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Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319: <i>Research, Development, Test & Evaluation, Navy / BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	1,141.797	83.793	90.472	165.775	-	165.775	157.821	184.838	212.970	222.095	Continuing	Continuing
0530: <i>Mine Hunt Systems</i>	270.881	0.000	9.536	9.851	-	9.851	4.109	4.261	4.351	4.438	Continuing	Continuing
1233: <i>Surface MCM Mid-life Upgrade</i>	137.929	12.161	6.349	4.237	-	4.237	1.956	1.903	1.033	1.054	Continuing	Continuing
1234: <i>Unmanned Surface Vehicle (USV)</i>	0.000	23.259	23.672	43.412	-	43.412	23.586	13.908	6.164	6.317	Continuing	Continuing
1235: <i>Mine Warfare Planning and Analysis</i>	0.000	0.000	7.760	8.910	-	8.910	7.515	6.826	6.967	7.108	Continuing	Continuing
2094.: <i>Unmanned Underwater Vehicle</i>	52.199	13.416	12.165	67.607	-	67.607	79.336	122.469	154.342	163.841	Continuing	Continuing
2131: <i>Assault Breaching System</i>	577.790	17.348	15.598	20.201	-	20.201	16.080	18.526	19.123	17.495	Continuing	Continuing
3123: <i>SMCM UUV</i>	102.998	17.609	15.392	11.557	-	11.557	25.239	16.945	20.990	21.842	Continuing	Continuing

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 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 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.

The Surface Mine Countermeasures (SMCM) programs are platform independent and will provide detection, classification, localization, identification, neutralization, and influence clearance capabilities. Programs develop: (1) remote 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 Mine Countermeasure (MCM) Avenger Class and other

UNCLASSIFIED

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platforms; (4) systems for neutralizing mines and light obstacles through the entire water column to include 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 and (6) integrate hardware for experimental testing related to surface ship, aircraft, and other cross platform applications.

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	86.333	118.588	134.937	-	134.937
Current President's Budget	83.793	90.472	165.775	-	165.775
Total Adjustments	-2.540	-28.116	30.838	-	30.838
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-28.104			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.540	0.000			
• Program Adjustments	0.000	0.000	34.372	-	34.372
• Rate/Misc Adjustments	0.000	-0.012	-3.534	-	-3.534

Change Summary Explanation

Program Adjustments:

Decrease in FY 2017 Surface & Shallow Water MCM by \$2.6 million as required for the Department of the Navy to comply with the Bipartisan Budget Act of 2015.

FY15 -\$2,540K Total adjustments; SBIR -\$2,540K.

FY16 -\$28,116K Total adjustments; Congressional Reductions -\$1,500K SSQ-94 Trainer development growth, -\$10,400K MHU Craft Fabrication, -1,304K MEDAL development growth, -\$2,000K Knifefish program delay, -\$12,900K LDUUV product development; -\$12K Miscellaneous Reductions.

FY17 +\$30,838K Total adjustments; Program Adjustments +\$5,844K Unmanned Influence Sweep System (UISS)Surface Vehicle, -\$9,800 Reduce LDUUV Prototype conversion, +\$3,520 LDUUV Submarine Integration, +\$7,100K Knifefish SMCM UUV Technology Transition, +27,708K Net Zero adjustment USV w/ AQS-20A, \$3,534K Miscellaneous adjustments.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>				Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
0530: <i>Mine Hunt Systems</i>	270.881	0.000	9.536	9.851	-	9.851	4.109	4.261	4.351	4.438	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project contains resources for systems, subsystems, and sensors integrated for use with the Remote Minehunting System (RMS) Remote Multi-Mission Vehicle (RMMV) for mine detection, classification, localization, identification, 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, identification, and neutralization.

The AN/AQS-20A is a mine hunting and identification system with acoustic and optic sensors housed in an underwater towed body. The acoustic sensors are designated for the detection, classification and localization of bottom, close-tethered, and volume targets in a single pass. The Electro-Optic Identification Device (EOID) replaces the Volume Search Sonar (VSS) for identification of bottom targets. The system will be deployed from the Littoral Combat Ship (LCS) as part of the MCM Mission Package. The RMS Remote Multi-Mission Vehicle (RMMV) tows the AN/AQS-20A.

The AN/AQS-20A Block 1 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, False Classification, and Depth Localization performance to meet Block 2 performance. The Forward Looking Sonar will be replaced with a new High Frequency Wideband design. The SLS will be replaced with a new Multi-function 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 FY12 and will complete in FY16. Award and management for Block 2 production units began in FY14. Materiel Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts continue beyond FY21.

In FY 2017, the AN/AQS-20A Block 2 P3I program will initiate Synthetic Aperture Sonar Acoustic (SAS) Recognition development and test. The AN/AQS-20A program will also complete mission analysis software tools for the AN/AQS-20A Block 2. The Block 2 P3I program began in FY17 and continues beyond FY21. Development of Depot Maintenance Overhaul and Technical Insertion plans will also occur. Development and Materiel Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts will continue beyond FY 2020.

This is not a new start. Realigned program funding from Program Element 0604373N/Project Unit 0529 beginning in FY16.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: AN/AQS-20A Product Development:	0.000	3.500	2.900	0.000	2.900

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p align="right"><i>Articles:</i></p> <p>FY 2015 Accomplishments: -Cited in Program Element 0604373N.</p> <p>FY 2016 Plans: - Complete Software updates for AN/AQS-20A Block 2 EDMs - Initiate Mission Analysis Software tools for AN/AQS-20A Block 2.</p> <p>FY 2017 Base Plans: - Initiate SAS Acoustic mine recognition development. - Initiate SAS Acoustic mine recognition ECP. - Complete Mission Analysis Software for AN/AQS-20A Block 2. - Correction of deficiencies identified during testing</p> <p>FY 2017 OCO Plans: N/A</p>	-	-	-	-	-
<p>Title: AN/AQS-20A Support:</p> <p align="right"><i>Articles:</i></p> <p>FY 2015 Accomplishments: -Cited in Program Element 0604373N.</p> <p>FY 2016 Plans: - Provide ongoing technical engineering support to AN/AQS-20A. - Complete updates to logistics products based on the results of LCS MCM MP testing. - Conduct repairs to AN/AQS-20A from LCS MCM MP TECHEVAL. - Conduct minefield maintenance</p> <p>FY 2017 Base Plans: - Continue to provide ongoing technical engineering support to AN/AQS-20A. - Develop Depot Maintenance (Overhaul) Plan. - Continue to conduct minefield maintenance. - Develop Technical Insertion Plan.</p> <p>FY 2017 OCO Plans:</p>	0.000 -	2.971 -	2.300 -	0.000 -	2.300 -

