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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Navy	<b>Date:</b> February 2018
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<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy / BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>											
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	1,301.031	126.761	154.117	62.727	-	62.727	76.052	77.092	86.408	100.631	Continuing	Continuing
0530: <i>Mine Hunt Systems</i>	280.439	9.469	9.761	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	299.669
1233: <i>Surface MCM Mid-life Upgrade</i>	156.226	4.073	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	160.299
1234: <i>Unmanned Surface Vehicle (USV)</i>	46.221	42.069	23.594	28.645	-	28.645	19.915	19.167	18.993	19.404	Continuing	Continuing
1235: <i>Mine Warfare Planning and Analysis</i>	7.520	8.664	3.139	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.323
2094: <i>Unmanned Underwater Vehicle</i>	64.860	21.945	60.187	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	146.992
2131: <i>Assault Breaching System</i>	610.235	19.651	11.623	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	641.509
2989: <i>Barracuda</i>	0.000	0.000	20.761	31.282	-	31.282	32.237	31.625	37.415	38.227	Continuing	Continuing
3123: <i>SMCM UUV</i>	135.530	20.890	25.052	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	181.472
3428: <i>Medium Displacement Unmanned Surface Vehicle (MDUSV)</i>	0.000	0.000	0.000	2.800	-	2.800	23.900	26.300	30.000	43.000	Continuing	Continuing

**Note**

FY 2019 and future funding for Projects 0530, 1233, and 1235 have been realigned to PE 0604127N; Project 2094 to PE 0604031N; Project 2131 to PE 0604126N and Project 3123 to 0604028N. Project 0530 realigned from PE 0603502N starting in FY 2019 included a \$1.192 million reduction to account for the availability of prior year execution balances.

The FY 2019 funding request for remaining projects was reduced by \$4.600 million to account for the availability of prior year execution balances.

**A. Mission Description and Budget Item Justification**

This program element provides resources for development of mine countermeasure systems to provide minehunting, minesweeping, and neutralization to counter known and projected mine threats. The mine countermeasures systems provide mobile, quick reaction forces capable of land or sea-based minehunting and minesweeping operations worldwide. Resources are for developing and deploying advanced mine-hunting and minesweeping systems and the intelligence and oceanographic capabilities that will enable mine warfare superiority. Tactics and techniques used vary across a diversity of environments and a diversity of threats, including both asymmetric and emerging. Resources provide for systems and support of mine warfare systems, maritime systems, and expeditionary systems to allow for continuous

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<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>
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operations of the Navy's warships and support vessels, other military vessels, and commercial vessels. Core capabilities include forward presence, deterrence, sea control, power projection, maritime security, humanitarian assistance and disaster response to maintain freedom of the seas. Increased capability includes conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, reducing or eliminating post-mission analysis detect, classify, identify, decide time, improving neutralization time, improving network communications, automatic target recognition, and achieving in-stride detect-to-engage capability. Concept of operations includes development of cooperative, unmanned, modular systems; the establishment of a capable networked command and control systems; and standing up an accurate and interactive environmental system with the ability to form and disseminate a Common Environmental Picture. Efforts benefit the Mine Countermeasure (MCM) force by transforming the Navy from the platform-centered legacy set of systems to a capability-centered force that is distributed, networked, and able to provide unique maritime influence and access across the entire maritime domain. Efforts also include undersea domain efforts associated with the Snakehead Large Displacement UUV (LDUUV), as well as efforts for the new Medium Displacement USV starting in FY19 which will serve as the unmanned surface vessel portion of the Navy's Future Surface Combatant (FSC) strategy.

The Surface Mine Countermeasures (SMCM) programs are in general platform independent and will provide detection, classification, localization, identification, neutralization, and influence clearance capabilities. Programs develop: (1) Unmanned minehunting capability for surface platforms; (2) the integration and improvement of new and existing systems (3) support for systems which detect, localize, classify, identify, and neutralize all mine types across MCM Avenger Class and other platforms; (4) systems for neutralizing mines and light obstacles through the entire water column to include deep water, open water, shallow water, very shallow water, surf zones, and beach landing craft zones in support of operations; (5) the integration of Unmanned Undersea Vehicles (UUVs) to meet Undersea Surveillance capabilities as well as other prioritized and enduring capabilities, requirements and gaps; (6) integrate hardware for experimental testing related to surface ship, aircraft, and other cross platform applications; and (7) provide for the future unmanned portion of the FSC strategy.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
Previous President's Budget	165.775	154.117	233.873	-	233.873
Current President's Budget	126.761	154.117	62.727	-	62.727
Total Adjustments	-39.014	0.000	-171.146	-	-171.146
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	9.680	0.000			
• SBIR/STTR Transfer	-3.694	0.000			
• Program Adjustments	0.000	0.000	-162.501	-	-162.501
• Rate/Misc Adjustments	0.000	0.000	-8.645	-	-8.645
• Congressional Directed Reductions	-45.000	-	-	-	-
Adjustments					

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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 / BA 4: Advanced Component Development & Prototypes (ACD&P)		R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM
<u>Change Summary Explanation</u> Program Adjustments:  FY17 -\$39,014K Total adjustments; Congressional Reductions: -\$2,000K LDUUV Support Excess Growth, -\$43,000K LDUUV - Continue Risk Reduction & Technology maturation effort only, -\$3,694K SBIR, +\$9,680K FY17 JUNE ATR Prior Approval Request.  FY18 No Change  FY19 -\$171,146K Total adjustments; Program adjustments: -\$145,106K realignment to new Program Elements; -\$20,432K realignment of UUV, +\$12,000K MCM Acceleration, -\$10,000K past execution and congressional marks, +\$2,800K Medium Displacement USV (MDUSV), +\$2,500K synthetic trainer, -\$3,090K ABS Excess growth, -\$1,173K MEDAL unjustified growth; Other Rate Adjustments: -\$5,792K under execution reduction, -\$853K miscellaneous adjustments.		

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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 0603502N / <i>Surface &amp; Shallow Water MCM</i>				Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>			
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
0530: <i>Mine Hunt Systems</i>	280.439	9.469	9.761	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	299.669
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**Note**

FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N. Project realigned from PE 0603502N starting in FY 2019.

**A. Mission Description and Budget Item Justification**

This project contains resources for systems, subsystems, and sensors integrated for use with the new program MCM Unmanned Surface Vehicle (MCM USV) for mine detection, classification, localization, and identification in support of mine neutralization, and influence clearance capabilities. Research, development, test, and evaluation efforts are for increasing capability by decreasing time required to conduct Mine Countermeasures (MCM) operations, ensuring low risk to naval and commercial vessels, and removing the man from the minefield. Increased capability includes conducting minefield reconnaissance (mine density and location) at high area search rates, improving detection capability, decreasing sensor false alarm rates, and reducing post-mission analysis for detection, classification, and identification.

The AN/AQS-20 is a mine hunting and identification system with sensors housed in an underwater towed body. The sensors are designated for the detection, classification and localization of bottom, close-tethered, and volume targets, and also for the identification of bottom targets. The system will be deployed from the Littoral Combat Ship (LCS) as part of the MCM Mission Package or can be deployed from other Vessels of Opportunity (VOO). The MCM USV is the tow platform for the AN/AQS-20.

The AN/AQS-20 Block 1 (the AQS-20A) is undergoing a Pre-Planned Product Improvement (P3I) program to upgrade the Forward Looking Sonar (FLS) and Side-Looking Sonars (SLS) to improve Probability of Classifying a Mine-like object as a Mine, reduce False Classification, and improve Depth Localization performance to meet Block 2 (the AQS-20C) performance. The Forward Looking Sonar is being replaced with a new High Frequency Wideband Forward Looking Sonar (WBFLS) design. The SLS is being replaced with a new Multifunction SLS with Synthetic Aperture Sonar (SAS) capability, as well as, improved signal processing and Signal to Noise Ratio. The Block 1 P3I program began in FY 2012 and completed in FY 2017. Award and management for Block 2 production units began in FY 2014 (the AQS-20C). Materiel Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts continue beyond FY2023.

In FY 2017, the AN/AQS-20 Block 2 P3I program conducted Synthetic Aperture Sonar (SAS) development and test. The AN/AQS-20 program also completed the initial build of algorithms and software components to be used for post mission analysis software tools for the AN/AQS-20 Block 2 (the AQS-20C). The Block 2 P3I program began in FY 2017 and continues beyond FY 2023. Development and Materiel Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts will continue beyond FY2023.

In FY 2018, the AN/AQS-20 Block 2 program (AQS-20C) is scheduled to conduct Developmental Testing (originally scheduled to start at end of FY17), initiate MCM USV integration, and initiation of MCM improvements for post mission analysis tools in support of Net-centric Sensor Analysis for Mine Warfare (NSAM) integration for

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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 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 0530 / Mine Hunt Systems				
the Fleet Operators. The net effect of these tools combined with the more powerful AN/AQS-20 Block 2 sensors will be improved classification of mines, more accurate vertical localization, reduced false calls, and improved area clearance rate sustained. Improvements also include the collection and ingestion of in-situ environmental data used for mission planning to configure the sensor which optimizes sensor performance during missions. Development of these tools begins in FY 2018 and will continue through FY 2021.						
In FY 2019 the project is realigned to Program Element 0604127N						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: AN/AQS-20 Product Development		2.900	3.036	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2018 Plans:						
- Continue SAS Acoustic mine recognition development.						
- Continue SAS Acoustic mine recognition ECP.						
- Initiate algorithm development for AN/AQS-20 Block 2 PMA Improvements including NSAM integration.						
- Complete development of the Mission Planning Optimizer used to configure the AN/AQS-20 Block 2 sensors.						
- Initiate AN/AQS-20 Block 2 improvements in support of MCM USV integration.						
- Complete initial Post Mission Analysis Software for AN/AQS-20 Block 2 (Q-20C) Multi-Function SLS and EOID.						
- Correct deficiencies identified during testing.						
FY 2019 Base Plans:						
FY 2019 funding in Program Element (PE) 0604127N.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						
Project realigned to PE 0604127N from PE 0603502N starting in FY 2019.						
Title: AN/AQS-20 Support		2.300	0.900	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2018 Plans:						
- Provide ongoing technical and management support to AN/AQS-20.						
- Continue to conduct test minefield maintenance.						
- Initiate AN/AQS-20 Block 2 Mission Planning and Post Mission Analysis Concept of Employment development.						
- Update Information Assurance Plans in support of AN/AQS-20 Block 2 (Q-20C).						
- Complete Depot Maintenance (Overhaul) Plan.						

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Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 0530 / Mine Hunt Systems		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Complete Technical Insertion Plan. <b>FY 2019 Base Plans:</b> FY 2019 funding in Program Element (PE) 0604127N. <b>FY 2019 OCO Plans:</b> N/A <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Project realigned to PE 0604127N from PE 0603502N starting in FY 2019.						
<b>Title:</b> AN/AQS-20 Test and Evaluation  <b>Articles:</b>		3.000 -	5.325 -	0.000 -	0.000 -	0.000 -
<b>FY 2018 Plans:</b> - Complete AN/AQS-20 Block 2 DT. - Conduct AN/AQS-20 Block 2 PMA Data Collection with test mines under various conditions. - Initiate SAS Acoustic recognition Testing. <b>FY 2019 Base Plans:</b> FY 2019 funding in Program Element (PE) 0604127N. <b>FY 2019 OCO Plans:</b> N/A <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Project realigned to PE 0604127N from PE 0603502N starting in FY 2019.						
<b>Title:</b> AN/AQS-20 Management Services  <b>Articles:</b>		1.269 -	0.500 -	0.000 -	0.000 -	0.000 -
<b>FY 2018 Plans:</b> - Provide planning and management for the AN/AQS-20 program. - Begin update of acquisition documentation in support of Full Rate Production (FRP) Decision Review. - Continue to provide Program Office travel support. <b>FY 2019 Base Plans:</b> FY 2019 funding in Program Element (PE) 0604127N. <b>FY 2019 OCO Plans:</b>						

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy				<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 1319 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>		<b>Project (Number/Name)</b> 0530 / <i>Mine Hunt Systems</i>	

<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
N/A					
<b><i>FY 2018 to FY 2019 Increase/Decrease Statement:</i></b> Project realigned to PE 0604127N from PE 0603502N starting in FY 2019.					
<b>Accomplishments/Planned Programs Subtotals</b>	9.469	9.761	0.000	0.000	0.000

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPN/1601: <i>LCS</i>	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,421.551	2,691.282
<i>MCM Mission Modules</i>											
• RDTEN/0604127N/0530: <i>Mine Hunt Systems</i>	0.000	0.000	7.579	-	7.579	8.861	7.234	4.447	4.548	Continuing	Continuing

**Remarks**  
 OPN/1601 funding line accounts for several programs, of which the AN/AQS-20 program is only a portion.

**D. Acquisition Strategy**  
 AN/AQS-20 LRIP procurement continued following Block 2 (AQS-20C units) competitive contract award in FY 2014. Continue to meet MCM MP requirements to support production of Block 2 units.

**E. Performance Metrics**  
 AN/AQS-20 - Successfully complete Block 2 DT in FY 2018.

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 0530 / Mine Hunt Systems					
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
AN/AQS-20 Hardware/ Software Development Q-20 on the H-53	SS/CPIF	Raytheon : Portsmouth, RI	31.120	0.000		0.000		0.000		-		0.000	0.000	31.120	-
AN/AQS-20 Hardware/ Software Development Q-20A on the H-60	C/CPFF	Raytheon : Portsmouth, RI	60.150	0.000		0.000		0.000		-		0.000	0.000	60.150	-
AN/AQS-20 Hardware/ Software Development	WR	NSWC, PC : Panama City FL	14.578	0.000		0.000		0.000		-		0.000	0.000	14.578	-
AN/AQS-2A Hardware/ Software Development	C/FP	Northrop Grumman : Melbourne, FL	4.572	0.000		0.000		0.000		-		0.000	0.000	4.572	-
AN/AQS-20 P3I	C/CPFF	Raytheon : Portsmouth, RI	17.391	1.100	Nov 2016	0.509	Nov 2018	0.000		-		0.000	0.000	19.000	-
AN/AQS-20 P3I	C/CPFF	ARL/UT : Austin, TX	9.017	0.600	Dec 2016	0.000		0.000		-		0.000	0.000	9.617	-
AN/AQS-20 P3I	WR	NSWC, PC : Panama City FL	5.054	1.200	Oct 2016	0.000		0.000		-		0.000	0.000	6.254	-
AN/AQS-20 Block 2 PMA	WR	NSWC, PC : Panama City FL	0.000	0.000		1.099	Nov 2017	0.000		-		0.000	0.000	1.099	-
AN/AQS-20 Block 2 PMA	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		1.128	Feb 2018	0.000		-		0.000	0.000	1.128	-
AN/AQS-20 Block 2 Intergration	C/CPFF	Lockhead Martin : Not Specified	0.000	0.000		0.300	Nov 2017	0.000		-		0.000	0.000	0.300	-
AN/AQS-20 Materiel Reliability ECP Development	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
AN/AQS-20 P3I	WR	Naval Research Lab : Stennis Space Center, MS	0.225	0.000		0.000		0.000		-		0.000	0.000	0.225	-
Subtotal			142.107	2.900		3.036		0.000		-		0.000	0.000	148.043	N/A
Remarks FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.															



