.</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The \$5.417M decrease from FY 2018 to FY 2019 is due to the winding down of the test program.</p>						
<p>Title: LCS Test & Evaluation</p> <p>Articles:</p> <p>Description: Execute formal LCS 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), MCM, ASW, and SUW MP integration.</p>		10.910 -	5.632 -	2.428 -	0.000 -	2.428 -

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p><i>FY 2018 Plans:</i> Complete Air Defense Test for Self Defense Test Ship. Begin planning for Air Defense Seaframe testing in support of PRA on the Independence Variant. Conduct VTUAV Dynamic Interface testing on the Freedom Variant. Conduct VTUAV IOT&E on the Independence Variant. Continue work on FSAR. Conduct Assessment and Identification of Mine Susceptibility (AIMS), Advanced Degaussing (ADG), and Advanced Mine Simulation System (AMISS) testing on the Freedom Variant. Conduct AIMS and AMISS testing on the Independence Variant. Complete post FSST availability on LCS 5 and LCS 6. Complete DDISAR for LCS Freedom Variant. Complete DDISAR for Independence Variant.</p> <p><i>FY 2019 Base Plans:</i> Begin MCM DT through TECHEVAL on the Independence Variant. Conduct SUW DT efforts on Independence Variant. Conduct ASW DT on the Freedom Variant. Complete work on FSAR. Complete Air Defense Seaframe testing in support of PRA on the Independence Variant. Conduct Seaframe and SUW MP SSMM DT, TECHEVAL, and IOT&E on the Freedom Variant.</p> <p><i>FY 2019 OCO Plans:</i> NA</p> <p><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i> The \$3.204M decrease from FY 2018 to FY 2019 is due to the removal of the Surface to Surface Mission Module (SSMM) test and prior year under-execution reduction.</p>					
Accomplishments/Planned Programs Subtotals	28.690	20.841	12.220	0.000	12.220

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SCN/2127: <i>Littoral Combat Ship (LCS)</i>	1,649.692	1,162.936	749.428	-	749.428	1,228.176	849.087	1,791.867	1,791.996	3,768.664	24,792.911
• OPN/1600: <i>LCS Common Mission Modules Equipment</i>	14.670	34.666	46.732	-	46.732	51.553	36.657	55.776	29.787	734.284	1,427.898
• OPN/0944: <i>LCS Class Support Equipment</i>	43.819	47.955	47.241	-	47.241	56.761	65.065	66.341	67.725	0.000	519.591
• OPN/1601: <i>LCS MCM Mission Modules</i>	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,501.531	2,771.262

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C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• OPN/1603: LCS SUW Mission Modules	21.064	52.960	26.006	-	26.006	26.566	15.342	15.711	52.511	5.104	315.024	
• RD TEN/3129: LCS Mission Package Development	153.595	116.871	8.899	-	8.899	10.311	9.356	9.254	9.410	Continuing	Continuing	
• OPN/1602: LCS ASW Mission Modules	0.000	0.000	57.294	-	57.294	52.754	63.181	34.104	34.777	142.398	384.508	
• RD TEN/3086: Frigate	83.080	143.450	134.772	-	134.772	75.353	77.639	70.469	72.022	Continuing	Continuing	
• OPN/1604: LCS In- Service Modernization	0.000	74.426	70.526	-	70.526	122.072	224.143	363.812	459.770	0.000	1,314.749	
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. Three additional LCS ships were awarded in FY17. The Navy's Acquisition Strategy supports procurement of LCS ships from FY18 through FY19 as currently budgeted.</p>												

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E. Performance Metrics

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.