UNCLASSIFIED

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Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
N/A					
Title: AN/AQS-20A Test and Evaluation Articles: FY 2015 Accomplishments: - Cited in Program Element 0604373N. FY 2016 Plans: - Conduct AN/AQS-20A Block 2 EDM Testing. - Complete AN/AQS-20A Block 2 EDM performance analysis. FY 2017 Base Plans: - Conduct AN/AQS-20A Block 2 LRIP Developmental Testing. - Conduct SAS Acoustic recognition Testing. - Test Planning for AN/AQS-20A Block 2 IOT&E. FY 2017 OCO Plans: N/A	0.000 -	1.765 -	3.300 -	0.000 -	3.300 -
Title: AN/AQS-20A Management Services Articles: FY 2015 Accomplishments: -Cited in Program Element 0604373N. FY 2016 Plans: - Provide planning and management for the AN/AQS-20A program. - Provide Program Office travel support. FY 2017 Base Plans: - Provide planning and management for the AN/AQS-20A program. - Update acquisition documentation in support of Full Rate Production (FRP) Decision Review and Initial Operational Capability (IOC). - Continue to provide Program Office travel support. FY 2017 OCO Plans:	0.000 -	1.300 -	1.351 -	0.000 -	1.351 -

UNCLASSIFIED

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B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
N/A					
Accomplishments/Planned Programs Subtotals	0.000	9.536	9.851	0.000	9.851

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

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPN 1601: <i>LCS MCM Mission Modules</i>	15.270	67.451	57.146	-	57.146	161.605	197.738	103.496	203.284	1,002.735	1,875.439
• RDTE&E 0604373N: <i>Airborne Mine Countermeasures (AMCM)</i>	12.992	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	324.735

Remarks

Funding displayed on BLI 1601 OPN in total, does not reflect AQS-20A OPN dollars.

D. Acquisition Strategy

AN/AQS-20A LRIP procurement continues following Block 2 competitive contract award in FY14. Continue to meet MCM MP requirements to support production of Block 2 units.

E. Performance Metrics

AN/AQS-20A - Successfully complete Block 2 IOT&E in FY 2018.

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AN/AQS-20A 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-20A 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-20A 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-20A 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-20A P3I	C/CPFF	Raytheon : Portsmouth, RI	16.441	0.000		0.950	Nov 2015	1.100	Nov 2016	-		1.100	Continuing	Continuing	Continuing
AN/AQS-20A P3I	C/CPFF	ARL/UT : Austin, TX	7.767	0.000		1.250	Dec 2015	0.600	Dec 2016	-		0.600	Continuing	Continuing	Continuing
AN/AQS-20A P3I	WR	NSWC, PC : Panama City FL	3.732	0.000		1.300	Oct 2015	1.200	Oct 2016	-		1.200	0.000	6.232	-
AN/AQS-20A 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-20A P3I	WR	Naval Research Lab : Stennis Space Center, MS	0.225	0.000		0.000		0.000		-		0.000	0.000	0.225	-
Subtotal			138.585	0.000		3.500		2.900		-		2.900	-	-	-

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AN/AQS-20A Engineering Services	WR	NSWC, PC : Panama City, FL	31.570	0.000		0.406	Oct 2015	0.410	Oct 2016	-		0.410	0.000	32.386	-
AN/AQS-20A Engineering Services	C/CPFF	Raytheon : Portsmouth, RI	3.686	0.000		0.800	Oct 2015	0.200	Oct 2016	-		0.200	0.000	4.686	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>
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Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AN/AQS-20A Engineering Services	Various	Various : Various	54.018	0.000		0.000		0.000		-		0.000	0.000	54.018	-
AN/AQS-20A Engineering Services 2	SS/CPIF	Raytheon : Portsmouth, RI	3.464	0.000		0.000		0.000		-		0.000	0.000	3.464	-
AN/AQS-20A ILS Function	WR	NSWC, PC : Panama City FL	6.368	0.000		1.250	Oct 2015	1.165	Oct 2016	-		1.165	0.000	8.783	-
AN/AQS-20A ILS Function	SS/CPIF	Raytheon : Portsmouth, RI	1.546	0.000		0.000		0.000		-		0.000	0.000	1.546	-
AN/AQS-20A ILS Function	Various	Various : Various	0.981	0.000		0.000		0.000		-		0.000	0.000	0.981	-
AN/AQS-20A Engineering Services	WR	NSWC/CD : Carderock, MD	0.500	0.000		0.160	Oct 2015	0.165	Oct 2016	-		0.165	0.000	0.825	-
AN/AQS-20A Engineering Services	WR	NSWC/NPT : Newport, RI	0.000	0.000		0.355	Oct 2015	0.360	Oct 2016	-		0.360	0.000	0.715	-
Subtotal			102.133	0.000		2.971		2.300		-		2.300	0.000	107.404	-

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AN/AQS-20A T&E Functions	WR	COTF : Norfolk, VA	0.000	0.000		0.000		0.350	Nov 2016	-		0.350	0.000	0.350	-
AN/AQS-20A T&E Functions	WR	NSWC, PC : Panama City FL	18.115	0.000		1.765	Oct 2015	2.550	Oct 2016	-		2.550	0.000	22.430	-
AN/AQS-20A T&E Functions	C/CPFF	Raytheon : Portsmouth, RI	4.134	0.000		0.000		0.400	Apr 2017	-		0.400	0.000	4.534	-
AN/AQS-20A T&E Functions	Various	Various : Various	1.583	0.000		0.000		0.000		-		0.000	0.000	1.583	-
AN/AQS-20A T&E Functions	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			23.832	0.000		1.765		3.300		-		3.300	0.000	28.897	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>
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Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
COTF - Naval Command Operational Test and Evaluation Force

Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
AN/AQS-20A Management Services	TBD	Various : Various	5.732	0.000		1.260	Dec 2015	1.311	Dec 2016	-		1.311	0.000	8.303	-
AN/AQS-20A Travel	TBD	Various : Various	0.587	0.000		0.040	Jan 2016	0.040	Mar 2017	-		0.040	0.000	0.667	-
AN/AQS-20A Acquisition Workforce Fund	Various	Various : Various	0.012	0.000		0.000		0.000		-		0.000	0.000	0.012	-
Need Item Text	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Subtotal			6.331	0.000		1.300		1.351		-		1.351	0.000	8.982	-