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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / Surface & Shallow Water MCM	<b>Project (Number/Name)</b> 0530 / Mine Hunt Systems
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<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
AN/AQS-20 Engineering Services	WR	NSWC, PC : Panama City, FL	31.976	0.410	Oct 2016	0.135	Nov 2017	0.000		-		0.000	0.000	32.521	-
AN/AQS-20 Engineering Services	C/CPFF	Raytheon : Portsmouth, RI	4.486	0.200	Oct 2016	0.200	Dec 2017	0.000		-		0.000	0.000	4.886	-
AN/AQS-20 Engineering Services	Various	Various : Various	54.018	0.000		0.000		0.000		-		0.000	0.000	54.018	-
AN/AQS-20 Engineering Services 2	SS/CPIF	Raytheon : Portsmouth, RI	3.464	0.000		0.000		0.000		-		0.000	0.000	3.464	-
AN/AQS-20 ILS Function	WR	NSWC, PC : Panama City FL	7.618	1.165	Oct 2016	0.200	Nov 2017	0.000		-		0.000	0.000	8.983	-
AN/AQS-20 ILS Function	SS/CPIF	Raytheon : Portsmouth, RI	1.546	0.000		0.000		0.000		-		0.000	0.000	1.546	-
AN/AQS-20 ILS Function	Various	Various : Various	0.981	0.000		0.000		0.000		-		0.000	0.000	0.981	-
AN/AQS-20 Engineering Services	WR	NSWC/CD : Carderock, MD	0.660	0.165	Oct 2016	0.000		0.000		-		0.000	0.000	0.825	-
AN/AQS-20 Engineering Services	WR	NSWC/NPT : Newport, RI	0.355	0.360	Oct 2016	0.365	Oct 2017	0.000		-		0.000	0.000	1.080	-
<b>Subtotal</b>			105.104	2.300		0.900		0.000		-		0.000	0.000	108.304	N/A

**Remarks**

FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
AN/AQS-20 T&E Functions	WR	COTF : Norfolk, VA	0.000	0.230	Nov 2016	0.200	Feb 2018	0.000		-		0.000	0.000	0.430	-
AN/AQS-20 T&E Functions	WR	NSWC, PC : Panama City FL	19.880	2.370	Oct 2016	4.525	Feb 2018	0.000		-		0.000	0.000	26.775	-
AN/AQS-20 T&E Functions	C/CPFF	Raytheon : Portsmouth, RI	4.134	0.400	Apr 2017	0.600	Feb 2018	0.000		-		0.000	0.000	5.134	-
AN/AQS-20 T&E Functions	Various	Various : Various	1.583	0.000		0.000		0.000		-		0.000	0.000	1.583	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b>													<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 1319 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>				<b>Project (Number/Name)</b> 0530 / <i>Mine Hunt Systems</i>					
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
AN/AQS-20 T&E Functions	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
<b>Subtotal</b>			25.597	3.000		5.325		0.000		-		0.000	0.000	33.922	N/A
<b>Remarks</b> FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N. COTF - Naval Command Operational Test and Evaluation Force															
<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
AN/AQS-20 Management Services	TBD	Various : Various	6.992	1.229	Dec 2016	0.470	Dec 2017	0.000		-		0.000	0.000	8.691	-
AN/AQS-20 Travel	TBD	Various : Various	0.627	0.040	Mar 2017	0.030	Mar 2018	0.000		-		0.000	0.000	0.697	-
AN/AQS-20 Acquisition Workforce Fund	Various	Various : Various	0.012	0.000		0.000		0.000		-		0.000	0.000	0.012	-
<b>Subtotal</b>			7.631	1.269		0.500		0.000		-		0.000	0.000	9.400	N/A
<b>Remarks</b> FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.															
			<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			280.439	9.469		9.761		0.000		-		0.000	0.000	299.669	N/A
<b>Remarks</b> FY 2019 and future funding for Project 0530 is in Program Element (PE) 0604127N.															

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PE 0603502N: *Surface & Shallow Water MCM*  
Navy

R-1 Line #37

<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water</i> <i>MCM</i>
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<b>Project (Number/Name)</b> 0530 / <i>Mine Hunt Systems</i>
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Proj 0530	FY 2017				FY 2018				1Q New PE ■	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
Project Moved to Program Element 0604127N																													
AN/AQS-20 Program Milestones								IOC ◆																					
AN/AQS-20 Development Phase	Block 2 P3I																												
	Block 1 & 2 ECP Development																												
AN/AQS-20 Test and Evaluation Milestones							Blk 2 DT																						
AN/AQS-20 System Deliveries							Blk 2 Basic (3 Units) ▲																						
							Blk 2 Basic (2 Units) ▲																						
							Blk 2 Option 1 (1 Unit) ▲																						
							Blk 2 Option 2 (4 Units) ▲																						

2019PB - 0603502N - 0530

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 0530 / <i>Mine Hunt Systems</i>	

**Schedule Details**

<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
<b><i>Proj 0530</i></b>				
Project Moved to Program Element 0604127N:	1	2019	1	2019
AN/AQS-20 Program Milestones: Initial Operational Capability (IOC)	4	2018	4	2018
AN/AQS-20 Development Phase: AN/AQS-20 Block 2 P3I	1	2017	4	2018
AN/AQS-20 Development Phase: AN/AQS-20 Materiel Reliability, Obsolescence, and Performance ECP Development (Block 1 & 2)	1	2017	4	2018
AN/AQS-20 Test and Evaluation Milestones: AN/AQS-20 Test Events Block 2 DT	3	2018	3	2018
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 Basic Award Systems (3 Units)	3	2018	3	2018
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 Basic Award Systems (2 Units)	3	2018	3	2018
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 Option 1 Award System (1 Unit)	3	2018	3	2018
AN/AQS-20 System Deliveries: AN/AQS-20 Block 2 Option 2 Award Systems (4 Units)	3	2018	3	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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade			
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
1233: Surface MCM Mid-life Upgrade	156.226	4.073	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	160.299
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**Note**

FY 2019 and future funding for Project 1233 is in Program Element (PE) 0604127N. Project realigned from PE 0603502N starting in FY 2019.

**A. Mission Description and Budget Item Justification**

This project provides resources for development, improvement and integration of MCM systems. A description of the major planned programs include the following:

1) AN/SQQ-32(V)4 High-Frequency, Wide Band (HFWB) is a technology upgrade to the AN/SQQ-32 Towed Body which will incorporate HFWB technology into the detection sonar to address performance deficiencies against new mine threats in the littorals. This upgrade will be installed on MCM-1 Class ships with the AN/SQQ-32(V)3 and will develop new transducer modules, fiber optic cable and modify topside processing and display software. 2) Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander. 3) Develop and implement Mine Countermeasures Commander's Estimate of the Situation (MCM CES). 4) The Unmanned Influence Sweep System (UISS) utilizes an Unmanned Surface Vehicle (USV) integrated with an Unmanned Surface Sweep System (US3), a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the Littoral Combat Ship (LCS) or a ship of opportunity; 5) The Multi-Function USV replaces the sweep system with a minehunting sensor. The capability leverages off a common USV to conduct minehunting missions. 6) AN/SLQ-60 Mine Neutralization System (MNS) Seafox on the MCM Class ships. MNS is the replacement to the existing AN/SLQ-48 Mine Neutralization System. 7) SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)4 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

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

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> HFWB/PRODUCT DEVELOPMENT:	0.312	0.000	0.000	0.000	0.000
<b>Articles:</b>	-	-	-	-	-
<b>FY 2018 Plans:</b> N/A					
<b>FY 2019 Base Plans:</b> N/A					
<b>FY 2019 OCO Plans:</b>					

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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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding realigned to PE 0604127N.						
Title: HFWB/SUPPORT:  Articles:		0.150 -	0.000 -	0.000 -	0.000 -	0.000 -
FY 2018 Plans: N/A						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding realigned to PE 0604127N.						
Title: HFWB/TEST AND EVALUATION:  Articles:		0.125 -	0.000 -	0.000 -	0.000 -	0.000 -
FY 2018 Plans: N/A						
FY 2019 Base Plans: N/A						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding realigned to PE 0604127N.						
Title: SSQ-94 MCM Trainer Development  Articles:		3.486 -	0.000 -	0.000 -	0.000 -	0.000 -
FY 2018 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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade			
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>						<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	
N/A											
<b>FY 2019 Base Plans:</b>											
N/A											
<b>FY 2019 OCO Plans:</b>											
N/A											
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>											
FY 2019 funding realigned to PE 0604127N.											
<b>Accomplishments/Planned Programs Subtotals</b>						4.073	0.000	0.000	0.000	0.000	
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• OPN/2622: Minesweeping System Replacement	26.764	31.531	35.709	-	35.709	55.949	51.338	34.007	16.753	Continuing	Continuing
<b>Remarks</b>											
The above funding line accounts for several programs, of which the mine sweeping system replacement programs are only a portion.											
<b>D. Acquisition Strategy</b>											
HFWB - Naval Surface Warfare Center, Panama City (NSWC, PC) and ARL UT designed and developed the HFWB upgrade to the AN/SQQ-32.											
<p>Mine Warfare and Environmental Decision Aids Library (MEDAL) - requirements for MEDAL Builds are generated through a formal requirements process. Requirements conferences gather a list of candidate functions based on a logical sequence to fully implement the overall software architecture. The fleet is presented with a recommended list of candidate capabilities based on this program plan, doctrine, fleet comments, and technology. These capability items are then prioritized by the fleet representatives (coordinated by Naval Mine Warfare and Anti-Submarine Command (NMAWC). The fleet inputs are then consolidated by COMINELWARCOM into an overall list which is then presented to Navy leadership for pricing and final selection. The selection is based on price, risk, available funding, and possibly by other program factors (e.g., ensure that MEDAL supports other program delivery schedules). Selection balances immediate needs, long term objectives, technical maturity and other programmatic factors. A verification and validation process is applied to any algorithms, tactics, or models to be incorporated in the software. MEDAL development to include integration of data fusion techniques and incorporation of Data Access Layer (DAL) architecture to meet FORCENet requirements. Acquisition strategy for Mine Countermeasures Commander's Estimate of the situation (MCM CES) is to deliver the software module within MEDAL builds by implementing the CES framework into the MEDAL software. SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)4 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.</p>											

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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 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade
<div>E. Performance Metrics</div> <div>SSQ-94 Trainer upgrade completion</div>		



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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade					
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
MNS Development	Various	TBD : TBD	22.455	0.000		0.000		0.000		-		0.000	0.000	22.455	-
SSQ-94 Trainer	WR	NSWC, PC : NSWC, PC	12.858	3.486	Nov 2016	0.000		0.000		-		0.000	0.000	16.344	-
BSP: Develop Bottom Sediment Classifier	WR	NRL : WASHINGTON, DC	0.258	0.000		0.000		0.000		-		0.000	0.000	0.258	-
Systems Engineering and Integration	WR	NSWC, PC : PANAMA CITY, FL	0.306	0.000		0.000		0.000		-		0.000	0.000	0.306	-
System Development 1	WR	NSWC, PC : SAN DIEGO, CA	0.373	0.000		0.000		0.000		-		0.000	0.000	0.373	-
Systems Engineering 2	WR	NSWC, PC : PANAMA CITY, FL	2.915	0.000		0.000		0.000		-		0.000	0.000	2.915	-
Systems Engineering 3 MCM CES	WR	NSWC, PC : PANAMA CITY, FL	1.633	0.000		0.000		0.000		-		0.000	0.000	1.633	-
HFVB: Primary Hardware Development 1	C/CPAF	ARL UT : TEXAS	15.511	0.000		0.000		0.000		-		0.000	0.000	15.511	-
Primary Hardware Development 2	WR	ARL-UT : AUSTIN, TX	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
HFVB: Tow Cable Development	C/CPAF	ARL UT : TEXAS	1.399	0.000		0.000		0.000		-		0.000	0.000	1.399	-
HFVB: Ship Integration	WR	NSWC, PC : PANAMA CITY, FL	1.697	0.000		0.000		0.000		-		0.000	0.000	1.697	-
HFVB: SYSTEM ENGINEER	C/CPAF	ARL UT : TEXAS	8.753	0.312	May 2017	0.000		0.000		-		0.000	0.000	9.065	-
Software Development MEDAL EA	C/CPFF	SAIC : McLean, VA	41.180	0.000		0.000		0.000		-		0.000	0.000	41.180	-
Subtotal			109.338	3.798		0.000		0.000		-		0.000	0.000	113.136	N/A
Remarks FY 2019 and future funding realigned to PE 0604127N.															

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1233 / Surface MCM Mid-life Upgrade					
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
Develop Logistics Products	WR	NSWC, PC : PANAMA CITY, FL	0.243	0.000		0.000		0.000		-		0.000	0.000	0.243	-
Software Development 1	C/CPFF	SAIC : McLean, VA	0.350	0.000		0.000		0.000		-		0.000	0.000	0.350	-
Software Development 2	C/CPFF	SAIC : McLean, Va	0.914	0.000		0.000		0.000		-		0.000	0.000	0.914	-
HFWB Software Development	C/CPAF	ARL-UT : TEXAS	8.300	0.150	May 2017	0.000		0.000		-		0.000	0.000	8.450	-
HFWB Integrated Logistics Support	WR	NSWC, PC : PANAMA CITY, FL	2.765	0.000		0.000		0.000		-		0.000	0.000	2.765	-
Software Engineering 1 MCM CES	WR	NSWC, PC : PANAMA CITY, FL	1.517	0.000		0.000		0.000		-		0.000	0.000	1.517	-
Software Engineering 2 MEDAL	WR	NSWC, PC : PANAMA CITY, FL	2.458	0.000		0.000		0.000		-		0.000	0.000	2.458	-
Subtotal			16.547	0.150		0.000		0.000		-		0.000	0.000	16.697	N/A
Remarks FY 2019 and future funding realigned to PE 0604127N.															
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
MEDAL Test and Evaluation	C/FP	SAIC : McLean, VA	7.636	0.000		0.000		0.000		-		0.000	0.000	7.636	-
MCM CES Test and Evaluation 1	C/CPAF	VARIOUS : VARIOUS	1.782	0.000		0.000		0.000		-		0.000	0.000	1.782	-
HFWB: Developmental Test and Evaluation	C/CPAF	ARL-UT : TEXAS	5.800	0.125	May 2017	0.000		0.000		-		0.000	0.000	5.925	-
Test and Evaluation 2	C/CPAF	VARIOUS : VARIOUS	5.204	0.000		0.000		0.000		-		0.000	0.000	5.204	-
Subtotal			20.422	0.125		0.000		0.000		-		0.000	0.000	20.547	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b>												<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 1319 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603502N / Surface & Shallow Water MCM						<b>Project (Number/Name)</b> 1233 / Surface MCM Mid-life Upgrade			
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Remarks</b> FY 2019 and future funding realigned to PE 0604127N.															
<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Program Management Support 1	C/CPFF	CACI : WASHINGTON, DC	0.263	0.000		0.000		0.000		-		0.000	0.000	0.263	-
Travel 1	WR	NAVSEA : WNY, DC	0.084	0.000		0.000		0.000		-		0.000	0.000	0.084	-
Government Engineering Support1	WR	NSWC, PC : PANAMA CITY, FL	0.325	0.000		0.000		0.000		-		0.000	0.000	0.325	-
MEDAL Program Management Support 2	Various	VARIOUS : VARIOUS	2.827	0.000		0.000		0.000		-		0.000	0.000	2.827	-
SBIR Assessment 2	Various	VARIOUS : VARIOUS	0.019	0.000		0.000		0.000		-		0.000	0.000	0.019	-
Program Management Support 3	C/CPFF	CACI : WASHINGTON, DC	1.341	0.000		0.000		0.000		-		0.000	0.000	1.341	-
Program Management Support 4	C/CPFF	CACI : WASHINGTON, DC	0.080	0.000		0.000		0.000		-		0.000	0.000	0.080	-
Government Engineering Support3	WR	NSWC, PC : PANAMA CITY, FL	0.090	0.000		0.000		0.000		-		0.000	0.000	0.090	-
Travel 3	C/CPAF	NAVSEA : WNY, DC	0.256	0.000		0.000		0.000		-		0.000	0.000	0.256	-
Program Management Support 5	C/CPFF	CACI : WASHINGTON, DC	0.167	0.000		0.000		0.000		-		0.000	0.000	0.167	-
Government Engineering Support4	WR	NSWC, PC : PANAMA CITY, FL	0.010	0.000		0.000		0.000		-		0.000	0.000	0.010	-
Travel4	C/CPAF	NSWC, PC : PANAMA CITY, FL	0.069	0.000		0.000		0.000		-		0.000	0.000	0.069	-
HFWB: Program Management Support 6	C/CPAF	VARIOUS : VARIOUS	1.442	0.000		0.000		0.000		-		0.000	0.000	1.442	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 1233 / <i>Surface MCM Mid-life Upgrade</i>
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<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
HFVB: Government Engineering Support5	WR	NSWC, PC : PANAMA CITY, FL	0.750	0.000		0.000		0.000		-		0.000	0.000	0.750	-
HFVB: Travel 5	C/CPAF	NAVSEA : WNY, DC	0.080	0.000		0.000		0.000		-		0.000	0.000	0.080	-
Government Engineering Support6	WR	NSWC, PC : PANAMA CITY, FL	1.352	0.000		0.000		0.000		-		0.000	0.000	1.352	-
Travel 6	C/CPAF	NAVSEA : WNY, DC	0.238	0.000		0.000		0.000		-		0.000	0.000	0.238	-
SBIR Assessment 6	Various	VARIOUS : VARIOUS	0.054	0.000		0.000		0.000		-		0.000	0.000	0.054	-
Program Management Support 7	C/CPAF	VARIOUS : VARIOUS	0.350	0.000		0.000		0.000		-		0.000	0.000	0.350	-
Acquisition Workforce Fund	Various	VARIOUS : VARIOUS	0.122	0.000		0.000		0.000		-		0.000	0.000	0.122	-
<b>Subtotal</b>			9.919	0.000		0.000		0.000		-		0.000	0.000	9.919	N/A

**Remarks**

FY 2019 and future funding realigned to PE 0604127N.