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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 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Product Development Summary	Various	Various : Various	479.868	0.000		0.000		0.000		-		0.000	0.000	479.868	-
Subtotal			479.868	0.000		0.000		0.000		-		0.000	0.000	479.868	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	68.080	2.170	Sep 2017	2.023	Feb 2018	1.460	Nov 2018	-		1.460	1.292	75.025	-
Government Engineering Support	WR	NSWC/PC : Panama City, FL	27.987	0.000		0.000		0.000		-		0.000	0.000	27.987	-
Government Engineering Support	WR	NUWC/N : Newport, RI	9.859	0.180	Apr 2017	0.153	Nov 2017	0.110	Nov 2018	-		0.110	0.000	10.302	-
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	70.881	2.245	Feb 2018	1.906	Feb 2018	1.375	Nov 2018	-		1.375	0.941	77.348	-
Government Engineering Support	Various	Government Activities : Various	50.416	2.359	Jul 2017	2.000	Feb 2018	1.443	Nov 2018	-		1.443	1.136	57.354	-
Contractor Engineering Support	C/CPAF	Alion/CSC : Arlington, VA	49.802	0.000		0.000		0.000		-		0.000	0.000	49.802	-
Contractor Engineering Support	C/CPAF	Various : Various	20.617	2.198	Sep 2017	1.863	Feb 2018	1.344	Mar 2019	-		1.344	1.759	27.781	-
Government Engineering Support	WR	NSWC/CD : Bethesda, MD	4.643	5.470	Apr 2017	4.592	Feb 2018	2.131	Nov 2018	-		2.131	4.558	21.394	-
Government Engineering Support	WR	PEO IWS : Various	0.300	3.088	Jan 2017	2.613	Mar 2018	1.886	Dec 2018	-		1.886	2.310	10.197	-

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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 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	WR	General Dynamics Bath Iron Works : Bath, ME	0.933	0.000		0.000		0.000		-		0.000	0.000	0.933	-
Condition Based Maintenance	WR	NSWC/PHD : Port Hueneme, CA	5.180	0.000		0.000		0.000		-		0.000	0.000	5.180	-
Government Engineering Support	WR	NSWC/PHD : Port Hueneme, CA	0.788	0.070	Apr 2017	0.059	Nov 2017	0.043	Nov 2018	-		0.043	0.000	0.960	-
Frigate Government Engineering Support	WR	NSWC/CD : Carderock, MD	1.179	0.000		0.000		0.000		-		0.000	0.000	1.179	-
Frigate Government Engineering Support	WR	NSWC/PD : Philadelphia, PA	0.468	0.000		0.000		0.000		-		0.000	0.000	0.468	-
Frigate Contractor Engineering Support	C/CPAF	Alion : Arlington, VA	0.973	0.000		0.000		0.000		-		0.000	0.000	0.973	-
Frigate Contractor Engineering Support	C/CPAF	Booz Allen Hamilton : McLean, VA	0.345	0.000		0.000		0.000		-		0.000	0.000	0.345	-
Subtotal			355.235	17.780		15.209		9.792		-		9.792	11.996	410.012	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	-
Test & Evaluation	WR	NSWC/PHD : Port Hueneme, CA	56.878	0.678	Apr 2017	0.416	Jan 2018	0.179	Nov 2018	-		0.179	0.751	58.902	-
Test & Evaluation	WR	NSWC/PD : Philadelphia, PA	65.428	0.916	Apr 2017	0.825	Nov 2017	0.000		-		0.000	0.000	67.169	-
Test & Evaluation	WR	NSWC/PC : Panama City, FL	16.414	0.059	Apr 2017	0.000		0.000		-		0.000	0.000	16.473	-
Test & Evaluation	WR	COMOPTEVFOR : Norfolk, VA	14.563	0.330	Apr 2017	0.000		0.757	Nov 2018	-		0.757	0.400	16.050	-

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Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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/COR : Corona, CA	17.746	0.440	Apr 2017	0.245	Nov 2017	0.106	Nov 2018	-		0.106	0.000	18.537	-
Test & Evaluation	WR	Government Activities : Various	70.872	0.194	Apr 2017	0.500	Nov 2017	0.216	Mar 2019	-		0.216	1.223	73.005	-
Test & Evaluation	C/CPAF	LM/GD/Austal : Various	78.326	1.850	Nov 2016	0.890	Jan 2018	0.000		-		0.000	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	21.902	0.642	Apr 2017	0.000		0.000		-		0.000	0.000	22.544	-
FSST Support	WR	NAVAIR : Patuxent River, MD	3.872	0.615	Jan 2017	0.000		0.000		-		0.000	0.000	4.487	-
Range Support	WR	NAWC/WD : Pt. Mugu, CA	2.693	0.775	Feb 2017	0.000		0.000		-		0.000	0.000	3.468	-
Test & Evaluation	WR	NSWC/CD : Bethesda, MD	16.142	3.716	Jan 2017	2.756	Feb 2018	1.170	Mar 2019	-		1.170	1.030	24.814	-
FSST Support	C/BA	National Science Foundation : Arlington, VA	2.321	0.350	Apr 2017	0.000		0.000		-		0.000	0.000	2.671	-
FSST Support	C/BA	NAVFAC Atlantic : Virginia Beach, VA	0.759	0.000		0.000		0.000		-		0.000	0.000	0.759	-
Test & Evaluation	C/BA	Naval Research Laboratory : Washington, DC	0.754	0.345	Apr 2017	0.000		0.000		-		0.000	0.000	1.099	-
Subtotal			412.076	10.910		5.632		2.428		-		2.428	3.404	434.450	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	-