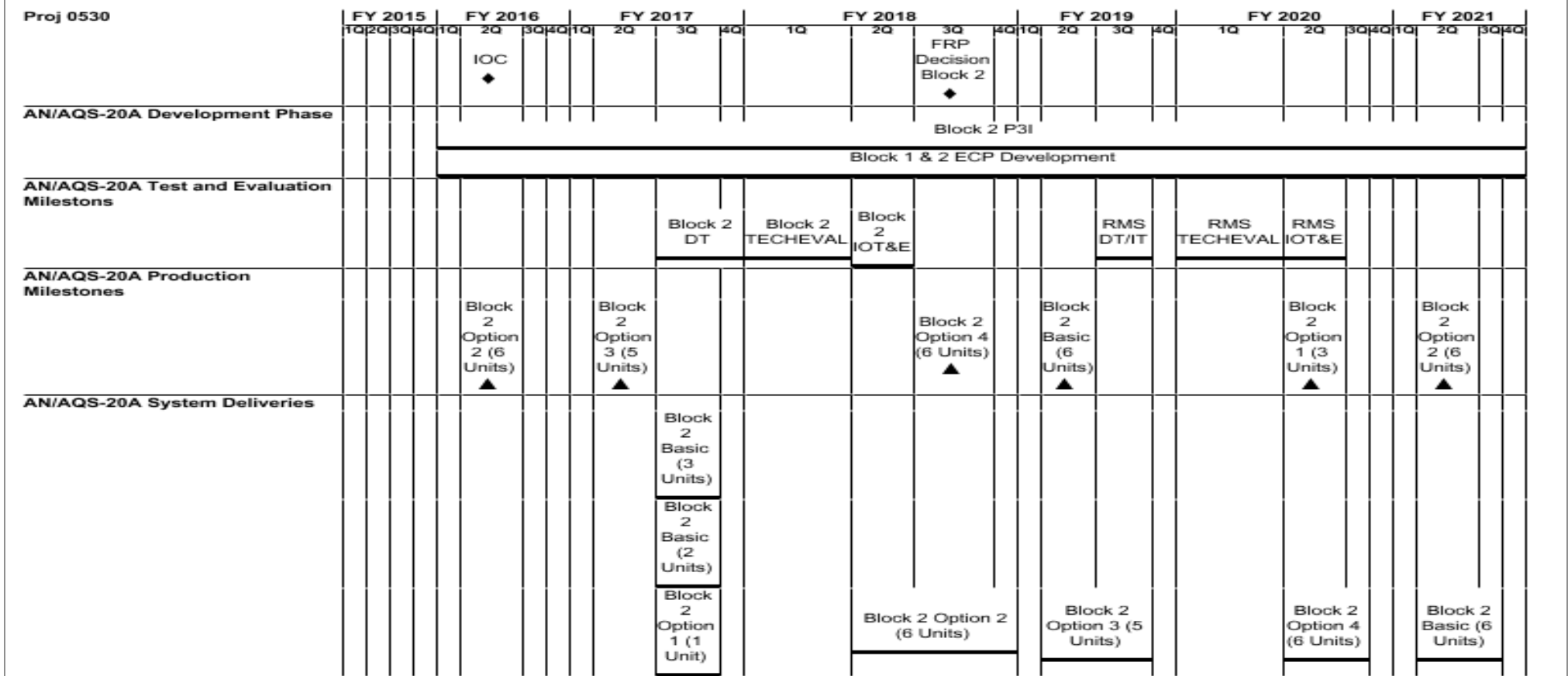
	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
	Project Cost Totals		270.881	0.000	9.536	9.851	-	9.851	-

Remarks

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy Date: February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>
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2017DON - 0603502N - 0530

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0530				
Initial Operatonal Capablity (IOC)	4	2018	4	2018
AN/AQS-20A Full Rate Production (FRP) Decision Block 2	3	2018	3	2018
AN/AQS-20A Development Phase: AN/AQS-20A Block 2 P3I	1	2016	4	2021
AN/AQS-20A Development Phase: AN/AQS-20A Materiel Reliability, Obsolesence, and Performance ECP Development (Block 1 & 2)	1	2016	4	2021
AN/AQS-20A Test and Evaluation Milestones: AN/AQS-20A Test Events Block 2 DT	3	2017	4	2017
AN/AQS-20A Test and Evaluation Milestones: AN/AQS-20A Test Events Block 2 TECHEVAL	1	2018	1	2018
AN/AQS-20A Test and Evaluation Milestones: AN/AQS-20A Test Events Block 2 IOT&E	2	2018	2	2018
AN/AQS-20A Test and Evaluation Milestones: RMS Test Events DT/IT	3	2019	3	2019
AN/AQS-20A Test and Evaluation Milestones: RMS Test Events TECHEVAL	1	2020	1	2020
AN/AQS-20A Test and Evaluation Milestones: RMS Test Events IOT&E	2	2020	2	2020
AN/AQS-20A Production Milestones: AN/AQS-20A Block 2- Option 2 Award (6 Units)	2	2016	2	2016
AN/AQS-20A Production Milestones: AN/AQS-20A Block 2 Option 3 Award (5 Units)	2	2017	2	2017
AN/AQS-20A Production Milestones: AN/AQS-20A Block 2 Option 4 Award (6 Units)	3	2018	3	2018
AN/AQS-20A Production Milestones: AN/AQS-20A Block 2 Basic Award (6 Units)	2	2019	2	2019
AN/AQS-20A Production Milestones: AN/AQS-20A Block 2 Option 1 Award (3 Units)	2	2020	2	2020
AN/AQS-20A Production Milestones: AN/AQS-20A Block 2 Option 2 Award (6 Units)	2	2021	2	2021
AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Basic Award Systems (3 Units)	3	2017	3	2017
AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Basic Award Systems (2 Units)	3	2017	3	2017
AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Option 1 Award System (1 Unit)	3	2017	3	2017

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 0530 / <i>Mine Hunt Systems</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Option 2 Award Systems (6 Units)	2	2018	4	2018
AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Option 3 Award Systems (5 Units)	2	2019	3	2019
AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Option 4 Award Systems (6 Units)	2	2020	3	2020
AN/AQS-20A System Deliveries: AN/AQS-20A Block 2 Basic Award Systems (6 Units)	2	2021	3	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>				Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
1233: <i>Surface MCM Mid-life Upgrade</i>	137.929	12.161	6.349	4.237	-	4.237	1.956	1.903	1.033	1.054	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