	<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	156.226	4.073		0.000		0.000		-		0.000	0.000	160.299	N/A

**Remarks**

**UNCLASSIFIED**

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

Date: February 2018

[illegible]

1319 / 4

R-1 Program Element (Number/Name)	Program Element Description	Program Element Type	Program Element Status	Program Element Location	Program Element Contact	Program Element Date	Program Element Comments
1	1.1	1.1.1	1.1.1.1	1.1.1.1.1	1.1.1.1.1.1	1.1.1.1.1.1.1	1.1.1.1.1.1.1.1
2	2.1	2.1.1	2.1.1.1	2.1.1.1.1	2.1.1.1.1.1	2.1.1.1.1.1.1	2.1.1.1.1.1.1.1
3	3.1	3.1.1	3.1.1.1	3.1.1.1.1	3.1.1.1.1.1	3.1.1.1.1.1.1	3.1.1.1.1.1.1.1
4	4.1	4.1.1	4.1.1.1	4.1.1.1.1	4.1.1.1.1.1	4.1.1.1.1.1.1	4.1.1.1.1.1.1.1
5	5.1	5.1.1	5.1.1.1	5.1.1.1.1	5.1.1.1.1.1	5.1.1.1.1.1.1	5.1.1.1.1.1.1.1
6	6.1	6.1.1	6.1.1.1	6.1.1.1.1	6.1.1.1.1.1	6.1.1.1.1.1.1	6.1.1.1.1.1.1.1
7	7.1	7.1.1	7.1.1.1	7.1.1.1.1	7.1.1.1.1.1	7.1.1.1.1.1.1	7.1.1.1.1.1.1.1
8	8.1	8.1.1	8.1.1.1	8.1.1.1.1	8.1.1.1.1.1	8.1.1.1.1.1.1	8.1.1.1.1.1.1.1
9	9.1	9.1.1	9.1.1.1	9.1.1.1.1	9.1.1.1.1.1	9.1.1.1.1.1.1	9.1.1.1.1.1.1.1
10	10.1	10.1.1	10.1.1.1	10.1.1.1.1	10.1.1.1.1.1	10.1.1.1.1.1.1	10.1.1.1.1.1.1.1
11	11.1	11.1.1	11.1.1.1	11.1.1.1.1	11.1.1.1.1.1	11.1.1.1.1.1.1	11.1.1.1.1.1.1.1
12	12.1	12.1.1	12.1.1.1	12.1.1.1.1	12.1.1.1.1.1	12.1.1.1.1.1.1	12.1.1.1.1.1.1.1
13	13.1	13.1.1	13.1.1.1	13.1.1.1.1	13.1.1.1.1.1	13.1.1.1.1.1.1	13.1.1.1.1.1.1.1
14	14.1	14.1.1	14.1.1.1	14.1.1.1.1	14.1.1.1.1.1	14.1.1.1.1.1.1	14.1.1.1.1.1.1.1
15	15.1	15.1.1	15.1.1.1	15.1.1.1.1	15.1.1.1.1.1	15.1.1.1.1.1.1	15.1.1.1.1.1.1.1
16	16.1	16.1.1	16.1.1.1	16.1.1.1.1	16.1.1.1.1.1	16.1.1.1.1.1.1	16.1.1.1.1.1.1.1
17	17.1	17.1.1	17.1.1.1	17.1.1.1.1	17.1.1.1.1.1	17.1.1.1.1.1.1	17.1.1.1.1.1.1.1
18	18.1	18.1.1	18.1.1.1	18.1.1.1.1	18.1.1.1.1.1	18.1.1.1.1.1.1	18.1.1.1.1.1.1.1
19	19.1	19.1.1	19.1.1.1	19.1.1.1.1	19.1.1.1.1.1	19.1.1.1.1.1.1	19.1.1.1.1.1.1.1
20	20.1	20.1.1	20.1.1.1	20.1.1.1.1	20.1.1.1.1.1	20.1.1.1.1.1.1	20.1.1.1.1.1.1.1
21	21.1	21.1.1	21.1.1.1	21.1.1.1.1	21.1.1.1.1.1	21.1.1.1.1.1.1	21.1.1.1.1.1.1.1
22	22.1	22.1.1	22.1.1.1	22.1.1.1.1	22.1.1.1.1.1	22.1.1.1.1.1.1	22.1.1.1.1.1.1.1
23	23.1	23.1.1	23.1.1.1	23.1.1.1.1	23.1.1.1.1.1	23.1.1.1.1.1.1	23.1.1.1.1.1.1.1
24	24.1	24.1.1	24.1.1.1	24.1.1.1.1	24.1.1.1.1.1	24.1.1.1.1.1.1	24.1.1.1.1.1.1.1
25	25.1	25.1.1	25.1.1.1	25.1.1.1.1	25.1.1.1.1.1	25.1.1.1.1.1.1	25.1.1.1.1.1.1.1
26	26.1	26.1.1	26.1.1.1	26.1.1.1.1	26.1.1.1.1.1	26.1.1.1.1.1.1	26.1.1.1.1.1.1.1
27	27.1	27.1.1	27.1.1.1	27.1.1.1.1	27.1.1.1.1.1	27.1.1.1.1.1.1	27.1.1.1.1.1.1.1
28	28.1	28.1.1	28.1.1.1	28.1.1.1.1	28.1.1.1.1.1	28.1.1.1.1.1.1	28.1.1.1.1.1.1.1
29	29.1	29.1.1	29.1.1.1	29.1.1.1.1	29.1.1.1.1.1	29.1.1.1.1.1.1	29.1.1.1.1.1.1.1
30	30.1	30.1.1	30.1.1.1	30.1.1.1.1	30.1.1.1.1.1	30.1.1.1.1.1.1	30.1.1.1.1.1.1.1
31	31.1	31.1.1	31.1.1.1	31.1.1.1.1	31.1.1.1.1.1	31.1.1.1.1.1.1	31.1.1.1.1.1.1.1
32	32.1	32.1.1	32.1.1.1	32.1.1.1.1	32.1.1.1.1.1	32.1.1.1.1.1.1	32.1.1.1.1.1.1.1

PE 0603502N / Surface & Shallow Water  
MCM

Project (Number/Name)	Start Date	End Date	Duration (Days)	Project Manager	Status	Notes
101	2023-01-01	2023-01-15	15	John Doe	Completed	Project completed successfully.
102	2023-01-16	2023-02-01	16	Jane Smith	In Progress	Project is currently in progress.
103	2023-02-02	2023-02-15	14	John Doe	Completed	Project completed successfully.
104	2023-02-16	2023-03-01	15	Jane Smith	In Progress	Project is currently in progress.
105	2023-03-02	2023-03-15	14	John Doe	Completed	Project completed successfully.
106	2023-03-16	2023-03-31	15	Jane Smith	In Progress	Project is currently in progress.
107	2023-04-01	2023-04-15	15	John Doe	Completed	Project completed successfully.
108	2023-04-16	2023-05-01	16	Jane Smith	In Progress	Project is currently in progress.
109	2023-05-02	2023-05-15	14	John Doe	Completed	Project completed successfully.
110	2023-05-16	2023-05-31	15	Jane Smith	In Progress	Project is currently in progress.

1233 / Surface MCM Mid-life Upgrade

[illegible]

2019PB - 0603502N - 1233

**UNCLASSIFIED**

PE 0603502N: *Surface & Shallow Water MCM*  
Navy

R-1 Line #37

<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water</i> <i>MCM</i>
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<b>Project (Number/Name)</b>	1233 / Surface MCM Mid-life Upgrade
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2019PB - 0603502N - 1233

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 1233 / <i>Surface MCM Mid-life Upgrade</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>HFWB</i></b>				
Schedule Detail	1	2019	1	2019
System Development: P3I: P3I Development	1	2017	4	2017
Deliveries: Installation: Installation	1	2017	4	2017
<b><i>SSQ-94 Trainer</i></b>				
System Development: Engineering and Manufacturing Development: Engineering and Manufacturing Development	1	2017	4	2017
Test and Evaluation: T&E: T&E	1	2017	4	2017
Production Milestones: Install: Build 1 Installs	1	2017	4	2017
Production Milestones: Install: Build 2/3 Installs	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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)			
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
1234: Unmanned Surface Vehicle (USV)	46.221	42.069	23.594	28.645	-	28.645	19.915	19.167	18.993	19.404	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

## Note

The FY 2019 funding request was reduced by \$4.600 million to account for the availability of prior year execution balances.

## A. Mission Description and Budget Item Justification

This project provides resources for development, improvement and integration of Unmanned Surface Vehicle (USV) Mine Countermeasure systems. A description of the major planned programs include the following:

1) The Unmanned Influence Sweep System (UISS) utilizes an Unmanned Surface Vehicle (USV) integrated with an Unmanned Surface Sweep System (US3), a magnetic/acoustic sweep system developed to sweep acoustic/magnetic influence mines, which can be deployed from the Littoral Combat Ship (LCS) or a Vessel of Opportunity (VOO);

2) MineHunting USVs (MHUs) were delivered in FY14 to 5th Fleet in response to an Urgent Operational Need (UON) from Naval Forces Central Command concerning Mine Countermeasure (MCM) capacity and capability gaps. Four systems (referred to as MHUs 1-4) were provided to Combined Task Force (CTF) 52 to conduct Minehunting Operations.

Each MHU consists of a USMI Naval Special Warfare (NSW) 11-meter Rigid Hull Inflatable Boat (RHIB), which was converted to an Unmanned Surface Vessel by Naval Undersea Warfare Center Division Newport, and tows a Northrop Grumman AQS-24B Minehunting sonar. The systems are controlled from a Command and Control (C2) container located on either an underway host platform or on pier-side. MHUs 1-4 are currently in sustainment and will support CTF52 until MCM Mission Packages are deployed to C5F AOR. In FY16-17, Speed to Fleet (S2F) funding supported the design and fabrication of an additional minehunting asset (referred to as "MHU 5") based on the MCM USV craft and integrating the AQS-24B. Beyond FY17, all future efforts with MHU 5 will be within the MCM USV with Payloads program.

3) The Mine Countermeasures Unmanned Surface Vehicle (MCM USV)[previous term CUSV] with Payloads program leverages the USV from the UISS Program of Record and adds a modular mission capability through the addition of multiple payloads. MCM USV w/AQS-20C integrates the existing AQS-20C mine-hunting sonar. MCM USV w/AQS-24B continues the Minehunting efforts of MHU 5. In FY19 the MCM USV with Payloads program will begin initial design efforts to support integration with a Mine Neutralization capability (Barracuda). Minesweeping payloads will be subsumed by the MCM USV with Payloads PoR upon the completion of UISS LRIPs.

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

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> UISS Product Development	9.355	0.700	1.000	0.000	1.000
<b>Articles:</b>	-	-	-	-	-



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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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<b>FY 2018 Plans:</b> Support completion of CT, UISS DT and Operational Assessment (OA) in support of Milestone C in 4QFY2018. During DT, identify any design changes that are needed in support of follow on production efforts. Complete the UISS EDM Technical Data Package (TDP) after completion of UISS EDM Developmental Testing (DT) and Operational Assessment (OA). Evaluate tech refresh product improvements.								
<b>FY 2019 Base Plans:</b> Develop ECPs for EDM and LRIP units. Conduct system engineering efforts in support of program and test efforts.								
<b>FY 2019 OCO Plans:</b> N/A								
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding increase to support ECPs.								
<b>Title:</b> UISS Support				1.790	0.500	1.250	0.000	1.250
<b>Articles:</b>				-	-	-	-	-
<b>FY 2018 Plans:</b> Engineering, management, and integrated logistics support for Technical Data Package (TDP),conduct Functional Configuration Audit (FCA), and Production Readiness Review (PRR). Support a Milestone C decision in 4Q FY 2018, preparations for IOC in FY19, and start of the development of proposal for Full Rate Production (FRP).								
<b>FY 2019 Base Plans:</b> Engineering, management and logistics support for IOC in 4QFY19, preps for IOT&E and ongoing LRIP efforts. Continue development of FRP documentation to release RFP in late FY19.								
<b>FY 2019 OCO Plans:</b> N/A								
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> FY 2019 funding increase to support IOT&E.								
<b>Title:</b> UISS Test and Evaluation				1.781	0.974	1.625	0.000	1.625
<b>Articles:</b>				-	-	-	-	-

**UNCLASSIFIED**

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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
<b>FY 2018 Plans:</b> Complete DT and conduct Operational Assessment (OA) of UISS EDM. Conduct LCS integration efforts for risk reduction and system verification (provided LCS ship schedule supports) in preparation for OA.								
<b>FY 2019 Base Plans:</b> Conduct UISS system level IOT&E in support of FRP decision planned for FY20.								
<b>FY 2019 OCO Plans:</b> N/A								
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding increase for IOT&E.								
<b>Title:</b> UISS Management				0.355	0.120	0.131	0.000	0.131
<b>Articles:</b>				-	-	-	-	-
<b>FY 2018 Plans:</b> Oversee ongoing contractor efforts. Manage efforts to get to Milestone C decision in 4Q FY 2018, start preparations for IOC in FY19, and start of the development of proposal for Full Rate Production (FRP)). Manage award of FY18 Low Rate Initial Production (LRIP) option.								
<b>FY 2019 Base Plans:</b> Oversee ongoing contractor efforts. Manage FRP RFP release and proposal evaluation.								
<b>FY 2019 OCO Plans:</b> N/A								
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding increase to support IOT&E.								
<b>Title:</b> MHU Product Development				8.186	0.000	0.000	0.000	0.000
<b>Articles:</b>				-	-	-	-	-
<b>FY 2018 Plans:</b> N/A								
<b>FY 2019 Base Plans:</b>								

## UNCLASSIFIED

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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A								
FY 2019 OCO Plans: N/A								
Title: MHU Support				1.414	0.300	0.900	0.000	0.900
Articles:				-	-	-	-	-
FY 2018 Plans: Provide program management, engineering and logistics support for product improvements to forward-deployed MHU 1-4 USVs and Command and Control (C2) Station. Tasking will maintain Cybersecurity compliance of system via a software baseline update developed and installed on fielded USVs and C2 container.								
FY 2019 Base Plans: Provide program management, engineering and logistics support for product improvements to forward-deployed MHU 1-4 USVs and Command and Control (C2) Station. Tasking will produce ECPs to implement increased capabilities to meet MCMRON-5 needs during MHU Overhaul, as well as maintain Cybersecurity compliance of system via a software baseline update developed and installed on fielded USVs and C2 container.								
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: Increase due to ECP development								
Title: MCM USV w/ Payloads Product Development				14.900	16.900	15.039	0.000	15.039
Articles:				-	-	-	-	-
FY 2018 Plans: Complete fabrication of MCM USV crafts and associated sonar D&R systems. Begin system level integration of initial MCM USV w/AQS-20C minehunting sonar. Begin system level integration of initial MCM USV w/AQS-24B minehunting sonar (previously MHU 5). Complete initial design & software development efforts for craft and payload integration, command & control, and operations. Complete fabrication of sonar Deploy and Retrieve systems for MCM USV. Conduct initial system level testing. Prepare to conduct User Operational Evaluation System (UOES) Employment.								
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 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Complete integration of an AQS-20C and AQS-24B with the MCM USV. Deliver MCM USVs (2) w/AQS-20C and AQS-24B to Fleet to begin evaluation of the system as a Minehunting capability within the MCM MP from LCS. Demonstrate system capability from LCS and/or shore operations through User Evaluated Operational System (UOES) Employment. Prepare and support design changes for initial Navy Developmental Testing (DT). Conduct efforts in preparation for start of MCM USV Full Rate Production (FRP) in FY20. Finalize technical data packages for MCM USV and sonar deploy and retrieve systems. Conduct technical feasibility studies, trade study analysis, tactics development, requirements definition and USV impact studies for Mine Neutralization integration with MCM USV. Construct Architecture Framework products, industry requests for information and develop procurement strategy for Mine Neutralization launcher.  <b>FY 2019 OCO Plans:</b> N/A  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Decrease due to transition from fabrication of MCM Craft to integration of sonars with the MCM craft.						
Title: MCM USV w/ Payloads Support  <b>Articles:</b>		4.288 -	3.600 -	4.100 -	0.000 -	4.100 -
FY 2018 Plans: Continue program management, engineering and technical support for efforts. Provide program management, engineering, logistics, and technical support for system level testing and integration. Review UISS logistics documentation and perform gap analysis to identify changes to logistics documents in order to support MCM USV and Payload integration.						
FY 2019 Base Plans: Continue program management, engineering and technical support for efforts. Support testing and assessment of system capabilities to determine Military utility. Support efforts for FRP preparations. Continue to update MCM USV with payloads logistics documentation and implement changes required to support UOES Employment and MCM MP IOT&E. Procure initial spares for test events. Funding increase due to adding Neutralization efforts.						
FY 2019 OCO Plans: N/A  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b>						