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Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	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	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,279.984	28.690	20.841	12.220	-	12.220	15.400	1,357.135	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

1319 / 4

R-1 Program Element (Number/Name)

PE 0603581N / (U)LITTORAL COMBAT
SHIP

Project (Number/Name)

3096 / Littoral Combat Ship

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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																												
DDISAR: Detailed Design Integrated Survivability Assessment Report - Independence Variant																												
DDISAR: Detailed Design Integrated Survivability Assessment Report - Freedom Variant																												
LCS FSAR: LCS Final Survivability Assessment Report																												
ADT: Air Defense Testing for Self Defense Test Ship																												
ADST in Support of PRA Testing: Air Defense Seaframe Testing - Independence Variant																												
ADG Degaussing: Advanced Degaussing System - Freedom Variant																												
AIMS Testing: Assessment and Identification of Mine Susceptibility - Independence Variant																												
AIMS Testing: Assessment and Identification of Mine Susceptibility - Freedom Variant																												
AMISS Testing: Advanced Mine Simulation System - Independence Variant																												
AMISS Testing: Advanced Mine Simulation System - Freedom Variant																												
VTUAV Dynamic Interface Testing: Vertical Take-off and Landing Unmanned Aerial Vehicle Dynamic Interface Testing - Independence Variant																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																				Date: February 2018																	
Appropriation/Budget Activity 1319 / 4										R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP								Project (Number/Name) 3096 / Littoral Combat Ship																			
										FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
										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
VTUAV Dynamic Interface Testing: Vertical Take-off and Landing Unmanned Aerial Vehicle Dynamic Interface Testing - Freedom Variant																																					
TECHEVAL SUW: Surface Warfare - Surface to Surface Mission Package (SSMM MP) Technical Evaluation - Freedom Variant																																					
IOT&E SUW: Surface Warfare - Surface to Surface Mission Package (SSMM MP) Initial Operational Test and Evaluation - Freedom Variant																																					
DT MCM TECHEVAL & IOT&E: Mine Countermeasure Mission Package Developmental Testing TECHEVAL (Phase I & II) & IOT&E - Independence Variant																																					
DT SUW: Surface Warfare Developmental Test - Independence Variant																																					
DT SUW: Surface Warfare Developmental Test - Phase I / Phase II- Freedom 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																																					
IOT&E VTUAV: Vertical Take-off and Landing Unmanned Aerial Vehicle Initial Operational Test and Evaluation - Independence Variant																																					

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy																								Date: February 2018													
Appropriation/Budget Activity 1319 / 4										R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP										Project (Number/Name) 3096 / Littoral Combat Ship																	
										FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
										1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
FSST Post Availability Report - LCS 5: Post Availability Report - Freedom Variant																																					
FSST Post Availability Report - LCS 6: Post Availability Report - Independence Variant																																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
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				
DDISAR: Detailed Design Integrated Survivability Assessment Report - Independence Variant	1	2017	1	2018
DDISAR: Detailed Design Integrated Survivability Assessment Report - Freedom Variant	1	2017	1	2018
LCS FSAR: LCS Final Survivability Assessment Report	1	2017	1	2019
ADT: Air Defense Testing for Self Defense Test Ship	1	2017	3	2018
ADST in Support of PRA Testing: Air Defense Seaframe Testing - Independence Variant	2	2018	3	2019
ADG Degaussing: Advanced Degaussing System - Freedom Variant	3	2018	3	2018
AIMS Testing: Assessment and Identification of Mine Susceptibility - Independence Variant	3	2018	3	2018
AIMS Testing: Assessment and Identification of Mine Susceptibility - Freedom Variant	3	2018	3	2018
AMISS Testing: Advanced Mine Simulation System - Independence Variant	3	2018	3	2018
AMISS Testing: Advanced Mine Simulation System - Freedom Variant	3	2018	3	2018
VTUAV Dynamic Interface Testing: Vertical Take-off and Landing Unmanned Aerial Vehicle Dynamic Interface Testing - Independence Variant	2	2017	2	2017
VTUAV Dynamic Interface Testing: Vertical Take-off and Landing Unmanned Aerial Vehicle Dynamic Interface Testing - Freedom Variant	1	2018	1	2018
TECHEVAL SUW: Surface Warfare - Surface to Surface Mission Package (SSMM MP) Technical Evaluation - Freedom Variant	1	2019	1	2019
IOT&E SUW: Surface Warfare - Surface to Surface Mission Package (SSMM MP) Initial Operational Test and Evaluation - Freedom Variant	1	2019	1	2019