UISS and Multi-Function USV funding moved to PE 0603502N Proj:1234 Unmanned Surface Vehicle (USV)
 Mine Warfare and Environmental Decision Aids Library (MEDAL) funding moved to Project Unit 1235

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)8 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: HFWB/PRODUCT DEVELOPMENT:	0.856	0.890	0.312	0.000	0.312
Articles:	-	-	-	-	-
FY 2015 Accomplishments: Continued systems engineering, requirements analysis, design and development for AN/SQQ-32(V)4 HFWB P3I thru the sensor effort.					
FY 2016 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>Continue systems engineering, requirements analysis, design and development for AN/SQQ-32(V)4 HFWB P3I thru the sensor effort.</p> <p>FY 2017 Base Plans: Continue systems engineering, requirements analysis, design and development for AN/SQQ-32(V)4 HFWB P3I thru the sensor effort.</p> <p>FY 2017 OCO Plans: N/A</p>					
<p>Title: HFWB/SUPPORT:</p> <p align="right">Articles:</p> <p>FY 2015 Accomplishments: Continued software requirements, configuration, and software integration for AN/SQQ-32(V)4 HFWB P3I through the sensor; Towed Body Performance Monitoring and fault Location (PMFL) and Towed Body Positioning Solution efforts.</p> <p>FY 2016 Plans: Complete software requirements, configuration, and software integration for AN/SQQ-32(V)4 HFWB P3I through the sensor (TTS); Towed Body Performance Monitoring and fault Location (PMFL) and Towed Body Positioning Solution efforts.</p> <p>FY 2017 Base Plans: Continue software requirements, configuration, and software integration for AN/SQQ-32(V)4 HFWB P3I through the sensor.</p> <p>FY 2017 OCO Plans: N/A</p>	0.369	0.155	0.150	0.000	0.150
	-	-	-	-	-
<p>Title: HFWB/TEST AND EVALUATION:</p> <p align="right">Articles:</p> <p>FY 2015 Accomplishments: Continued to perform Lab and At Sea testing for AN/SQQ-32(V)4 HFWB P3I efforts to include through the sensor (TTS); Towed Body Performance Monitoring and fault Location (PMFL) and Towed Body Positioning Solution efforts.</p> <p>FY 2016 Plans:</p>	0.303	0.638	0.125	0.000	0.125
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy			Date: February 2016		
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>			
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
Continue to perform Lab and At Sea testing for AN/SQQ-32(V)4 HFWB P3I TTS effort. Complete Lab and at sea testing for PMFL and Towed Body Positioning Solution.					
FY 2017 Base Plans: Continue to perform Lab and At Sea testing for AN/SQQ-32(V)4 HFWB P3I effort and thru the sensor testing.					
FY 2017 OCO Plans: N/A					
Title: MEDAL/PRODUCT DEVELOPMENT:					
Articles:					
	3.512	0.000	0.000	0.000	0.000
	-	-	-	-	-
FY 2015 Accomplishments: Conducted Test & Evaluation of MINEnet Tactical (MEDAL EA). Integration activities with LCS Mission Package. Developed Information Assurance documentation for Authority to Operate on Navy networks. Conducted series of Development tests (DTs). Continued planning for the development of MEDAL EA Increment 2. Began development of MEDAL EA course curriculum. Conducted series of regression tests.					
FY 2016 Plans: Moved to Project Unit (PU) 1235					
FY 2017 Base Plans: N/A					
FY 2017 OCO Plans: N/A					
Title: MEDAL/SUPPORT:					
Articles:					
	0.436	0.000	0.000	0.000	0.000
	-	-	-	-	-
FY 2015 Accomplishments: Oversaw technical integration of developed algorithms and models that have demonstrated their effectiveness with respect to their objectives. Supported effort to include communication with activities such as applied labs, government activities, and designated contractors. Assisted in providing the speed, agility, adaptability, and flexibility required for modern MCM operations. Completed introduction of CES capability and Planning on Risk (PoR) functionality via a limited fielding to Fleet Users including Mine Countermeasures Squadrons (MCMRONs)					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
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. FY 2016 Plans: Moved to Project Unit (PU) 1235 FY 2017 Base Plans: N/A FY 2017 OCO Plans: N/A					
Title: SSQ-94 MCM Trainer Development Articles:	4.305 -	4.666 -	3.650 -	0.000 -	3.650 -
FY 2015 Accomplishments: SSQ-94 Mine Warfare Countermeasures Simulator; continued development of hardware and software upgrades to the combat system team/individual training capabilities on the MCM Class Ship FY 2016 Plans: SSQ-94 Mine Warfare Countermeasures Simulator; continue development of hardware and software upgrades to the combat system team/individual training capabilities on the MCM Class Ship FY 2017 Base Plans: SSQ-94 Mine Warfare Countermeasures Simulator; continue development of hardware and software upgrades to the combat system team/individual training capabilities on the MCM Class Ship FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	12.161	6.349	4.237	0.000	4.237

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• OPN/2622: <i>Minesweeping System Replacement</i>	36.259	21.014	56.675	-	56.675	55.423	41.358	41.578	42.404	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>

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

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u> <u>Base</u>	<u>FY 2017</u> <u>OCO</u>	<u>FY 2017</u> <u>Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

HFWB - Naval Surface Warfare Center, Panama City (NSWC, PC) and ARL UT designed and developed the HFWB upgrade to the AN/SQQ-32.

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)8 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

UISS (US3)- The UISS program moved to Project Unit 1234 starting in FY15.