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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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Increase due to additional support for the UOES Employment						
Title: MCM USV w/ Payloads Test and Evaluation		0.000	0.250	4.350	0.000	4.350
Articles:		-	-	-	-	-
FY 2018 Plans:						
Complete contractor initial integration testing of MCM USV w/AQS-24B and MCM USV w/AQS-20C.						
FY 2019 Base Plans:						
Conduct a UOES test period (for Q-20C and Q-24B) and a Development Testing and Operational Assessment period for the MCM USV w/ AQS-20C sonar in preparation for future MCM MP IOT&E and production decisions.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						
Increase from FY 2018 to FY 2019 funding for Development Testing and Operational Assessment (DT/OA)in FY19.						
Title: MCM USV w/ Payloads Management		0.000	0.250	0.250	0.000	0.250
Articles:		-	-	-	-	-
FY 2018 Plans:						
Provide program planning, management and acquisition document updates for the MCM USV w/Payloads program.						
FY 2019 Base Plans:						
Provide program planning, management and acquisition document updates for the MCM USV w/Payloads program.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						
No Change						
Accomplishments/Planned Programs Subtotals		42.069	23.594	28.645	0.000	28.645

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)			
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
			<u>FY 2019</u>	<u>FY 2019</u>	<u>FY 2019</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Complete</u>	<u>Total Cost</u>
• 0603596N: LCS Mission Modules	3.300	3.900	5.000	-	5.000	1.800	0.000	0.000	0.000	0.000	64.129
• OPN/1601: LCS	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,421.551	2,691.282
MCM Mission Modules											
<b>Remarks</b>											
0603596N RDT&E Funding shown only reflects funding for required UISS development efforts.											
OPN/1601 - The above funding line accounts for several programs, of which the Unmanned Surface Vehicle programs are only a portion.											
<b>D. Acquisition Strategy</b>											
UISS - Requirements are documented in the Unmanned Influence Sweep System (UISS) Capability Development Document (CDD) and now have been updated, as needed, in the UISS Capability Production Document (CPD). An Engineering and Manufacturing Development (E&MD) contract was awarded in FY14 with a planned option for Low Rate Initial Production (LRIP) in FY 2018.											
<b>E. Performance Metrics</b>											
UISS - Successfully reach Milestone C in FY 2018											

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)					
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
UISS: Product Development	C/CPIF	Textron Systems, Inc : Hunt Valley, MD	20.538	9.355	Dec 2016	0.700	Jan 2018	1.000	Jan 2019	-		1.000	Continuing	Continuing	Continuing
MHU: Product Development	SS/CPFF	APL JHU : Laurel, MD	12.015	0.200	Jun 2017	0.000		0.000		-		0.000	0.000	12.215	-
MHU: Product Development	C/FPIF	Textron Systems, Inc : Hunt Valley, MD	0.000	7.545	Mar 2017	0.000		0.000		-		0.000	0.000	7.545	-
MHU: Product Development	WR	NSWC PC : Panama City, FL	0.761	0.161	Dec 2016	0.000		0.000		-		0.000	0.000	0.922	-
MHU: Product Development	WR	NUWC N : Newport, RI	0.490	0.250	Dec 2016	0.000		0.000		-		0.000	0.000	0.740	-
MHU: Product Development	WR	NSWC CD : Bethesda, MD	0.205	0.030	Dec 2016	0.000		0.000		-		0.000	0.000	0.235	-
MHU: Product Development	WR	Various : Various	0.570	0.000		0.000		0.000		-		0.000	0.000	0.570	-
MCM USV: Product Development	C/FPIF	Textron Systems, Inc : Hunt Valley, MD	0.000	9.040	Jan 2017	7.900	Jan 2018	3.339	Jan 2019	-		3.339	Continuing	Continuing	Continuing
MCM USV: Product Development1	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.000		0.000		3.100	Jan 2019	-		3.100	Continuing	Continuing	Continuing
MCM USV: Product Development	SS/CPFF	Raytheon : Portsmouth, RI	0.000	3.185	Jun 2017	3.500	Feb 2018	1.975	Feb 2019	-		1.975	Continuing	Continuing	Continuing
MCM USV: Product Development	SS/CPFF	APL JHU : Laurel, MD	0.000	0.000		0.000		0.750	Feb 2019	-		0.750	Continuing	Continuing	Continuing
MCM USV: Product Development	WR	NSWC PC : Panama City, FL	0.000	0.925	Jan 2017	3.200	Jan 2018	1.500	Jan 2019	-		1.500	Continuing	Continuing	Continuing
MCM USV: Product Development	WR	NUWC N : Newport, RI	0.000	0.770	Jan 2017	0.800	Jan 2018	0.725	Jan 2019	-		0.725	Continuing	Continuing	Continuing
MCM USV: Product Development	WR	NSWC, CD : Bethesda, MD	0.000	0.980	Jun 2017	1.500	Jan 2018	0.950	Jan 2019	-		0.950	Continuing	Continuing	Continuing
MCM USV: Product Development	C/CPIF	TBD : TBD	0.000	0.000		0.000		2.700	Apr 2019	-		2.700	0.000	2.700	-
MCM USV: Product Development	Various	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b>												<b>Date: February 2018</b>			
<b>Appropriation/Budget Activity</b> 1319 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603502N / Surface & Shallow Water MCM						<b>Project (Number/Name)</b> 1234 / Unmanned Surface Vehicle (USV)			
<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Subtotal</b>			34.579	32.441		17.600		16.039		-		16.039	Continuing	Continuing	N/A
<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
UISS: Engineering Support	WR	NUWC, N : Newport, RI	0.350	0.250	Dec 2016	0.100	Dec 2017	0.250	Dec 2018	-		0.250	Continuing	Continuing	Continuing
UISS: Engineering Support	WR	NSWC, PC : Panama City, FL	1.689	0.400	Dec 2016	0.100	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
UISS: Engineering Support	WR	NSWC, CD : Bethesda, MD	1.711	0.100	Dec 2016	0.000		0.100	Dec 2018	-		0.100	Continuing	Continuing	Continuing
UISS: Engineering Support	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.670	0.500	Dec 2016	0.100	Jan 2018	0.100	Jan 2019	-		0.100	Continuing	Continuing	Continuing
UISS: Integrated Logistics	WR	NSWC, PC : Panama City, FL	0.290	0.200	Dec 2016	0.050	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
UISS: Integrated Logistics	WR	NSWC, CD : Bethesda, MD	0.611	0.140	Dec 2016	0.050	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
UISS: Integrated Logistics	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.728	0.200	Dec 2016	0.100	Dec 2017	0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
MHU: Engineering Support	WR	SSC, PAC : San Diego, CA	0.260	0.050	Dec 2016	0.030	Dec 2017	0.030	Dec 2018	-		0.030	Continuing	Continuing	Continuing
MHU: Engineering Support	WR	NSWC, PC : Panama City, FL	0.360	0.457	Dec 2016	0.120	Feb 2018	0.840	Feb 2019	-		0.840	Continuing	Continuing	Continuing
MHU: Engineering Support	WR	NUWC, N : Newport, RI	0.260	0.477	Dec 2016	0.120	Mar 2018	0.000		-		0.000	0.000	0.857	-
MHU: Engineering Support	WR	NSWC, CD : Bethesda, MD	0.160	0.090	Dec 2016	0.030	Dec 2017	0.030	Dec 2018	-		0.030	Continuing	Continuing	Continuing
MHU: Engineering Support	WR	Various : Various	0.180	0.340	Dec 2016	0.000		0.000		-		0.000	0.000	0.520	-
MCM USV: Engineering Support	WR	NSWC, PC : Panama City, FL	0.000	2.458	Jan 2017	1.400	Jan 2018	1.400	Jan 2019	-		1.400	Continuing	Continuing	Continuing



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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)					
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
MCM USV: Engineering Support	WR	NUWC, N : Newport, RI	0.000	1.830	Jan 2017	1.200	Jan 2018	0.800	Jan 2019	-		0.800	Continuing	Continuing	Continuing
MCM USV: Engineering Support	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.000		0.500	Jan 2018	0.215	Jan 2019	-		0.215	Continuing	Continuing	Continuing
MCM USV: Integrated Logistics	SS/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		0.400	Jan 2019	-		0.400	Continuing	Continuing	Continuing
MCM USV: Integrated Logistics	SS/CPFF	Northrup Grumman : Annapolis, MD	0.000	0.000		0.000		0.300	Mar 2019	-		0.300	Continuing	Continuing	Continuing
MCM USV: Integrated Logistics	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.000		0.500	Jan 2018	0.985	Feb 2019	-		0.985	Continuing	Continuing	Continuing
Subtotal			7.269	7.492		4.400		6.250		-		6.250	Continuing	Continuing	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
UISS: Test and Evaluation	WR	NSWC, PC : Panama City, FL	0.430	0.600	Dec 2016	0.200	Dec 2017	1.050	Dec 2018	-		1.050	Continuing	Continuing	Continuing
UISS: Test and Evaluation	WR	NSWC, CD : Bethesda, MD	0.650	0.681	Dec 2016	0.500	Dec 2017	0.400	Dec 2018	-		0.400	Continuing	Continuing	Continuing
UISS: Test and Evaluation	C/CPIF	Textron Systems, Inc : Hunt Valley, MD	1.209	0.500	Dec 2016	0.274	Dec 2017	0.175	Dec 2018	-		0.175	Continuing	Continuing	Continuing
MCM USV: Test and Evaluation	WR	NSWC, PC : Panama City, FL	0.000	0.000		0.150	Jun 2018	2.200	Mar 2019	-		2.200	Continuing	Continuing	Continuing
MCM USV: Test and Evaluation	WR	NSWC, CD : Bethesda, MD	0.000	0.000		0.100	Jun 2018	0.250	Mar 2019	-		0.250	Continuing	Continuing	Continuing
MCM USV: Test and Evaluation	SS/CPFF	Raytheon : Portsmouth, RI	0.000	0.000		0.000		0.400	Mar 2019	-		0.400	Continuing	Continuing	Continuing
MCM USV: Test and Evaluation	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.000		0.000		1.500	Mar 2019	-		1.500	0.000	1.500	-
Need Item Text	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b>													<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 1319 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603502N / Surface & Shallow Water MCM						<b>Project (Number/Name)</b> 1234 / Unmanned Surface Vehicle (USV)			
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Subtotal</b>			2.289	1.781		1.224		5.975		-		5.975	Continuing	Continuing	N/A
<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
UISS: Travel	WR	NAVSEA : Washington, DC	0.200	0.075	Jun 2017	0.020	Jan 2018	0.020	Jan 2019	-		0.020	Continuing	Continuing	Continuing
UISS: Management	C/CPAF	TBD : TBD	1.884	0.280	Dec 2016	0.100	Nov 2017	0.111	Nov 2018	-		0.111	Continuing	Continuing	Continuing
MCM USV: Travel	WR	NAVSEA : Washington, DC	0.000	0.000		0.100	Jan 2018	0.100	Jan 2019	-		0.100	Continuing	Continuing	Continuing
MCM USV: Management	C/CPAF	TBD : TBD	0.000	0.000		0.150	Nov 2017	0.150	Nov 2018	-		0.150	Continuing	Continuing	Continuing
<b>Subtotal</b>			2.084	0.355		0.370		0.381		-		0.381	Continuing	Continuing	N/A
			<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			46.221	42.069		23.594		28.645		-		28.645	Continuing	Continuing	N/A
<b>Remarks</b>															

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

Date: February 2018

Appropriation/Budget Activity

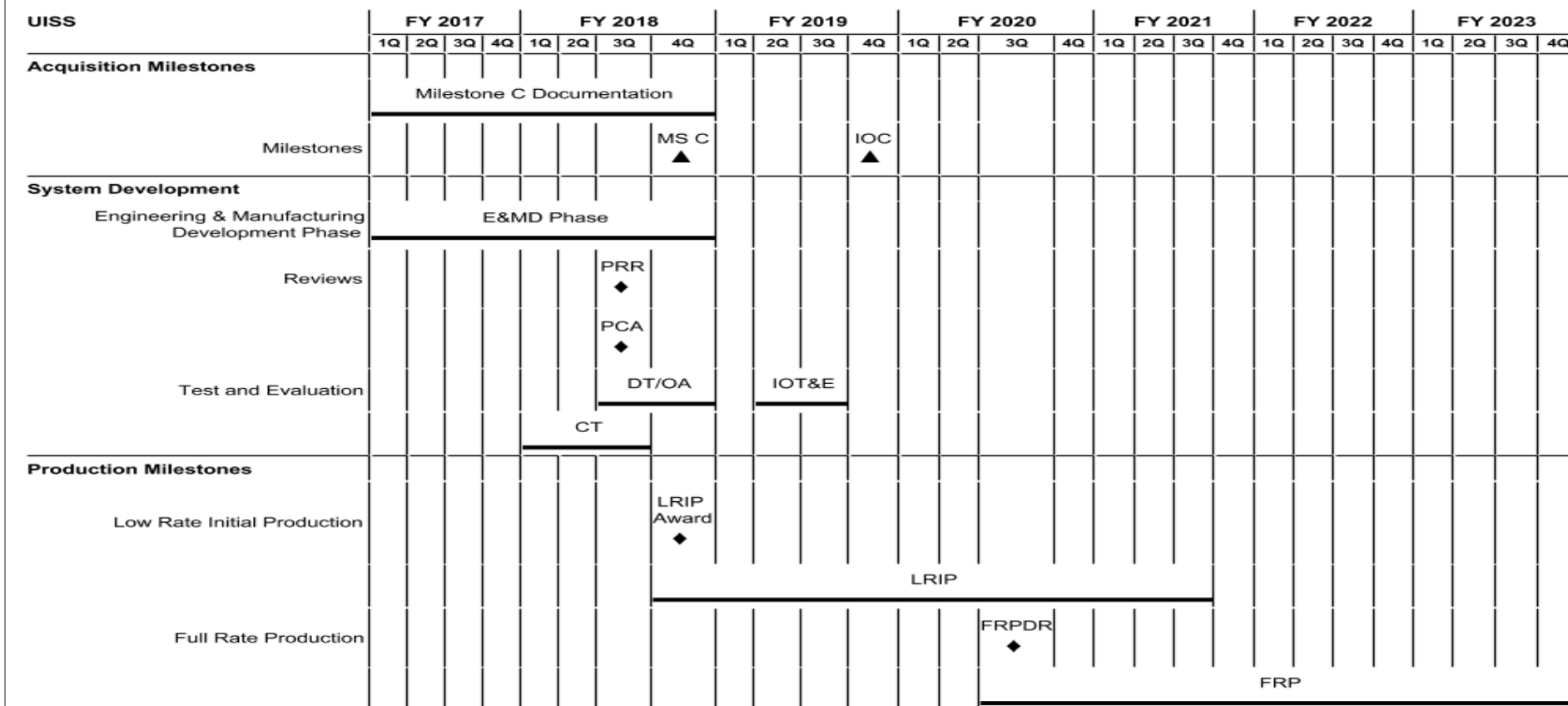
1319 / 4

R-1 Program Element (Number/Name)

PE 0603502N / Surface & Shallow Water  
MCM

Project (Number/Name)

1234 / Unmanned Surface Vehicle (USV)