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018	
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 TECHEVAL & IOT&E: Mine Countermeasure Mission Package Developmental Testing TECHEVAL (Phase I & II) & IOT&E - Independence Variant		4	2019	4 2020
DT SUW: Surface Warfare Developmental Test - Independence Variant		3	2019	4 2019
DT SUW: Surface Warfare Developmental Test - Phase I / Phase II- Freedom Variant		2	2018	1 2019
ASW DT: Anti-Submarine Warfare Developmental Test - Freedom Variant		2	2019	2 2019
ASW TECHEVAL: Anti-Submarine Warfare Technical Evaluation - Freedom Variant		3	2019	3 2019
ASW IOT&E: Anti-Submarine Warfare Mission Package Initial Operational Test and Evaluation - Freedom Variant		4	2019	4 2019
IOT&E VTUAV: Vertical Take-off and Landing Unmanned Aerial Vehicle Initial Operational Test and Evaluation - Independence Variant		1	2018	2 2018
FSST Post Availability Report - LCS 5: Post Availability Report - Freedom Variant		1	2017	2 2018
FSST Post Availability Report - LCS 6: Post Availability Report - Independence Variant		1	2017	4 2018

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
4506: LCS Training	8.085	22.116	20.150	15.777	-	15.777	2.153	1.748	0.893	0.915	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. 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/T2C Key Performance Parameter (KPP) requirements.												
RDT&E funds are used to develop advanced Immersive Virtual Ship Environment (IVSE), or Virtual Reality (VR) 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. RDT&E funds are also used to test and evaluate training devices to verify compliance with requirements.												
The FY 2019 funding request was reduced by \$2.208 million to account for the availability of prior year execution balances.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Title: LCS Total System Training Architecture							22.116	20.150	15.777	0.000	15.777	
							Articles: -	-	-	-	-	
FY 2018 Plans: FY18 funding provides for the development and testing of various training courseware to provide the fleet with these required training capabilities as LCS hull deliveries increase. RDT&E funding provides Naval Air Warfare Center Training Systems Division (NAWC TSD) program management oversight as the LCS Training System Executive Agent. Funding is provided to continue Phase I and II of the IVSE combat systems courseware development, begin IVSE Deck Courseware development and oversee performance of the development efforts, while providing additional support efforts to the LCS Fleet Introduction Program Office (PMS 505). This funding also supports continued NAVFAC efforts preparing for additional small ship homeports required by the Strategic Laydown plan.												
FY 2019 Base Plans:												

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018	
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<p>FY19 funding provides for the development and testing of multiple training courseware to provide the fleet with these required training capabilities and LCS hull deliveries increase. RDT&E funding provides Naval Air Warfare Center Training Systems Division (NAWC TSD) program management oversight while they complete the development of LCS deck operations (both variants) and continue combat systems IVSE courseware and begins the development of the combat systems part task trainer. NAWC will start the development of the VTUAV visual display trainer, oversee performance of the development effort, while providing additional support efforts to the LCS Fleet Introduction Program Office (PMS 505). This funding also supports continued NAVFAC efforts preparing for additional small ship homeports required by the Strategic Laydown plan.</p> <p>FY 2019 OCO Plans: N/A</p> <p>FY 2018 to FY 2019 Increase/Decrease Statement: The decrease of \$4.373M from FY18 to FY19 is due to a \$0.303M rate/efficiency reduction, \$2.208M prior year under execution reduction and the completion of \$1.862M of Training Development and Courseware efforts, as both Phases will be completed within FY18.</p>					
Accomplishments/Planned Programs Subtotals	22.116	20.150	15.777	0.000	15.777