E. Performance Metrics

UISS - Successfully reached Milestone B in FY14; Awarded EDM contract.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
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	4.100	4.305	Nov 2014	4.666	Nov 2015	3.650	Nov 2016	-		3.650	0.000	16.721	-
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	Continuing	Continuing	Continuing
HFWB: Primary Hardware Development 1	C/CPAF	NSWC, PC/ARL UT : FLORIDA/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	-
HFWB: Tow Cable Development	C/CPAF	NSWC, PC/ARL UT : FLORIDA/TEXAS	1.399	0.000		0.000		0.000		-		0.000	0.000	1.399	-
HFWB: Ship Integration	WR	NSWC, PC : PANAMA CITY, FL	1.697	0.000		0.000		0.000		-		0.000	0.000	1.697	-
HFWB: SYSTEM ENGINEER	C/CPAF	NSWC/ARL UT : FLORIDA/TEXAS	7.007	0.856	Nov 2014	0.890	Nov 2015	0.312	Nov 2016	-		0.312	0.000	9.065	-
Software Development MEDAL EA	C/CPFF	SAIC : McLean, VA	37.668	3.512	Nov 2014	0.000		0.000		-		0.000	0.000	41.180	-
Subtotal			95.322	8.673		5.556		3.962		-		3.962	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
1319 / 4				PE 0603502N / Surface & Shallow Water MCM					1233 / Surface MCM Mid-life Upgrade						
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	-
HFVB Software Development	WR	NSWC, PC/ARL-UT : FLORIDA/TEXAS	7.776	0.369	Nov 2014	0.155	Nov 2015	0.150	Nov 2016	-		0.150	0.000	8.450	-
HFVB Integrated Logistics Support	WR	NSWC, PC : PANAMA CITY, FL	2.765	0.000	Nov 2014	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	2.022	0.436	Nov 2014	0.000		0.000		-		0.000	0.000	2.458	-
Subtotal			15.587	0.805		0.155		0.150		-		0.150	0.000	16.697	-
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	5.924	1.712	Nov 2014	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	-
HFVB: Developmental Test and Evaluation	WR	NSWC, PC/ARL-UT : FLORIDA/TEXAS	4.859	0.303	Nov 2014	0.638	Nov 2015	0.125	Nov 2016	-		0.125	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			17.769	2.015		0.638		0.125		-		0.125	0.000	20.547	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>
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Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
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	2.159	0.668	Nov 2014	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	-
HFWB: Government Engineering Support5	WR	NSWC, PC : PANAMA CITY, FL	0.750	0.000		0.000		0.000		-		0.000	0.000	0.750	-
HFWB: 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	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>
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HFWB	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021						
	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			
Acquisition Milestones																															
Milestones																															
System Development																															
P3I	P3I																														
Test and Evaluation																															
Production Milestones																															
Contract Award																															
Full Rate Production	FRP																														
Deliveries																															
Installation	Installation																														

2017PB - 0603502N - 1233

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>
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MEDAL	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021							
	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				
Acquisition Milestones																																
System Development																																
MEDAL EA v.1 Iterations	Iteration 7																															
MEDAL EA v.2 Development	v.2 Development																															
Program moved to PU 1235																																
Test and Evaluation																																
Enterprise Arch (EA) v.1	EA DT/OA V1																															
Production Milestones																																
MEDAL EA Deliveries	MEDAL EA Deliveries																															

2017PB - 0603502N - 1233

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy

Date: February 2016

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*

SSQ-94 Trainer	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Acquisition Milestones																												
Milestones																												
Preliminary Design Review	▲																											
Critical Design Review				▲																								
Development Test							▲																					
System Development																												
System Design	System Design																											
Engineering and Manufacturing Development				Engineering and Manufacturing Development																								
Test and Evaluation																												
T&E				T&E																								
Production Milestones																												
Install							Build 1 Installs																					
							Build 2 Installs																					

2017PB - 0603502N - 1233

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1233 / <i>Surface MCM Mid-life Upgrade</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
HFWB				
System Development: P3I: P3I Development	1	2015	4	2021
Production Milestones: Full Rate Production: FRP	1	2015	2	2016
Deliveries: Installation: Installation	1	2015	4	2017
MEDAL				
System Development: MEDAL EA v.1 Iterations: EA v.1 Iteration 7	1	2015	4	2015
System Development: MEDAL EA v.2 Development: EA v.2 Development	1	2015	4	2015
System Development: Program moved to PU 1235: Program moved to PU 1235	3	2016	3	2016
Test and Evaluation: Enterprise Arch (EA) v.1: Enterprise Arch (EA) v.1 Development and Test	1	2015	4	2015
Production Milestones: MEDAL EA Deliveries: Deliveries	1	2015	4	2015
SSQ-94 Trainer				
Acquisition Milestones: Preliminary Design Review: Preliminary Design Review	1	2015	1	2015
Acquisition Milestones: Critical Design Review: Critical Design Review	4	2015	4	2015
Acquisition Milestones: Development Test: Development Test	3	2016	3	2016
System Development: System Design: System Design	1	2015	4	2015
System Development: Engineering and Manufacturing Development: Engineering and Manufacturing Development	4	2015	4	2017
Test and Evaluation: T&E: T&E	1	2016	4	2017
Production Milestones: Install: Build 1 Installs	1	2017	4	2017
Production Milestones: Install: Build 2 Installs	1	2017	4	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>				Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
1234: <i>Unmanned Surface Vehicle (USV)</i>	0.000	23.259	23.672	43.412	-	43.412	23.586	13.908	6.164	6.317	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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 ship of opportunity; 2) Mine Hunting USVs (MHUs) include USVs towing AN/AQS-24A mine hunting sonars and associated support equipment, including a command and control center that will be deployed from shore and vessels of opportunity. MHUs are in response to an Urgent Operational Need (UON) from Naval Forces Central Command. FY16 Speed to Fleet (S2F) funding to design and fabricate a replacement MHU vehicle, including new command and control center, and associated in-theater support equipment. 3) Unmanned Surface Vehicle with AN/AQS-20A sonar will integrate the existing AQS-20 minehunting sonar with an Unmanned Surface Vehicle (USV). An existing USV design will be leveraged to include a modular payload capability.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: UISS Product Development	12.375	8.163	1.069	0.000	1.069
Articles:	-	-	-	-	-
FY 2015 Accomplishments: Continued building UISS Engineering Development Model (EDM). Conducted Preliminary Design Review (PDR). Conducted Critical Design Review (CDR).					
FY 2016 Plans: Complete UISS EDM.					
FY 2017 Base Plans: Finalize system configuration in preparation for LRIP					
FY 2017 OCO Plans: N/A					
Title: UISS Support	5.073	1.060	1.260	0.000	1.260
Articles:	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p><i>FY 2015 Accomplishments:</i> Continued engineering and integrated logistic support (ILS) for the UISS Engineering and Manufacturing Development (E&MD) phase.</p> <p><i>FY 2016 Plans:</i> Complete engineering and logistic support for UISS E&MD.</p> <p><i>FY 2017 Base Plans:</i> Engineering and logistics support for UISS system tests.</p> <p><i>FY 2017 OCO Plans:</i> N/A</p>					
<p><i>Title:</i> UISS Test and Evaluation</p> <p align="right"><i>Articles:</i></p> <p><i>FY 2015 Accomplishments:</i> Completed UISS Test and Evaluation Master Plan (TEMP).</p> <p><i>FY 2016 Plans:</i> Conduct contractor testing. Begin Developmental Testing (DT) and Operational Assessment (OA) of UISS EDM</p> <p><i>FY 2017 Base Plans:</i> Complete all Developmental Testing (DT) and Operational Assessment (OA) of UISS EDM</p> <p><i>FY 2017 OCO Plans:</i> N/A</p>	0.400 -	2.600 -	2.937 -	0.000 -	2.937 -
<p><i>Title:</i> UISS Management</p> <p align="right"><i>Articles:</i></p> <p><i>FY 2015 Accomplishments:</i> Continued UISS EDM contract management.</p> <p><i>FY 2016 Plans:</i> Continue UISS EDM contract management. Initiate development of Milestone (MS) C documentation.</p> <p><i>FY 2017 Base Plans:</i></p>	1.050 -	1.034 -	0.838 -	0.000 -	0.838 -