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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)												
Mine Hunting USV (MHU)	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
System Development																												
MHU 1-4 Sonar Upgrade																												
Identify Cybersecurity Vulnerabilites																												
Design/Implement Vulnerabilities ECPs																												
Install Cybersecurity Updates																												
Design/Implement Cyber Updates ECP 1																												
Install ECPs and Cybersecurity Updates 1																												
Design/Implement Cyber Updates ECP 2																												
Install ECPs and Cybersecurity Updates 2																												
Design/Implement Cyber Updates ECP 3																												
Install ECPs and Cybersecurity Updates 3																												
Design/Implement Cyber Updates ECP 4																												
Install ECPs and Cybersecurity Updates 4																												
2019PB - 0603502N - 1234																												

2019PB - 0603502N - 1234

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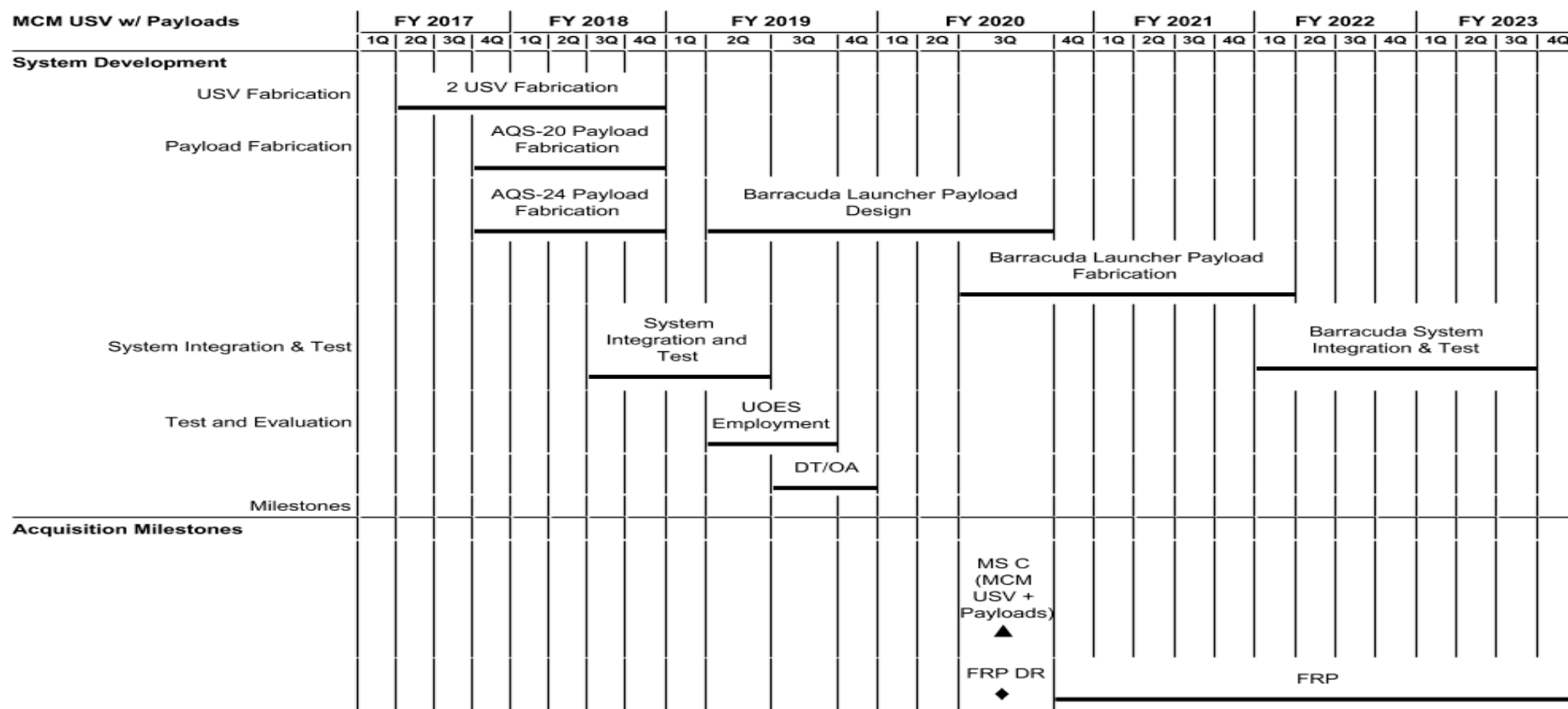
PE 0603502N: *Surface & Shallow Water MCM*  
Navy

Date: February 2018

Appropriation/Budget Activity	1319 / 4
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**R-1 Program Element (Number/Name)**  
PE 0603502N / *Surface & Shallow Water*  
*MCM*

<b>Project (Number/Name)</b>	1234 / Unmanned Surface Vehicle (USV)
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2019PB - 0603502N - 1234

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 1234 / <i>Unmanned Surface Vehicle (USV)</i>	

**Schedule Details**

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>UISS</i></b>				
Acquisition Milestones: Milestone C Documentation	1	2017	4	2018
Acquisition Milestones: Milestones: Milestone C	4	2018	4	2018
Acquisition Milestones: Milestones: Initial Operational Capability	4	2019	4	2019
System Development: Engineering & Manufacturing Development Phase: Engineering & Manufacturing Development Phase	1	2017	4	2018
System Development: Reviews: Production Readiness Review (PRR)	3	2018	3	2018
System Development: Reviews: Physical Configuration Audit (PCA)	3	2018	3	2018
System Development: Test and Evaluation: DT Testing	3	2018	4	2018
System Development: Test and Evaluation: Initial Operational Test & Evaluation	2	2019	3	2019
System Development: Test and Evaluation: Contractor Testing	1	2018	3	2018
Production Milestones: Low Rate Initial Production: LRIP Contract Award	4	2018	4	2018
Production Milestones: Low Rate Initial Production: LRIP phase	4	2018	3	2021
Production Milestones: Full Rate Production: Full Rate Production Decision Review	3	2020	3	2020
Production Milestones: Full Rate Production: Full Rate Production	3	2020	4	2023
<b><i>Mine Hunting USV (MHU)</i></b>				
System Development: MHU 1-4 Sonar Upgrade:	1	2017	2	2017
System Development: Identify Cybersecurity Vulnerabilites:	4	2017	4	2017
System Development: Design/Implement Vulnerabilities ECPs:	1	2018	3	2018
System Development: Install Cybersecurity Updates:	4	2018	4	2018
System Development: Design/Implement Cyber Updates ECP 1:	1	2019	3	2019
System Development: Install ECPs and Cybersecurity Updates 1:	4	2019	4	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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 1234 / Unmanned Surface Vehicle (USV)	
		Start		End	
Events by Sub Project		Quarter	Year	Quarter	Year
System Development: Design/Implement Cyber Updates ECP 2:		1	2020	3	2020
System Development: Install ECPs and Cybersecurity Updates 2:		4	2020	4	2020
System Development: Design/Implement Cyber Updates ECP 3:		1	2021	3	2021
System Development: Install ECPs and Cybersecurity Updates 3:		4	2021	4	2021
System Development: Design/Implement Cyber Updates ECP 4:		1	2022	3	2022
System Development: Install ECPs and Cybersecurity Updates 4:		4	2022	4	2022
MCM USV w/ Payloads					
System Development: USV Fabrication: 2 USV Fabrication		2	2017	4	2018
System Development: Payload Fabrication: AQS-20 Payload Fabrication		4	2017	4	2018
System Development: Payload Fabrication: AQS-24 Payload Fabrication		4	2017	4	2018
System Development: Payload Fabrication: Barracuda Launcher Payload Design		2	2019	3	2020
System Development: Payload Fabrication: Barracuda Launcher Payload Fabrication		3	2020	1	2022
System Development: System Integration & Test: System Integration and Test		3	2018	2	2019
System Development: System Integration & Test: Barracuda System Integration & Test		1	2022	3	2023
System Development: Test and Evaluation: UOES Employment		2	2019	3	2019
System Development: Test and Evaluation: Development Test/Operational Assessment		3	2019	4	2019
Acquisition Milestones: Milestone C (MCM USV + Payloads)		3	2020	3	2020
Acquisition Milestones: Full Rate Production Decision Review		3	2020	3	2020
Acquisition Milestones: Full Rate Production		4	2020	4	2023

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 1235 / Mine Warfare Planning and Analysis			
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
1235: Mine Warfare Planning and Analysis	7.520	8.664	3.139	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.323
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Note FY 2019 and future funding for Project 1235 is in Program Element (PE) 0604127N. Project realigned from PE 0603502N starting in FY 2019.												
A. Mission Description and Budget Item Justification Mine Warfare and Environmental Decision Aids Library (MEDAL) is a software segment on the Global Command and Control System - Maritime (GCCS-M). MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: MEDAL Product Development  Articles:  FY 2018 Plans: MINEnet Tactical v1.3 development to include Minefield Planning and JABS initial capabilities and COBRA updates. Update MEDAL EA course curriculum for MINEnet Tactical 1.3.  FY 2019 Base Plans: Funding has been realigned to PE 0604127N.  FY 2019 OCO Plans: N/A  FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604127N.								4.114	1.433	0.000	0.000	0.000
								-	-	-	-	-
Title: MEDAL Support  Articles:  FY 2018 Plans: Initiate the development of MEDAL EA MINEnet Tactical v1.3 with reduced set of capability upgrades. Provide technical integration of developed algorithms and models that have demonstrated their effectiveness with respect to their objectives. Support efforts to include communication with activities such as applied labs,								2.945	0.423	0.000	0.000	0.000
								-	-	-	-	-



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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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 1235 / Mine Warfare Planning and Analysis				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
government activities, and designated contractors. Assist in providing the speed, agility, adaptability, and flexibility required for modern MCM operations. Begin fielding MINEnet Tactical v1.2.2								
FY 2019 Base Plans: Funding has been realigned to PE 0604127N.								
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604127N.								
Title: MEDAL Test and Evaluation				0.897	0.675	0.000	0.000	0.000
Articles:				-	-	-	-	-
FY 2018 Plans: MEDAL EA v1.2.2 - Conduct series of Development Tests (DTs) and a series of regression tests. Continue System Development testing activities with multiple platforms including LCS MCM MPAS, ISNS, CANES and ONENET integration tests. Continue Cybersecurity patching and assessments. Deliver to Fleet in accordance with the MEDAL EA Fielding Plan.								
FY 2019 Base Plans: Funding has been realigned to PE 0604127N.								
FY 2019 OCO Plans: N/A								
FY 2018 to FY 2019 Increase/Decrease Statement: Funding has been realigned to PE 0604127N.								
Title: MEDAL Management				0.708	0.608	0.000	0.000	0.000
Articles:				-	-	-	-	-
FY 2018 Plans: Continue to provide program management support and travel for MEDAL program. Program management shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. As part of the systems engineering element of PM, communicate and coordinate with MIW C4ISR, ICWS, Organic MCM, Mainstreaming MIEW, Expeditionary Warfare C4ISR, tactics development,								

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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 0603502N / Surface & Shallow Water MCM			Project (Number/Name) 1235 / Mine Warfare Planning and Analysis				
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>							<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<p>long term planning, Naval Special Clearance Team (NSCT-1) Assault Breaching System (ABS), LCS, and other programs as they relate to MEDAL and MIW Mission Planning, Evaluation, and C4ISR. Other PM tasking to include briefings, demonstrations, and project planning as required.</p> <p><b>FY 2019 Base Plans:</b> Funding has been realigned to PE 0604127N.</p> <p><b>FY 2019 OCO Plans:</b> N/A</p> <p><b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding has been realigned to PE 0604127N.</p>											
<b>Accomplishments/Planned Programs Subtotals</b>							8.664	3.139	0.000	0.000	0.000
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 2622/LV075: Mine Sweeping Replacement (MEDAL).	2.358	3.585	1.111	-	1.111	0.799	0.889	0.891	0.900	0.000	16.356
<b>Remarks</b>											
<b>D. Acquisition Strategy</b>											
<p>Mine Warfare and Environmental Decision Aids Library (MEDAL) - requirements for MEDAL Builds are generated through a formal requirements process. Requirements conferences gather a list of candidate functions based on a logical sequence to fully implement the overall software architecture. The fleet is presented with a recommended list of candidate capabilities based on this program plan, doctrine, fleet comments, and technology. These capability items are then prioritized by the fleet representatives (coordinated by Naval Surface and Mine War-fighting Development Center (SMWDC). The fleet inputs are then consolidated by COMINELWARCOM into an overall list which is then presented to Navy leadership for pricing and final selection. The selection is based on price, risk, available funding, and possibly by other program factors (e.g., ensure that MEDAL supports other program delivery schedules). Selection balances immediate needs, long term objectives, technical maturity and other programmatic factors. A verification and validation process is applied to any algorithms, tactics, or models to be incorporated in the software.</p>											
<b>E. Performance Metrics</b>											
<p>Mine Warfare and Environmental Decision Aids Library (MEDAL) development to include integration of data fusion techniques and incorporation of Data Access Layer (DAL) architecture to meet FORCENet requirements.</p>											

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b>													<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 1319 / 4							<b>R-1 Program Element (Number/Name)</b> PE 0603502N / Surface & Shallow Water MCM				<b>Project (Number/Name)</b> 1235 / Mine Warfare Planning and Analysis				

<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
MEDAL EA	C/CPAF	SAIC : McLean, VA	4.464	4.114	Oct 2016	1.433	Oct 2017	0.000		-		0.000	0.000	10.011	-
<b>Subtotal</b>			4.464	4.114		1.433		0.000		-		0.000	0.000	10.011	N/A

**Remarks**  
FY 2019 and future funding realigned to PE 0604127N.

<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
MEDAL EA	WR	NSWC PC : Panama City FL	0.247	2.945	Nov 2016	0.423	Nov 2017	0.000		-		0.000	0.000	3.615	-
<b>Subtotal</b>			0.247	2.945		0.423		0.000		-		0.000	0.000	3.615	N/A

**Remarks**  
FY 2019 and future funding realigned to PE 0604127N.

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
MEDAL EA	C/CPAF	SAIC : McLean, VA	2.398	0.897	Oct 2016	0.675	Oct 2017	0.000		-		0.000	0.000	3.970	-
<b>Subtotal</b>			2.398	0.897		0.675		0.000		-		0.000	0.000	3.970	N/A

**Remarks**  
FY 2019 and future funding realigned to PE 0604127N.

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b>												<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 1319 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0603502N / Surface & Shallow Water MCM				<b>Project (Number/Name)</b> 1235 / Mine Warfare Planning and Analysis					

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
MEDAL EA	WR	NSWC PC : Panama City FI	0.411	0.708	Nov 2016	0.608	Dec 2017	0.000		-		0.000	0.000	1.727	-
<b>Subtotal</b>			0.411	0.708		0.608		0.000		-		0.000	0.000	1.727	N/A

**Remarks**  
FY 2019 and future funding realigned to PE 0604127N.

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	7.520	8.664	3.139	0.000	-	0.000	0.000	19.323	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 0603502N / Surface & Shallow Water  
MCM

Project (Number/Name)

1235 / Mine Warfare Planning and Analysis

MEDAL	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
									Realigned to PE 0604127N ▲																			
<b>Acquisition Milestones</b>																												
MEDAL EA V1.X Development																												
<b>Test and Evaluation</b>																												
MEDAL EA V1.X Regression Test & Evaluation																												
<b>Delivery Milestones</b>																												
MEDAL EA V1.1 Fielding																												

2019PB - 0603502N - 1235

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 1319 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>		<b>Project (Number/Name)</b> 1235 / <i>Mine Warfare Planning and Analysis</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>MEDAL</b>				
Schedule Detail	1	2019	1	2019
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.2 Development	1	2017	4	2017
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.3X Development	1	2018	4	2018
Test and Evaluation: MEDAL EA V1.X Regression Test & Evaluation: MEDAL EA V1.2X Test & Evaluation	1	2018	1	2018
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.2 Fielding	2	2018	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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2094 / Unmanned Underwater Vehicle			
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
2094: Unmanned Underwater Vehicle	64.860	21.945	60.187	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	146.992
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**Note**

FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N. Project realigned from PE 0603502N starting in FY 2019.

**A. Mission Description and Budget Item Justification**

In order to accelerate future capability and support steady growth of the fleet's UUV Family of Systems (FoS) the Snakehead Large Displacement Unmanned Undersea Vehicle (LDUUV) program will design and build a modular, reconfigurable Unmanned Undersea Vehicle (UUV) with Open Architecture (OA) software (SW) focused on introducing a new class (large displacement) of UUVs to the Navy to provide increased endurance, payload hosting, and delivery capability.