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/5664: Surface Training Equipment	87.714	83.022	230.425	-	230.425	120.574	102.596	70.083	69.408	Continuing	Continuing
Remarks PEOLCS funding accounts for only a portion of the OPN/5664 Line.											
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 FY20. 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											

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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603581N / (U)LITTORAL COMBAT SHIP	Project (Number/Name) 4506 / LCS Training
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 (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).		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
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 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	1.878	0.000		0.000		2.550	Nov 2018	-		2.550	0.000	4.428	-
Combat Systems Courseware	C/FFP	Cubic : Orlando, FL	0.000	14.200	Feb 2017	10.145	Nov 2017	7.316	Nov 2018	-		7.316	7.800	39.461	-
Eng. Training Courseware	C/FFP	Cubic : Orlando, FL	0.600	0.492	Oct 2016	0.000		0.000		-		0.000	0.000	1.092	-
Training Development - Support	WR	NAWC/TSD : Orlando, FL	4.547	3.203	Nov 2016	4.000	Nov 2017	0.587	Nov 2018	-		0.587	Continuing	Continuing	Continuing
VTUAV/MH60	C/FFP	TBD : TBD	0.000	0.000		0.000		1.000	Mar 2019	-		1.000	6.270	7.270	-
Combat System Part Task Trainer	C/FP	TBD : TBD	0.000	0.000		0.000		1.500	Mar 2019	-		1.500	0.000	1.500	-
Mission Bay Trainer	C/CPAF	Cubic : Orlando, FL	0.000	0.822	Oct 2016	0.000		0.000		-		0.000	0.000	0.822	-
Subtotal			7.025	18.717		14.145		12.953		-		12.953	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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	0.320	0.204	Nov 2016	0.180	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Information Assurance	WR	NSWC, DN : Dam Neck, VA	0.400	1.214	Nov 2016	1.500	Nov 2017	1.500	Nov 2018	-		1.500	Continuing	Continuing	Continuing
Training ISEA	WR	NSWC/PHD : Port Huenuma, CA	0.200	0.541	Nov 2016	0.500	Nov 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Warfare Center SME/ NAVFAC	WR	VARIOUS : VARIOUS	0.000	0.067	Mar 2017	0.170	Nov 2017	0.150	Nov 2018	-		0.150	Continuing	Continuing	Continuing
Subtotal			0.920	2.026		2.350		1.650		-		1.650	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018		
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 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Management Support	C/CPAF	Various : Various	0.140	1.373	Mar 2017	3.655	Mar 2018	1.174	Mar 2019	-		1.174	Continuing	Continuing	Continuing
Subtotal			0.140	1.373		3.655		1.174		-		1.174	Continuing	Continuing	N/A

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.085	22.116	20.150	15.777	-	15.777	Continuing	Continuing	N/A

Remarks

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PE 0603581N: (U)LITTORAL COMBAT SHIP
Navy

R-1 Line #52

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

Project (Number/Name) 4506 / LCS Training

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2019PB - 0603581N - 4506

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy			Date: February 2018
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: VSTS Development	1	2017	2	2017
Interactive Virtual Shipboard Environment: DECK IVSE- Development: DECK IVSE Contract Award	1	2018	1	2018
Interactive Virtual Shipboard Environment: DECK IVSE- Development: DECK IVSE- Development	1	2018	4	2019
Interactive Virtual Shipboard Environment: Combat System Courseware Development: Combat System Courseware Contract Award	2	2017	2	2017
Interactive Virtual Shipboard Environment: Combat System Courseware Development: Combat System Courseware Development	2	2017	4	2020
Interactive Virtual Shipboard Environment: VTUAV/MH60 Development: VTUAV/MH60 Contract Award	2	2019	2	2019
Interactive Virtual Shipboard Environment: VTUAV/MH60 Development: VTUAV/MH60 Development	2	2019	4	2020
Training Development: Training Development: Training Development - Support	1	2017	4	2023
Combat System Part Task Trainer: Combat Systems Part Task Trainer - Contract Award	2	2019	2	2019
Combat System Part Task Trainer: Combat Systems Part Task Trainer - Development	2	2019	2	2021