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy			Date: February 2016			
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Complete UISS EDM contract management. Complete development of MS C documentation						
FY 2017 OCO Plans: N/A						
Title: MHU Product Development		3.780	10.415	8.186	0.000	8.186
	Articles:	-	-	-	-	-
FY 2015 Accomplishments: Integrated upgraded minehunting sonar (AN/AQS-24B) onboard MHUs, to include upgrading Comand and Control (C2) center, MHU electronics and associated equipment. Conducted performance testing of AN/AQS-24B sonar towed from MHUs.						
FY 2016 Plans: Continue improvements to the Comand and Control (C2) center, MHU electronics and associated equipment. Complete integration of AN/AQS-24B sonar with MHU. Conduct performance testing of AN/AQS-24B sonar towed from MHUs. Commence design and fabrication of one improved MHU hull, additional C2 center equipment, and in-theater support equipment. Commence AN/AQS-24B integration with improved MHU vehicles.						
FY 2017 Base Plans: Complete fabrication of improved MHU hull with AN/AQS-24B Sonars. Conduct Developmental and Operational Test & Evaluation.						
FY 2017 OCO Plans: N/A						
Title: MHU Support		0.581	0.400	1.414	0.000	1.414
	Articles:	-	-	-	-	-
FY 2015 Accomplishments: Provide engineering and logistic support for upgrade training and forward-deployed operations.						
FY 2016 Plans: Provide engineering and logistic support for product improvements and forward-deployed operations.						
FY 2017 Base Plans:						

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy				Date: February 2016	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>		Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
Provide engineering and logistics support for product improvements and forward deployed operations. Provide additional contractor training for enhanced hull and payload delivery systems.					
FY 2017 OCO Plans: N/A					
Title: USV w/AQS-20 Product Development					
Articles:					
	0.000	0.000	23.000	0.000	23.000
	-	-	-	-	-
FY 2015 Accomplishments: N/A					
FY 2016 Plans: N/A					
FY 2017 Base Plans: Begin design and fabrication of two USV EDMs with a modular payload capability. Design and fabricate deploy and retrieve system payload to integrate the AN/AQS-20A minehunting sonar with the USV. Conduct design reviews. Prepare USVs for system level testing.					
FY 2017 OCO Plans: N/A					
Title: USV w/ AQS-20 Support					
Articles:					
	0.000	0.000	4.708	0.000	4.708
	-	-	-	-	-
FY 2015 Accomplishments: N/A					
FY 2016 Plans: N/A					
FY 2017 Base Plans: Provide engineering and technical support for USV EDM design and fabrication, and deploy and retrieve design and fabrication. Develop tactics, techniques, and procedures for USV w/AQS-20A.					
FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals					
	23.259	23.672	43.412	0.000	43.412

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>

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

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>			<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• 0603596N: <i>LCS Mission Modules</i>	24.329	2.348	7.129	-	7.129	3.894	0.000	0.000	0.000	0.000	46.700

Remarks

D. Acquisition Strategy

UISS - Requirements will be documented in the Unmanned Influence Sweep System (UISS) Capability Development Document (CDD). An Engineering and Manufacturing Development (E&MD) contract was awarded in FY14 with an option for Low Rate Initial Production (LRIP) in FY 2017.

E. Performance Metrics

UISS - Successfully reach Milestone C in 3Q FY 2017

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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 1	C/CPIF	Textron Systems Inc : Hunt Valley, MD	0.000	12.375	Feb 2015	8.163	Dec 2015	1.069	Dec 2016	-		1.069	Continuing	Continuing	Continuing
MHU: Product Development 1	C/FFP	TBD : TBD	0.000	2.150	Jan 2015	9.909	Jan 2016	3.370	Jan 2017	-		3.370	Continuing	Continuing	Continuing
MHU: Product Development 2	WR	NSWC PC : Panama City, FL	0.000	0.501	Dec 2014	0.260	Dec 2015	2.486	Dec 2016	-		2.486	Continuing	Continuing	Continuing
MHU: Product Development 3	WR	NUWC N : Newport, RI	0.000	0.360	Dec 2014	0.130	Dec 2015	1.620	Dec 2016	-		1.620	Continuing	Continuing	Continuing
MHU: Product Development 4	WR	NSWC CD : Bethesda, MD	0.000	0.110	Dec 2014	0.050	Dec 2015	0.220	Dec 2016	-		0.220	Continuing	Continuing	Continuing
MHU: Product Development 5	WR	Various : Various	0.000	0.420	Dec 2014	0.150	Dec 2015	0.490	Dec 2016	-		0.490	Continuing	Continuing	Continuing
USV w/Q-20: Product Development 1	TBD	TBD : TBD	0.000	0.000		0.000		13.250	Jan 2017	-		13.250	0.000	13.250	-
USV w/Q-20: Product Development 2	WR	NSWC PC : Panama City, FL	0.000	0.000		0.000		5.250	Jan 2017	-		5.250	0.000	5.250	-
USV w/Q-20: Product Development 3	WR	NUWC N : Newport, RI	0.000	0.000		0.000		4.500	Jan 2017	-		4.500	0.000	4.500	-
Subtotal			0.000	15.916		18.662		32.255		-		32.255	-	-	-