The Snakehead LDUUV will be modular in design and include hotel functionality (guidance and control, navigation, autonomy, situational awareness, core communications, and power distribution), energy and power, propulsion and maneuvering, mission sensors, and communications links. It is intended that modules will have well defined interfaces for the purposes of implementing cost-effective upgrades in future increments to leverage advances in technology. The Snakehead LDUUV is a CNO/ASN(RDA) approved Accelerated Acquisition phased approach to build capabilities at a manageable level of risk in the Navy's class of Large Displacement Unmanned Undersea Vehicles. It consists of two phases of government-led development with significant industry involvement transitioning to industry production of the full vehicles.

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

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> LDUUV Product Development	17.440	51.838	0.000	0.000	0.000
<b>Articles:</b>	-	-	-	-	-
<b><i>FY 2018 Plans:</i></b> Conduct detailed design for two Phase I LDUUVs, and prepare for Critical Design Review (CDR). Procure remaining LLTM (rest of hull, sensors, batteries, etc.).  Continue Industry supported experimentation with autonomy sense and avoidance, Intelligence Preparation of Operational Environment (IPOE) demonstrations, and propulsion, navigation, communications, launch and recovery experimentation to					

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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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 2094 / Unmanned Underwater Vehicle		
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
reduce risk with submarine and surface ship integration.						
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604031N.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604031N from PE 0603502N starting in FY 2019.						
Title: LDUUV Support		2.832	6.662	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2018 Plans: Complete initial development of documentation and drawings, Submarine Interface Control documents, System Hazard Analysis, Master System Test and Evaluation Plan (MSTEP); work on required documentation for detailed design and critical design review. Continue supportability analysis. Support demonstration exercises. Ramp up due to larger efforts as part of detailed design.						
FY 2019 Base Plans: FY 2019 funding in Program Element (PE) 0604031N.						
FY 2019 OCO Plans: N/A						
FY 2018 to FY 2019 Increase/Decrease Statement: Project realigned to PE 0604031N from PE 0603502N starting in FY 2019.						
Title: LDUUV Management		1.673	1.687	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2018 Plans: Provide program management support and travel for the LDUUV program. Program management plans include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and						



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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy							<b>Date:</b> February 2018				
<b>Appropriation/Budget Activity</b> 1319 / 4				<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>			<b>Project (Number/Name)</b> 2094 / <i>Unmanned Underwater Vehicle</i>				
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>							<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program.  <b>FY 2019 Base Plans:</b> FY 2019 funding in Program Element (PE) 0604031N.  <b>FY 2019 OCO Plans:</b> N/A  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Project realigned to PE 0604031N from PE 0603502N starting in FY 2019.											
<b>Accomplishments/Planned Programs Subtotals</b>							21.945	60.187	0.000	0.000	0.000
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019 Base</u>	<u>FY 2019 OCO</u>	<u>FY 2019 Total</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• 0604031N/2094: <i>Unmanned Undersea Vehicles</i>	0.000	0.000	92.613	-	92.613	135.641	136.136	121.836	129.429	Continuing	Continuing
<b>Remarks</b>											
Funding moved to new Program Element in FY2019											
<b>D. Acquisition Strategy</b>											
Utilizing Navy requirements to insert incremental capability, the LDUUV program will design, build, and test risk-reducing UUVs in two phases followed by competitive award of a production contract.											
<b>E. Performance Metrics</b>											
LDUUV - Completed Preliminary Design Review (PDR) 4Q FY17											
LDUUV - Complete Critical Design Review (CDR) 1Q FY19											

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2094 / Unmanned Underwater Vehicle					
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
LDUUV Vehicles, Hardware, & Design	WR	NUWC Newport : Newport, RI	6.604	6.070	Dec 2016	9.127	Dec 2017	0.000		-		0.000	0.000	21.801	-
LDUUV Vehicles, Hardware, & Design	C/CPFF	Various : Various	13.299	2.100	Feb 2017	27.871	Feb 2018	0.000		-		0.000	0.000	43.270	-
LDUUV Vehicles, Hardware, & Design	WR	NSWC Carderock : Carderock, MD	1.705	2.805	Dec 2016	2.920	Dec 2017	0.000		-		0.000	0.000	7.430	-
LDUUV Vehicles, Hardware, & Design	WR	NSWC PCD : Panama City, FL	0.400	0.120	Dec 2016	0.166	Dec 2017	0.000		-		0.000	0.000	0.686	-
LDUUV Vehicles, Hardware, & Design	SS/CPFF	ARL PSU : State College, PA	0.907	4.170	Jan 2017	6.176	Jan 2018	0.000		-		0.000	0.000	11.253	-
LDUUV Vehicles, Hardware, & Design	SS/CPFF	APL/JHU : Laurel, MD	0.988	0.000		0.000		0.000		-		0.000	0.000	0.988	-
LDUUV Vehicles, Hardware, & Design	WR	SSC Pacific : San Diego, CA	0.455	0.215	Jan 2017	0.423	Feb 2018	0.000		-		0.000	0.000	1.093	-
LDUUV Vehicles, Hardware, & Design	WR	NUWC KPT : Keyport, WA	0.075	1.750	Jan 2017	4.391	Feb 2018	0.000		-		0.000	0.000	6.216	-
LDUUV Risk Reduction Sonar	C/CPFF	ARL UT : Austin, TX	0.228	0.000	Jan 2017	0.551	Feb 2018	0.000		-		0.000	0.000	0.779	-
LDUUV Experimentation and Risk Reduction - Battery Certification	WR	NSWC Crane : Crane IN	0.925	0.210	Dec 2016	0.213	Dec 2017	0.000		-		0.000	0.000	1.348	-
LDUUV Platform Integration	Various	VAR : VAR	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			25.586	17.440		51.838		0.000		-		0.000	0.000	94.864	N/A
Remarks FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.															

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2094 / Unmanned Underwater Vehicle					
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
LDUUV ILS & Engineering Support	Various	VAR : VAR	17.768	0.250	Dec 2016	0.000		0.000		-		0.000	0.000	18.018	-
PLUS ILS & Engineering Support	Various	VAR : VAR	8.321	0.000		0.000		0.000		-		0.000	0.000	8.321	-
LDUUV Engineering Support	WR	NUWC Newport : Newport, RI	1.079	0.723	Dec 2016	4.452	Dec 2017	0.000		-		0.000	0.000	6.254	-
LDUUV Launch and Recovery Engineering Support	WR	NSWC PCD : Panama City, FL	0.000	0.260	Dec 2016	0.306	Dec 2017	0.000		-		0.000	0.000	0.566	-
LDUUV Hydrodynamics and Propulsion Engineering Support	C/CPFF	VAR : VAR	0.295	0.701	Feb 2017	0.450	Feb 2018	0.000		-		0.000	0.000	1.446	-
LDUUV Hull and Propulsion Engineering Support	WR	NSWC Carderock : Carderock, MD	0.288	0.468	Dec 2016	0.286	Dec 2017	0.000		-		0.000	0.000	1.042	-
LDUUV Command and Control Engineering Support	WR	SSC Pacific : San Diego, CA	0.122	0.120	Dec 2016	0.000		0.000		-		0.000	0.000	0.242	-
LDUUV Acoustic Engineering Support	SS/CPFF	ARL UW : Seattle, WA	0.200	0.000	Jan 2017	0.208	Jan 2018	0.000		-		0.000	0.000	0.408	-
LDUUV Engineering Support	SS/CPFF	APL/JHU : Laurel, MD	0.275	0.116	Jan 2017	0.335	Jan 2018	0.000		-		0.000	0.000	0.726	-
LDUUV ILS & Engineering Support	WR	NUWC Keyport : Keyport, WA	0.325	0.131	Dec 2016	0.125	Dec 2017	0.000		-		0.000	0.000	0.581	-
LDUUV ILS & Engineering Support2	SS/CPFF	VAR : VAR	0.110	0.063	Feb 2017	0.500	Feb 2018	0.000		-		0.000	0.000	0.673	-
Subtotal			28.783	2.832		6.662		0.000		-		0.000	0.000	38.277	N/A
Remarks FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.															

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2094 / Unmanned Underwater Vehicle					
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
PLUS Fleet Experimentation	Various	Various : Various	5.077	0.000		0.000		0.000		-		0.000	0.000	5.077	-
Subtotal			5.077	0.000		0.000		0.000		-		0.000	0.000	5.077	N/A
Remarks FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.															
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
LDUUV Program Management	WR	NUWC Newport : Newport, RI	1.715	0.380	Dec 2016	0.536	Dec 2017	0.000		-		0.000	0.000	2.631	-
LDUUV Program Management	Various	Various : Various	1.899	1.130	Dec 2016	0.989	Dec 2017	0.000		-		0.000	0.000	4.018	-
LDUUV Travel	Various	NAVSEA : Washington, DC	0.400	0.163	Dec 2016	0.162	Dec 2017	0.000		-		0.000	0.000	0.725	-
PLUS Program Management	Various	VAR : VAR	1.239	0.000		0.000		0.000		-		0.000	0.000	1.239	-
PLUS Travel	Various	NAVSEA : Washington, DC	0.161	0.000		0.000		0.000		-		0.000	0.000	0.161	-
Subtotal			5.414	1.673		1.687		0.000		-		0.000	0.000	8.774	N/A
Remarks FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.															
			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			64.860	21.945		60.187		0.000		-		0.000	0.000	146.992	N/A
Remarks FY 2019 and future funding for Project 2094 is in Program Element (PE) 0604031N.															

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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 0603502N / Surface & Shallow Water MCM										Project (Number/Name) 2094 / Unmanned Underwater Vehicle							
LDUUV	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
Project Unit Moved to Program Element 0604031N											New PE ■																	
LDUUV Development																												
Experimentation Risk Reduction																												
Phase 1																												
Preliminary Design																												
Detail Design																												
Design Reviews																												
Phase 1 PDR ◆																												
LDUUV (INPs)																												
Fleet Familiarization Training and Exercises																												
Tactics, Techniques, Procedures (TTPs) and CONOP development																												

2019PB - 0603502N - 2094.L24

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 2094 / <i>Unmanned Underwater Vehicle</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>LDUUV</b>				
Project Unit Moved to Program Element 0604031N:	1	2019	1	2019
LDUUV Development: Experimentation Risk Reduction: Technology Risk Reduction	1	2017	4	2018
LDUUV Development: Phase 1: Preliminary Design	1	2017	4	2017
LDUUV Development: Phase 1: Detail Design	4	2017	4	2018
LDUUV Development: Design Reviews: Phase 1 PDR	4	2017	4	2017
LDUUV (INPs): Fleet Familiarization Training and Exercises: Schedule Detail	2	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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2131 / Assault Breaching System			
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
2131: Assault Breaching System	610.235	19.651	11.623	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	641.509
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

## Note

FY 2019 and future funding for Project 2131 is in Program Element (PE) 0604126N. Project realigned from PE 0603502N starting in FY 2019.

## A. Mission Description and Budget Item Justification

This program provides a combination of U.S. Navy systems to counter the threat to amphibious forces from obstacles and anti-landing/sea mines in the Beach Zone and Surf Zone (0-10 ft water). The Assault Breaching Systems (ABS) consist of a system of systems approach that includes the following programs: JABS - Joint Direct Attack Munition (JDAM) Assault Breaching System; CMS - Countermine System; COBRA - Coastal Battlefield Reconnaissance and Analysis; PNMS - Precision Navigation and Marking System; and C4I - Command, Control, Computers, Communications, and Intelligence. The Assault Breaching Systems enable the Navy-Marine Corps team to conduct Joint Forcible Entry Operations (JFEO), Ship-To-Objective Maneuver (STOM), and other combat operations to project power ashore.

The JDAM Assault Breaching System (JABS) is a currently fielded system that neutralizes surface mines and obstacles in the Beach Zone and Surf Zone. The ABS Tactical Decision Aid optimizes the Desired Points of Impact (DPI) for JDAM munitions to effectively neutralize mines and obstacles while minimizing the required number of munitions and friendly aircraft sorties. Continued testing is required to optimize the ABS Tactical Decision Aid database for the most common enemy mines and obstacles.

Coastal Battlefield Reconnaissance and Analysis (COBRA) is the ABS program to conduct ISR/T. This system provides Airborne Mine Countermeasures (AMCM) capability, and one system consists of two Airborne Payloads and one Post Mission Analysis Station. Block I is a multispectral sensor capable of daytime detection of surface-laid minefields and obstacles in the Beach Zone and adds on-board near real-time processing. Block II capability adds a 3D LIDAR (Light Detection and Ranging) sensor that enables nighttime detection of mines and obstacles in the Beach Zone and the Surf Zone (0-10 ft of water). Block II also adds on-board real-time processing of multispectral imagery data. COBRA consists of a modular payload architecture that can be integrated onto the MQ-8B Fire Scout or USN manned helicopters like the MH-60. COBRA will serve as the "detect" mission module in the Surf Zone and Beach Zone for the Littoral Combat Ship (LCS) Mine Warfare mission package.

Precision Navigation & Marking System (PNMS) provides navigational upgrades for the Landing Craft, Air Cushion (LCAC); Landing Craft, Utility (LCU); and Amphibious Assault Vehicle (AAV). A system of virtual lane marking improves the navigation ability of these three assault craft which enables them to navigate safely through the neutralized assault lanes provided by JABS and CMS. OPN funds the CRAFTALTS to upgrade the navigation systems. LCU Navigation Upgrade: Modernized the navigation system to enable safe transit through the breached lane. LCAC Autopilot Upgrade: An integrated improvement to the LCAC Service Life Extension Program (SLEP) navigation system for craft control that allows precise navigation and hovering within the breached lane. These software upgrades and backfits occur during scheduled LCAC SLEPs. AAV Navigation Upgrade : Modernize the navigation system to enable precise transit through the breached lane.

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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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 2131 / Assault Breaching System		
Command, Control, Computers, Communications and Intelligence (C4I) system will tie all of the above systems together under an integrated ABS architecture that is compatible with the existing Mine Warfare architecture.						
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Product Development:		11.630	7.668	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2018 Plans:						
COBRA - Increase design and development of COBRA hardware and begin initial integration test planning of additional surf zone capabilities.						
JABS - Continue design and engineering of weapon effectiveness for beach and surf zones.						
Precision Navigation/Marking - Continue evaluation/assessment of EDMs supporting PN/M efforts.						
FY 2019 Base Plans:						
Funding has been realigned to PE 0604126N.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						
Funding has been realigned to PE 0604126N.						
Title: Technical Support:		1.506	0.942	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2018 Plans:						
COBRA - Continue to provide management and shipping, contract and test/studies, C4I Data Fusion. Provide technical /acquisition support and documentation (ILS, training, data, drawings).						
FY 2019 Base Plans:						
Funding has been realigned to PE 0604126N.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						



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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 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 2131 / Assault Breaching System			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Funding has been realigned to PE 0604126N.						
Title: Test and Evaluation:		5.580	2.209	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2018 Plans:						
COBRA - Continue advance surf zone component/capability design and test.						
JABS - Surf Zone (SZ) and Beach Zone (BZ) characterization testing.						
FY 2019 Base Plans:						
Funding has been realigned to PE 0604126N.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						
Funding has been realigned to PE 0604126N.						
Title: Management:		0.935	0.804	0.000	0.000	0.000
Articles:		-	-	-	-	-
FY 2018 Plans:						
Continue to manage Mine magazine inventory management and shipping, contract management and tests/ studies, C4I/Data fusion.						
FY 2019 Base Plans:						
Funding has been realigned to PE 0604126N.						
FY 2019 OCO Plans:						
N/A						
FY 2018 to FY 2019 Increase/Decrease Statement:						
Funding has been realigned to PE 0604126N.						
Accomplishments/Planned Programs Subtotals		19.651	11.623	0.000	0.000	0.000

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2131 / Assault Breaching System			
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/2624: SHALLOW WATER Mine CM SHIP	8.875	8.796	8.616	-	8.616	8.730	5.595	5.703	5.811	0.000	100.599
Remarks											
D. Acquisition Strategy											
Countermine/Counter Obstacle (CM/CO)is JDAM Assault Breaching System (JABS) and ABS Tactical Decision Aid testing is ongoing.											
Intelligence/Surveillance/Reconnaissance/Targeting (ISR/T) - COBRA Block I achieved MS C in 3rd QTR FY 2009.											
Precision Navigation & Marking System (PNMS) - The navigation upgrades for the Landing Craft, Air Cushion (LCAC) and Landing Craft, Utility (LCU) are complete. AAV enhancements will be achieved through an ECP (PMA AAV (Marine Corps)) in 1st QTR FY 2019.											
E. Performance Metrics											
Successful COBRA integration, flight tests: Operational Assessment (OA) and Development Testing (DT) into the MQ-8B FIRESCOUT. COBRA achieved IOC in FY 2017.											
The above systems continue to meet or exceed their Key Performance Parameters.											