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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: Engineering Support 1	WR	NUWC, N : Newport, RI	0.000	0.200	Dec 2014	0.150	Dec 2015	0.150	Dec 2016	-		0.150	Continuing	Continuing	Continuing
UISS: Engineering Support 2	WR	NSWC, PC : Panama City, FL	0.000	1.486	Dec 2014	0.203	Dec 2015	0.250	Dec 2016	-		0.250	Continuing	Continuing	Continuing
UISS: Engineering Support 3	WR	NSWC, CD : Bethesda, MD	0.000	1.586	Dec 2014	0.125	Dec 2015	0.170	Dec 2016	-		0.170	Continuing	Continuing	Continuing
UISS: Engineering Support 4	C/CPFF	Textron Systems Inc : Hunt Valley, MD	0.000	0.550	Feb 2015	0.120	Dec 2015	0.250	Dec 2016	-		0.250	Continuing	Continuing	Continuing

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>
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Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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: Integrated Logistics 1	WR	NSWC, PC : Panama City, FL	0.000	0.200	Dec 2014	0.090	Dec 2015	0.090	Dec 2016	-		0.090	Continuing	Continuing	Continuing
UISS: Integrated Logistics 2	WR	NSWC, CD : Bethesda, MD	0.000	0.408	Dec 2014	0.203	Dec 2015	0.250	Dec 2016	-		0.250	Continuing	Continuing	Continuing
UISS: Integrated Logistics 3	C/CPFF	Textron Systems, Inc : Hunt Valley, MD	0.000	0.643	Feb 2015	0.085	Dec 2015	0.100	Dec 2016	-		0.100	Continuing	Continuing	Continuing
MHU: Engineering Support 1	WR	SSC, PAC : San Diego, CA	0.000	0.210	Dec 2014	0.050	Dec 2015	0.050	Dec 2016	-		0.050	Continuing	Continuing	Continuing
MHU: Engineering Support 2	WR	NSWC, PC : Panama City, FL	0.000	0.160	Dec 2014	0.200	Dec 2015	0.457	Dec 2016	-		0.457	Continuing	Continuing	Continuing
MHU: Engineering Support 3	WR	NUWC, N : Newport, RI	0.000	0.160	Dec 2014	0.100	Dec 2015	0.477	Dec 2016	-		0.477	Continuing	Continuing	Continuing
MHU: Engineering Support 4	WR	NSWC, CD : Bethesda, MD	0.000	0.110	Dec 2014	0.050	Dec 2015	0.090	Dec 2016	-		0.090	Continuing	Continuing	Continuing
MHU: Engineering Support 5	WR	Various : Various	0.000	0.180	Dec 2014	0.000		0.340	Dec 2016	-		0.340	Continuing	Continuing	Continuing
USV w/Q-20: Engineering Support 1	WR	NSWC, PC : Panama City, FL	0.000	0.000		0.000		2.458	Jan 2017	-		2.458	0.000	2.458	-
USV w/Q-20: Engineering Support 2	WR	NUWC, N : Newport, RI	0.000	0.000		0.000		2.250	Jan 2017	-		2.250	0.000	2.250	-
Subtotal			0.000	5.893		1.376		7.382		-		7.382	-	-	-

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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 1	WR	NSWC, PC : Panama City, FL	0.000	0.100	Dec 2014	0.500	Mar 2016	1.771	Dec 2016	-		1.771	Continuing	Continuing	Continuing
UISS: Test and Evaluation 2	WR	NSWC, CD : Bethesda, MD	0.000	0.250	Dec 2014	0.600	Mar 2016	0.723	Dec 2016	-		0.723	Continuing	Continuing	Continuing
UISS: Test and Evaluation 3	C/CPFF	TBD : TBD	0.000	0.050	Dec 2014	1.500	Mar 2016	0.443	Dec 2016	-		0.443	Continuing	Continuing	Continuing

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>
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UISS	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Program Moved from Project 1233	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: black; margin-right: 5px;"></div> Moved from Project 1233 </div>																											
Acquisition Milestones	<div style="border-top: 1px solid black; border-bottom: 1px solid black; margin-bottom: 5px;"> Milestone C Documentation </div>																											
Milestones	<div style="display: flex; justify-content: space-between; width: 100%;"> <div style="width: 40%;">MS C ▲</div> <div style="width: 40%;">IOC ▲</div> </div>																											
System Development	<div style="border-top: 1px solid black; border-bottom: 1px solid black; margin-bottom: 5px;"> E&MD Phase </div>																											
Engineering & Manufacturing Development Phase	<div style="display: flex; justify-content: space-around; width: 100%;"> <div style="text-align: center;">PDR ◆</div> <div style="text-align: center;">CDR ◆</div> <div style="text-align: center;">PCA ◆</div> <div style="text-align: center;">PRR ◆</div> </div>																											
Reviews	<div style="display: flex; justify-content: space-around; width: 100%;"> <div style="text-align: center;">CT</div> <div style="text-align: center;">DT/OA</div> <div style="text-align: center;">IOT&E</div> </div>																											
Test and Evaluation	<div style="border-top: 1px solid black; border-bottom: 1px solid black; margin-bottom: 5px;"> LRIP </div>																											
Production Milestones	<div style="border-top: 1px solid black; border-bottom: 1px solid black; margin-bottom: 5px;"> LRIP Award ◆ </div>																											
Low Rate Initial Production	<div style="border-top: 1px solid black; border-bottom: 1px solid black; margin-bottom: 5px;"> LRIP </div>																											

2017PB - 0603502N - 1234

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>
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Mine Hunting USV (MHU)	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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																												
MHU 5 Design and Fabrication																												
MHU 5 sonar integration and test																												
MHU 5 Contractor Training																												
MHU 5 Fleet Integration																												

2017PB - 0603502N - 1234

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>
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USV with AN/QQS-20A Sonar	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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																												
USV Fabrication																												
Payload Fabrication																												
System Integration & Test																												
Deploy USV w/AQS-20A as UOES																												
Development Test/Operational Assessment																												