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2131 / Assault Breaching System					
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
Primary Hardware Dev, COBRA	C/CPAF	Arete : Tucson, AZ	172.558	9.049	Jan 2017	5.347	Dec 2017	0.000		-		0.000	0.000	186.954	-
Primary Hardware Dev, CMS	C/CPAF	Boeing : St. Louis, MO	99.974	0.000		0.000		0.000		-		0.000	0.000	99.974	-
Ancillary Hardware Dev, JABS	C/CPAF	Various : Various	22.078	0.000		0.000		0.000		-		0.000	0.000	22.078	-
Systems Engineering, COBRA	WR	NSWC, PC : PANAMA CITY, FL	20.860	0.000		0.781	Oct 2017	0.000		-		0.000	0.000	21.641	-
Software Dev, COBRA	WR	NAVAIR : Patuxent River, MD	12.958	0.000		0.000		0.000		-		0.000	0.000	12.958	-
Systems Engineering, CMS	WR	NSWC, PC : PANAMA CITY, FL	31.505	0.000		0.000		0.000		-		0.000	0.000	31.505	-
JABS	WR	NSWC PC : NSWC IH	8.463	1.555	May 2017	0.799	Nov 2017	0.000		-		0.000	0.000	10.817	-
Training Dev, COBRA	WR	NSWC, PC : PANAMA CITY, FL	10.586	0.775	Oct 2016	0.559	Nov 2017	0.000		-		0.000	0.000	11.920	-
Tooling	WR	NSWC, PC : PANAMA CITY, FL	0.860	0.000		0.000		0.000		-		0.000	0.000	0.860	-
ABS IPT/Test Assets/Proj Eng	WR	NSWC, PC : PANAMA CITY, FL	9.065	0.251	May 2017	0.182	Nov 2017	0.000		-		0.000	0.000	9.498	-
Precision Navigation & Marking	WR	NSWC, PC : PANAMA CITY, FL	16.526	0.000		0.000		0.000		-		0.000	0.000	16.526	-
Subtotal			405.433	11.630		7.668		0.000		-		0.000	0.000	424.731	N/A
Remarks FY 2019 and future funding has been realigned to PE 0604126N.															

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2131 / Assault Breaching System					
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
Development Support Equipment	WR	NSWC, PC : PANAMA CITY, FL	20.731	0.849	Oct 2016	0.613	Nov 2017	0.000		-		0.000	0.000	22.193	-
Software Development	WR	NSWC, PC : PANAMA CITY, FL	8.037	0.202	Nov 2016	0.000		0.000		-		0.000	0.000	8.239	-
Integrated Logistics Support	WR	NSWC PC : PANAMA CITY, FL	2.712	0.099	Oct 2016	0.072	Nov 2017	0.000		-		0.000	0.000	2.883	-
Configuration Management	WR	NSWC, PC : PANAMA CITY, FL	3.744	0.100	Nov 2016	0.072	Oct 2017	0.000		-		0.000	0.000	3.916	-
Technical Data	WR	NSWC, PC : PANAMA CITY, FL	2.588	0.000		0.000		0.000		-		0.000	0.000	2.588	-
Studies & Analysis	WR	NSWC IH : INDIAN HEAD, MD	6.276	0.256	Nov 2016	0.185	Oct 2017	0.000		-		0.000	0.000	6.717	-
GFE	WR	NSWC, PC : PANAMA CITY, FL	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
Subtotal			44.488	1.506		0.942		0.000		-		0.000	0.000	46.936	N/A
Remarks															
FY 2019 and future funding has been realigned to PE 0604126N.															
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
Development Test & Evaluation	WR	NSWC, IH : INDIAN HEAD, MD	60.898	2.484	May 2017	1.126	Oct 2017	0.000		-		0.000	0.000	64.508	-
Operational Test & Evaluation	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	8.655	1.074	Nov 2016	0.361	Nov 2017	0.000		-		0.000	0.000	10.090	-
Tooling	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	0.700	0.000		0.000		0.000		-		0.000	0.000	0.700	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b>													<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 1319 / 4							<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>					<b>Project (Number/Name)</b> 2131 / <i>Assault Breaching System</i>			

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
GFE	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
Development Test	WR	NSWC PC : Panama City, FL	13.634	2.022	May 2017	0.722	Nov 2017	0.000		-		0.000	0.000	16.378	-
<b>Subtotal</b>			84.287	5.580		2.209		0.000		-		0.000	0.000	92.076	N/A

**Remarks**  
 FY 2019 and future funding has been realigned to PE 0604126N.

<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Contractor Engineering Support	C/CPFF	BAH, Northrop Grumman : DC, FL	10.935	0.125	Dec 2016	0.090	Dec 2017	0.000		-		0.000	0.000	11.150	-
Government Engineering Support	WR	NSWC, IH : INDIAN HEAD, MD	36.077	0.409	May 2017	0.359	Nov 2017	0.000		-		0.000	0.000	36.845	-
Program Management Support	WR	NSWC/ IH, PC : INDIAN HEAD, PANAMA CITY	25.657	0.351	Apr 2017	0.318	Nov 2017	0.000		-		0.000	0.000	26.326	-
Travel	WR	NAVSEA : WNY, DC	1.713	0.050	Oct 2016	0.037	Oct 2017	0.000		-		0.000	0.000	1.800	-
Assessment/BTR	C/CPAF	VARIOUS : VARIOUS	1.434	0.000		0.000		0.000		-		0.000	0.000	1.434	-
Acquisition Workforce	Various	VARIOUS : VARIOUS	0.211	0.000		0.000		0.000		-		0.000	0.000	0.211	-
<b>Subtotal</b>			76.027	0.935		0.804		0.000		-		0.000	0.000	77.766	N/A

**Remarks**  
 FY 2019 and future funding has been realigned to PE 0604126N.

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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 0603502N / Surface & Shallow Water MCM					Project (Number/Name) 2131 / Assault Breaching System				
		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		610.235	19.651		11.623		0.000		-		0.000	0.000	641.509	N/A
Remarks														

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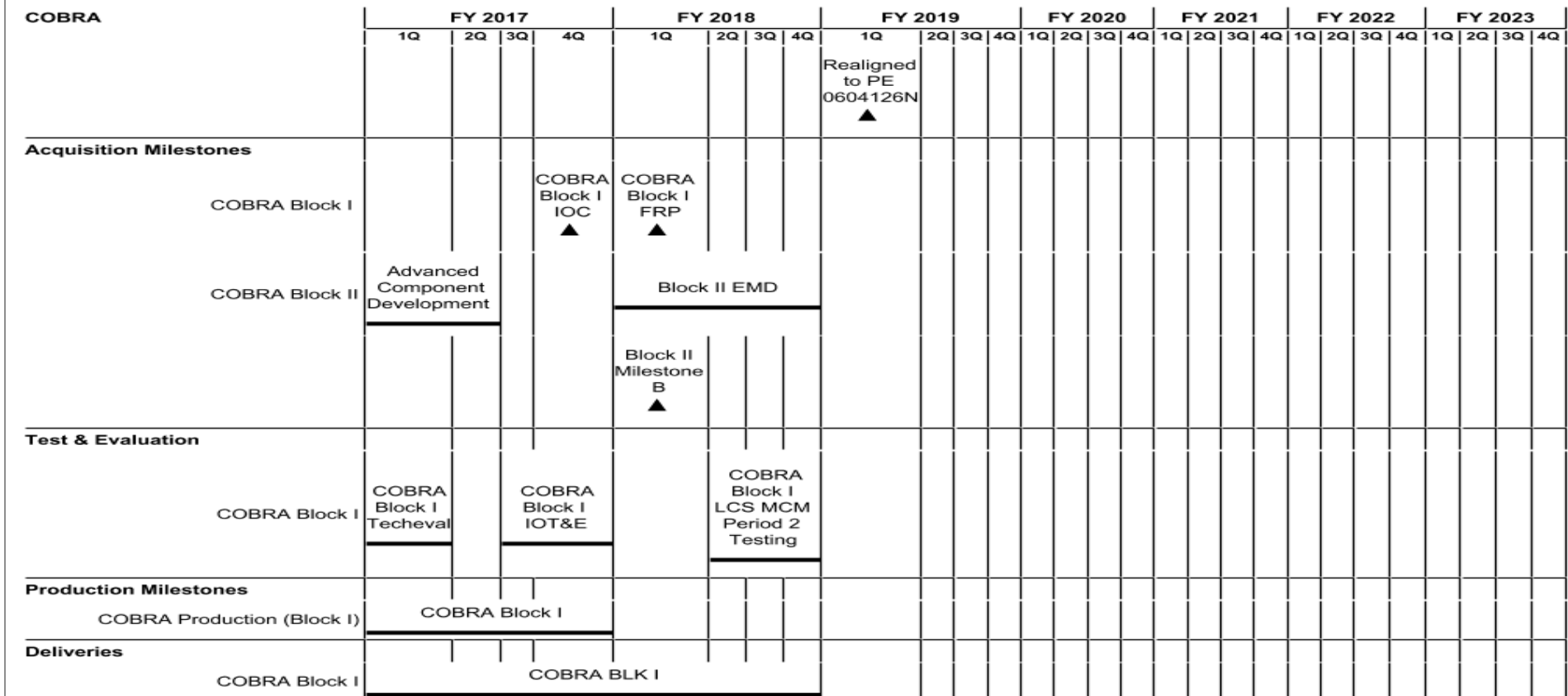
**Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy**

**Date:** February 2018

**Appropriation/Budget Activity**  
1319 / 4

**R-1 Program Element (Number/Name)**  
PE 0603502N / Surface & Shallow Water  
MCM

**Project (Number/Name)**  
2131 / Assault Breaching System



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 2131 / <i>Assault Breaching System</i>	

**Schedule Details**

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>COBRA</b>				
Schedule Detail	1	2019	1	2019
Acquisition Milestones: COBRA Block I: COBRA Block I IOC	4	2017	4	2017
Acquisition Milestones: COBRA Block I: COBRA Block I FRP	1	2018	1	2018
Acquisition Milestones: COBRA Block II: Advanced Component Development	1	2017	2	2017
Acquisition Milestones: COBRA Block II: COBRA Block II EMD	1	2018	4	2018
Acquisition Milestones: COBRA Block II: COBRA Block II Milestone B	1	2018	1	2018
Test & Evaluation: COBRA Block I: COBRA Block I Techeval (DT Phase 2)	1	2017	1	2017
Test & Evaluation: COBRA Block I: COBRA Block I IOT&E	3	2017	4	2017
Test & Evaluation: COBRA Block I: COBRA Block I LCS MCM Period 2 Testing	2	2018	4	2018
Production Milestones: COBRA Production (Block I): COBRA Block I	1	2017	4	2017
Deliveries: COBRA Block I: Block I	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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2989 / Barracuda			
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
2989: Barracuda	0.000	0.000	20.761	31.282	-	31.282	32.237	31.625	37.415	38.227	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
A. Mission Description and Budget Item Justification												
The Barracuda program provides an expendable, low cost, and unmanned mine neutralization capability against previously located near-surface mines with the potential to address other targets. Barracuda is a mine neutralization system with the form factor of an A-size sonobuoy. It is a modular weapon that will be stored and assembled on LCS, will be deployed from the Mine Countermeasures Unmanned Surface Vehicle (MCM USV), and will maintain communications with the operator on LCS while autonomously re-acquiring mines in the near surface and await a fire command from the operator on board LCS.												
An Analysis of Alternatives (AoA) was conducted in June 2015 to address the unmet near surface requirements resulting from cancelation of the RAMICS program in FY13. Several systems were considered and Barracuda was selected. The Naval Capabilities Board (NCB) approved the AoA results for the Gate 2 decision in July 2015.The NCB endorsed the Barracuda Capabilities Development Document (CDD) for the Gate 3 decision in April 2016; CDD was approved in September 2016.												
The Barracuda baseline capability is transitioned from the Office of Naval Research (ONR) Single Sortie Detect-To-Engage (SS DTE) Future Naval Capability (FNC). Barracuda provides the only near surface mine neutralization system that will allow the Littoral Combat Ship (LCS) Mine Countermeasure (MCM) Mission Package (MP) to fully meet its two minehunting performance requirements. Initial Barracuda deployment will be on the MCM USV as part of the LCS MCM MP. Subsequent plans are to expand potential means of providing in-stride MCM capabilities and transitioning follow-on FNCs from ONR. Barracuda may be hosted by an LCS, Expeditionary Sea Base (ESB), or shore facility.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)							FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Title: Barracuda: Product Development							0.000	16.118	25.879	0.000	25.879	
							Articles: -	-	-	-	-	
FY 2018 Plans: Conduct Barracuda Integrated Baseline Review (IBR) to confirm sufficient resource loading and establish a baseline to track earned value. Initiate detailed design of the system starting with conducting a System Requirements Review (SRR) to verify requirements traceability, conduct a System Functional Review (SFR), and prepare for Milestone B and contract award.												
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 0603502N / Surface & Shallow Water MCM		Project (Number/Name) 2989 / Barracuda				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Begin component modeling, simulation, fabrication and testing to verify design in preparation for Preliminary Design Review (PDR). Conduct and manage safety reviews as development efforts proceed.  FY 2019 OCO Plans: N/A  FY 2018 to FY 2019 Increase/Decrease Statement: FY2019 funding increase supports modeling and simulation efforts following Milestone B and EM&D.								
Title: Barracuda: Engineering Support  Articles:  FY 2018 Plans: Complete source selection and complete contract award. Manage contractor deliverables and oversee contractor Systems Engineering Technical Reviews (SETR), including IBR, SRR, and SFR.  FY 2019 Base Plans: Review, evaluate and manage contractor deliverables and contractor detailed design effort in preparation for CDR.  FY 2019 OCO Plans: N/A  FY 2018 to FY 2019 Increase/Decrease Statement: FY2019 funding increase supports modeling and simulation efforts following Milestone B and EM&D.				0.000 -	4.357 -	5.167 -	0.000 -	5.167 -
Title: Barracuda: Management Services  Articles:  FY 2018 Plans: Provide program management, financial management, and engineering support.  FY 2019 Base Plans: Continue to provide program management, financial management, and engineering support.  FY 2019 OCO Plans: N/A  FY 2018 to FY 2019 Increase/Decrease Statement:				0.000 -	0.286 -	0.236 -	0.000 -	0.236 -

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy				<b>Date:</b> February 2018							
<b>Appropriation/Budget Activity</b> 1319 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>		<b>Project (Number/Name)</b> 2989 / <i>Barracuda</i>							
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>											
	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>						
FY2019 funding increase supports modeling and simulation efforts following Milestone B and EM&D.											
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	20.761	31.282	0.000	31.282						
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• 0604373N/2473: <i>Airborne Mine Countermeasures</i>	7.357	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	7.357
<b>Remarks</b>											
Barracuda FY17 funding in budget PE 0604373N and realigned to PE 0603502N in FY18 - FY23.											
<b>D. Acquisition Strategy</b>											
Transition ONR FNC SS DTE to Barracuda in FY17 and FY18 following the same approach to design a low cost modular neutralizer that leverages economies of scale and reduces total ownership cost. Release the Barracuda RFP in 3QFY17. Achieve Milestone B in 2QFY18. Award a cost plus incentive fee base contract to design and deliver 750 Engineering Development Models (EDMs) with two cost plus fixed fee Low Rate Initial Production (LRIP) options to manufacture and deliver 1000 Barracudas per option. Base award will occur in 3QFY18. LRIP option #1 planned to be exercised in FY25 and LRIP option #2 in FY26. Manage the production cost model throughout the detailed design effort to deliver a low cost design in the Technical Data Package (TDP). There will be Government Purpose Rights on the TDP that will enable release of the TDP for a full and open competition of the Full Rate Production (FRP) contract planned in FY27. Initial Operating Capability (IOC) planned for 4QFY25.											
<b>E. Performance Metrics</b>											
Efficient design, fabrication, and testing to deliver a low cost solution that achieves required probability of kill against near surface mines.											

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 2989 / Barracuda					
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
Barracuda Hardware/ Support	C/CPIF	TBD : TBD	0.000	0.000		16.118	May 2018	25.879	May 2019	-		25.879	0.000	41.997	-
Subtotal			0.000	0.000		16.118		25.879		-		25.879	0.000	41.997	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
Barracuda Engineering Support	WR	NUWC NPT : Newport, RI	0.000	0.000		0.544	Dec 2017	0.549	Dec 2018	-		0.549	Continuing	Continuing	Continuing
Barracuda Engineering Services	C/CPIF	JHU APL : Baltimore, MD	0.000	0.000		0.668	Dec 2017	0.826	Nov 2018	-		0.826	Continuing	Continuing	Continuing
Barracuda Engineering Support	WR	NSWC, PC : Panama City, FL	0.000	0.000		1.341	Nov 2017	1.472	Nov 2018	-		1.472	Continuing	Continuing	Continuing
Barracuda Support	WR	NSWC, IHD : Indian Head, MD	0.000	0.000		1.357	Dec 2017	1.432	Nov 2018	-		1.432	0.000	2.789	-
Barracuda Support	WR	Naval Research Lab : Washington, DC	0.000	0.000		0.193	Dec 2017	0.578	Jan 2019	-		0.578	0.000	0.771	-
Barracuda Support	WR	NSWC, Carderock : Bethesda, MD	0.000	0.000		0.254	Dec 2017	0.310	Jan 2019	-		0.310	0.000	0.564	-
Subtotal			0.000	0.000		4.357		5.167		-		5.167	Continuing	Continuing	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
Barracuda Management Support	WR	NSWC, PC : Panama City, FL	0.000	0.000		0.286	Dec 2017	0.236	Dec 2018	-		0.236	0.000	0.522	-
Subtotal			0.000	0.000		0.286		0.236		-		0.236	0.000	0.522	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Navy										<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 1319 / 4					<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>					<b>Project (Number/Name)</b> 2989 / <i>Barracuda</i>			
	<b>Prior Years</b>	<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>	0.000	0.000		20.761		31.282		-		31.282	Continuing	Continuing	N/A
<b>Remarks</b>													

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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 0603502N / Surface & Shallow Water  
MCM

**Project (Number/Name)**

2989 / Barracuda

Proj 2989	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
<b>Acquisition Milestones</b>																												
Barracuda Acquisition Documentation																												
Barracuda Design Reviews																												
<b>System Development</b>																												
Barracuda																												
<b>Test and Evaluation</b>																												
Development Testing (DT)																												
<b>System Deliveries</b>																												
Engineering Development Model Delivery																												

2019DON - 0603502N - 2989

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 2989 / <i>Barracuda</i>	

**Schedule Details**

<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
<b><i>Proj 2989</i></b>				
Acquisition Milestones: Barracuda Acquisition Documentation: Acquisition Documentation	1	2017	1	2018
Acquisition Milestones: Barracuda Acquisition Documentation: Milestone B Decision	2	2018	2	2018
Acquisition Milestones: Barracuda Acquisition Documentation: Contract Award	3	2018	3	2018
Acquisition Milestones: Barracuda Design Reviews: Preliminary Design Review	1	2020	1	2020
Acquisition Milestones: Barracuda Design Reviews: Critical Design Review	1	2021	1	2021
System Development: Barracuda: Barracuda Development	1	2017	4	2022
Test and Evaluation: Development Testing (DT): Development Testing (DT): Development Testing (DT)	1	2023	4	2023
System Deliveries: Engineering Development Model Delivery: Engineering Development Model Delivery	2	2021	4	2022

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 3123 / SMCM UUV			
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
3123: SMCM UUV	135.530	20.890	25.052	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	181.472
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Note FY 2019 and future funding for Project 3123 is in Program Element (PE) 0604028N. Project realigned from PE 0603502N starting in FY 2019.												
A. Mission Description and Budget Item Justification In order to accelerate future capability and support steady growth of the fleet's UUV Family of Systems (FoS) the Knifefish Surface Mine Countermeasure Unmanned Undersea Vehicle (SMCM UUV) program develops new, advanced Unmanned Undersea Vehicles (UUVs) to support clandestine mine detection capability against volume, bottom, and buried mines. Equipment includes vehicles and associated systems support equipment. In parallel, Pre-Planned Product Improvement (P3I) design efforts are ongoing to support insertion of incremental capability when the technology is ready. Planned P3I candidates being considered include increased detection range capability, communications upgrades, on-board sonar processing and target recognition, command and control improvements, and other smaller tasks.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Knifefish SMCM UUV  Articles:  FY 2018 Plans: Complete CT and Developmental Testing (DT)/Operational Assessment (OA). Achieve Milestone C in 3QFY18. Conduct Pre-Planned Product Improvement (P3I) development efforts to increase sonar range by 3x and lay initial foundation for follow-on P3I efforts (onboard processing, re-acquisition, dual-side sonar, and increased endurance). Component fabrication, testing, and initial integration of P3I efforts to increase sonar range.  FY 2019 Base Plans: Funding realigned to PE 0604028N.  FY 2019 OCO Plans: N/A  FY 2018 to FY 2019 Increase/Decrease Statement: FY 2019 funding has been realigned to PE 0604028N.								20.890	25.052	0.000	0.000	0.000
								-	-	-	-	-
Accomplishments/Planned Programs Subtotals								20.890	25.052	0.000	0.000	0.000



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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 3123 / SMCM UUV			
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/2622: Minesweeping Replacement	26.764	31.531	35.709	-	35.709	55.949	51.338	34.007	16.753	Continuing	Continuing
• OPN/1601: LCS MCM Mission Modules	29.724	55.870	124.147	-	124.147	204.324	245.108	227.068	234.109	1,501.531	2,771.262
• RDTEN/0603018N/3123: SMCM UUV	0.000	0.000	16.717	-	16.717	22.747	23.598	24.031	24.031	Continuing	Continuing
Remarks											
The above OPN funding lines account for several programs, of which the Knifefish program is only a portion.											
D. Acquisition Strategy											
The Knifefish program was initiated in FY11 to develop Surface Mine Countermeasure Unmanned Undersea Vehicles (SMCM UUV) equipped with advanced Low Frequency Broadband (LFBB) sonar that provides volume, bottom, and buried mine detection capability. Procurement of the SMCM UUV with LFBB will occur after Milestone C.											
E. Performance Metrics											
Successful Milestone C in 3Q FY 2018 and FRP Decision in FY 2019.											

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy** **Date:** February 2018

<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / Surface & Shallow Water MCM	<b>Project (Number/Name)</b> 3123 / SMCM UUV
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<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
SMCM UOES Development	C/CPAF	BLUEFIN : CAMBRIDGE, MA	15.142	0.000		0.000		0.000		-		0.000	0.000	15.142	-
Knifefish Development	C/CPIF	Various : Various	17.497	0.000		0.000		0.000		-		0.000	0.000	17.497	-
Knifefish Development & Engineering Support	C/CPIF	General Dynamics AIS : McLeansville, NC	67.124	14.696	Dec 2016	9.134	Dec 2017	0.000		-		0.000	0.000	90.954	-
Hardware/Software Development - Support Equipment	WR	NSWC, PC : PANAMA CITY, FL	2.429	3.000	Dec 2016	1.250	Dec 2017	0.000		-		0.000	0.000	6.679	-
Knifefish P3I Development Contractor	C/CPIF	GDMS : McLeansville, NC	0.000	0.000		4.908	Dec 2017	0.000		-		0.000	0.000	4.908	-
<b>Subtotal</b>			102.192	17.696		15.292		0.000		-		0.000	0.000	135.180	N/A

**Remarks**

FY 2019 and future funding has been realigned to PE 0604028N.

<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Engineering Support	WR	NSWC, PC : PANAMA CITY, FL	16.769	2.369	Dec 2016	1.000	Dec 2017	0.000		-		0.000	0.000	20.138	-
Engineering Support	WR	NUWC, Newport : NEWPORT, RI	5.728	0.490	Dec 2016	0.400	Dec 2017	0.000		-		0.000	0.000	6.618	-
Engineering Support	WR	VARIOUS : VARIOUS	4.479	0.313	Dec 2016	1.000	Dec 2017	0.000		-		0.000	0.000	5.792	-
Engineering Support P3I	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.500	Dec 2017	0.000		-		0.000	0.000	0.500	-
Engineering Support P3I	WR	NUWC, Newport : NEWPORT, RI	0.000	0.000		0.250	Dec 2017	0.000		-		0.000	0.000	0.250	-
Engineering Support P3I	WR	VARIOUS : VARIOUS	0.000	0.000		3.800	Dec 2017	0.000		-		0.000	0.000	3.800	-

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 3123 / SMCM UUV					
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
Subtotal			26.976	3.172		6.950		0.000		-		0.000	0.000	37.098	N/A
Remarks FY 2019 and future funding has been realigned to PE 0604028N.															
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
Developmental Test & Evaluation	WR	NOMWC : STENNIS, MS	0.526	0.000		0.000		0.000		-		0.000	0.000	0.526	-
Government T&E Support	WR	VARIOUS : VARIOUS	1.329	0.000		0.920	Dec 2017	0.000		-		0.000	0.000	2.249	-
Test and Evaluation	WR	COMOPTEVFOR : NORFOLK, VA	0.556	0.000		0.160	Dec 2017	0.000		-		0.000	0.000	0.716	-
Government T&E Support	WR	NSWC, PC : PANAMA CITY, FL	0.449	0.000		0.500	Dec 2017	0.000		-		0.000	0.000	0.949	-
Subtotal			2.860	0.000		1.580		0.000		-		0.000	0.000	4.440	N/A
Remarks FY 2019 and future funding has been realigned to PE 0604028N.															
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	C/CPFF	VARIOUS : WASHINGTON, DC	3.120	0.000		1.105	Feb 2018	0.000		-		0.000	0.000	4.225	-
Travel	WR	NAVSEA : WNY, DC	0.335	0.022	Dec 2016	0.125	Dec 2017	0.000		-		0.000	0.000	0.482	-
Acquisition Workforce	WR	VARIOUS : VARIOUS	0.047	0.000		0.000		0.000		-		0.000	0.000	0.047	-
Subtotal			3.502	0.022		1.230		0.000		-		0.000	0.000	4.754	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 0603502N / Surface & Shallow Water MCM						Project (Number/Name) 3123 / SMCM UUV			
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
Remarks FY 2019 and future funding has been realigned to PE 0604028N.															
			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			135.530	20.890		25.052		0.000		-		0.000	0.000	181.472	N/A
Remarks															

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PE 0603502N: *Surface & Shallow Water MCM*  
Navy

R-1 Line #37

<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water</i> <i>MCM</i>
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3123 / SMCM UUV

MCM

[illegible]

2019PB - 0603502N - 3123

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 3123 / <i>SMCM UUV</i>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Proj 3123</b>				
Project Unit Moved to New Program Element 0604028N:	1	2019	1	2019
Knifefish Acquisition Program: Knifefish Milestones: Milestone C	3	2018	3	2018
Knifefish Acquisition Program: Knifefish Development:	1	2017	2	2018
Knifefish Acquisition Program: Knifefish Test Events: DT/OA	2	2018	2	2018
Knifefish P3I: Extended Sonar Range: Extended Range Prelim Design	2	2018	2	2018
Knifefish P3I: Extended Sonar Range: Extended Range Detailed Design	2	2018	3	2018
Knifefish P3I: Extended Sonar Range: Extended Range Fabrication/Test	3	2018	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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)			
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
3428: Medium Displacement Unmanned Surface Vehicle (MDUSV)	0.000	0.000	0.000	2.800	-	2.800	23.900	26.300	30.000	43.000	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

**Note**

Medium Displacement Unmanned Surface Vehicle (MDUSV) is a new start in FY2019

**A. Mission Description and Budget Item Justification**

Startup of efforts for the new Medium Displacement USV starting in FY19 which will serve as the unmanned surface vessel portion of the Navy's Future Surface Combatant (FSC) strategy. The FSC USV is intended to provide low-cost, high endurance, reconfigurable ships able to accommodate various payloads for unmanned missions in support of the Navy's Surface Fleet. FSC USVs will be optionally manned and will operate autonomously while collaborating with US Navy combatants. The FSC USVs can be sent forward alone, work as a team, or accompany individual combatants or battle groups. Expected missions include electronic warfare, anti-surface warfare, strike, or others.

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

	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
<b>Title:</b> Product Development	0.000	0.000	1.900	0.000	1.900
<b>Articles:</b>	-	-	-	-	-
<b>FY 2018 Plans:</b> N/A					
<b>FY 2019 Base Plans:</b> Begin initial concept design efforts and analysis of alternatives planning for FSC USV efforts.					
<b>FY 2019 OCO Plans:</b> N/A					
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding for initial concept design commences in FY19.					
<b>Title:</b> Support	0.000	0.000	0.700	0.000	0.700
<b>Articles:</b>	-	-	-	-	-
<b>FY 2018 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy				<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 1319 / 4		<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>		<b>Project (Number/Name)</b> 3428 / <i>Medium Displacement Unmanned Surface Vehicle (MDUSV)</i>		
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>						
		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>
N/A						
<b>FY 2019 Base Plans:</b> Begin engineering and technical support for future surface combatant (FSC) USV efforts.						
<b>FY 2019 OCO Plans:</b> N/A						
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding for FSC support commences in FY19.						
<b>Title:</b> Management		0.000	0.000	0.200	0.000	0.200
<b>Articles:</b>		-	-	-	-	-
<b>FY 2018 Plans:</b> N/A						
<b>FY 2019 Base Plans:</b> Conduct management and program efforts for future surface combatant (FSC) USV efforts.						
<b>FY 2019 OCO Plans:</b> N/A						
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding for FSC management commences in FY19.						
<b>Accomplishments/Planned Programs Subtotals</b>		0.000	0.000	2.800	0.000	2.800
<b>C. Other Program Funding Summary (\$ in Millions)</b>						
N/A						
<b>Remarks</b>						
<b>D. Acquisition Strategy</b>						
FSC USV is an ideal candidate for an accelerated acquisition approach and that will be evaluated as an option. Ongoing Medium/Large USV efforts (ACTUV/Sea Hunter and SCO efforts) will serve as Technology Maturation and Risk Reduction efforts. Pre-Milestone A FSC USV activities (requirements document development, conduct of AoA) will provide basis for establishing the Program of Record. Acquisition Strategy, including contracting strategy, will be developed in FY20 to support a notional MS A decision in FY21. Two development contracts will be competitively awarded in FY23 following a notional MS B decision.						



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Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 3428 / <i>Medium Displacement Unmanned Surface Vehicle (MDUSV)</i>

## E. Performance Metrics

Successful Milestone A decision in FY21.

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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 0603502N / Surface & Shallow Water MCM				Project (Number/Name) 3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)					
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
Development Efforts	TBD	Various : Various	0.000	0.000		0.000		1.900	Dec 2018	-		1.900	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		1.900		-		1.900	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
Engineering Support	WR	Various : Various	0.000	0.000		0.000		0.700	Dec 2018	-		0.700	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		0.700		-		0.700	Continuing	Continuing	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	C/CPFF	Various : Washington, DC	0.000	0.000		0.000		0.200	Dec 2018	-		0.200	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.000		0.200		-		0.200	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			0.000	0.000		0.000		2.800		-		2.800	Continuing	Continuing	N/A
Remarks															
New effort starting in FY19 for the USV portion of the Future Surface Combatant.															

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PE 0603502N: *Surface & Shallow Water MCM*  
Navy

R-1 Line #37

**R-1 Program Element (Number/Name)**  
PE 0603502N / *Surface & Shallow Water*  
*MCM*

**Project (Number/Name)**  
3428 / *Medium Displacement Unmanned Surface Vehicle (MDUSV)*

PE 0603502N / Surface & Shallow Water  
MCM

3428 / Medium Displacement Unmanned Surface Vehicle (MDUSV)

[illegible]

2019PB - 0603502N - 3428

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0603502N / <i>Surface &amp; Shallow Water MCM</i>	<b>Project (Number/Name)</b> 3428 / <i>Medium Displacement Unmanned Surface Vehicle (MDUSV)</i>	

**Schedule Details**

<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
<b><i>Medium Displacement USV</i></b>				
Initial Planning and Concept Design Efforts: Schedule Detail	1	2019	2	2020
Analysis of Alternatives: Schedule Detail	2	2020	1	2021
Acquisition Documentation & Initial Contracts Efforts: Schedule Detail	1	2021	3	2023
Award EDM Contract(s): Schedule Detail	3	2023	3	2023
EDM Design Efforts: Schedule Detail	4	2023	4	2023
Fleet Experimentation Efforts: Schedule Detail	3	2020	2	2023
Payload Development and Experimentation Efforts: Schedule Detail	2	2020	2	2022