2017PB - 0603502N - 1234

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
UISS				
Program Moved from Project 1233: Program Moved from Project 1233	1	2015	1	2015
Acquisition Milestones: Milestone C Documentation	2	2015	2	2017
Acquisition Milestones: Milestones: Milestone C	3	2017	3	2017
Acquisition Milestones: Milestones: Initial Operational Capability	4	2019	4	2019
System Development: Engineering & Manufacturing Development Phase: Engineering & Manufacturing Development phase	1	2015	2	2017
System Development: Reviews: Preliminary Design Review (PDR)	2	2015	2	2015
System Development: Reviews: Critical Design Review (CDR)	4	2015	4	2015
System Development: Reviews: Production Readiness Review (PRR)	1	2017	1	2017
System Development: Reviews: Physical Configuration Audit (PCA)	4	2016	4	2016
System Development: Test and Evaluation: DT Testing	4	2016	2	2017
System Development: Test and Evaluation: Initial Operational Test & Evaluation	2	2019	3	2019
System Development: Test and Evaluation: Contractor Training	3	2016	3	2016
Production Milestones: Low Rate Initial Production: LRIP Contract Award	3	2017	3	2017
Production Milestones: Low Rate Initial Production: LRIP phase	3	2017	4	2021
Mine Hunting USV (MHU)				
System Development: MHU 1-4 Sonar Upgrade: Schedule Detail	2	2015	4	2016
System Development: MHU 5 Design and Fabrication: Schedule Detail	1	2016	2	2017
System Development: MHU 5 sonar integration and test: Factory Acceptance Test	2	2017	2	2017
System Development: MHU 5 sonar integration and test: Operational Assessment	4	2017	4	2017
System Development: MHU 5 Contractor Training: Contractor Training	1	2017	4	2017

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1234 / <i>Unmanned Surface Vehicle (USV)</i>

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
System Development: MHU 5 Fleet Integration: Fleet Integration	1	2018	4	2018
<i>USV with AN/AQS-20A Sonar</i>				
System Development: USV Fabrication: Schedule Detail	1	2017	4	2017
System Development: Payload Fabrication: Schedule Detail	2	2017	3	2017
System Development: System Integration & Test: Schedule Detail	1	2018	4	2018
System Development: Deploy USV w/AQS-20A as UOES: Schedule Detail	4	2018	3	2019
System Development: Development Test/Operational Assessment: Schedule Detail	4	2019	2	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>			Project (Number/Name) 1235 / <i>Mine Warfare Planning and Analysis</i>				
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
1235: <i>Mine Warfare Planning and Analysis</i>	0.000	0.000	7.760	8.910	-	8.910	7.515	6.826	6.967	7.108	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: MEDAL Product Development	0.000	4.704	5.105	0.000	5.105
Articles:	-	-	-	-	-
FY 2015 Accomplishments: N/A - Funded in PU 1233					
FY 2016 Plans: MEDAL EA - Conduct Test & Evaluation of MINEnet Tactical. Continue MINEnet Tactical integration activities with LCS Mission Package. Continue to develop Information Assurance (IA) documentation for Authority to operate on Navy networks. MINEnet Tactical v1.2 development. Conduct Test and Evaluation of MINEnet Tactical v1.2 Conduct regression tests. Develop MEDAL EA v2 supporting documentation development. Conduct planning for the development of MEDAL EA v2. Continue MINEnet Tactical course curriculum development.					
FY 2017 Base Plans: MEDAL EA - MINEnet Tactical v1.3 development. Conduct Test and Evaluation of MINEnet Tactical v1.3and regressions tests. Conduct a series of development tests. Continue planning for the development of MEDAL EA v2.0 Continue development of MEDAL EA course curriculum.					
FY 2017 OCO Plans: N/A					
Title: MEDAL Support	0.000	0.247	0.557	0.000	0.557
Articles:	-	-	-	-	-
FY 2015 Accomplishments:					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy				Date: February 2016	
Appropriation/Budget Activity 1319 / 4		R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>		Project (Number/Name) 1235 / <i>Mine Warfare Planning and Analysis</i>	
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)					
N/A - Funded in PU 1233					
FY 2016 Plans: Oversee technical integration of developed algorithms and models that have demonstrated their effectiveness with respect to their objectives. Support effort to include communication with activities such as applied labs, government activities, and designated contractors. Assist in providing the speed, agility, adaptability, and flexibility required for modern MCM operations. Achieve IOC and begin fielding to achieve FOC. Begin the introduction of MEDAL EA MINEnet Tactical v1.1 capability and Planning on Risk (PoR) functionality via a limited fielding to Fleet Users including Mine Countermeasures Squadrons (MCMRONS) and Naval Surface and Mine War-fighting Development Center (SMWDC).					
FY 2017 Base Plans: Continue the development of MEDAL EA MINEnet Tactical v1.3 capability and Planning on Risk (PoR) functionality via a limited fielding to Fleet Users including Mine Countermeasures Squadrons (MCMRONS) and Naval Surface and Mine War-fighting Development Center (SMWDC). Provide technical integration of developed algorithms and models that have demonstrated their effectiveness with respect to their objectives. Support effort to include communication with activities such as applied labs, government activities, and designated contractors. Assist in providing the speed, agility, adaptability, and flexibility required for modern MCM operations.					
FY 2017 OCO Plans: N/A					
Title: MEDAL Test and Evaluation					
Articles:					
	0.000	2.398	2.519	0.000	2.519
	-	-	-	-	-
FY 2015 Accomplishments: N/A - Funded in PU 1233					
FY 2016 Plans: MEDAL EA - Conduct series of Development tests (DTs) and a series of regression tests. Continue System Integration testing activities with multiple platforms. Conduct planning for subsequent OA events. Deliver to Fleet in accordance with the MEDAL EA Fielding Plan.					
FY 2017 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy			Date: February 2016			
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1235 / <i>Mine Warfare Planning and Analysis</i>				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)						
		FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
MEDAL NG - Conduct series of Development tests (DTs) and a series of regression tests. Continue System Development testing activities with multiple platforms. Deliver to Fleet in accordance with the MEDAL EA Fielding Plan.						
FY 2017 OCO Plans: N/A						
Title: MEDAL Management		0.000	0.411	0.729	0.000	0.729
		Articles:	-	-	-	-
FY 2015 Accomplishments: N/A - Funded in PU 1233						
FY 2016 Plans: 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, long term planning, Naval Special Clearance Team (NSCT-1) Assault Breaching Systems of Systems (ABSoS), 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.						
FY 2017 Base Plans: 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, long term planning, Naval Special Clearance Team (NSCT-1) Assault Breaching Systems of Systems (ABSoS), 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.						
FY 2017 OCO Plans: N/A						
Accomplishments/Planned Programs Subtotals		0.000	7.760	8.910	0.000	8.910

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1235 / <i>Mine Warfare Planning and Analysis</i>

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

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u>			<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• 2622/LV075: <i>Mine Sweeping Replacement (MEDAL).</i>	1.855	2.973	4.349	-	4.349	3.673	1.135	0.798	0.850	0.000	16.628

Remarks

D. Acquisition Strategy

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 COMINWARCOM 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.

E. Performance Metrics

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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
1319 / 4				PE 0603502N / Surface & Shallow Water MCM						1235 / Mine Warfare Planning and Analysis					
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	C/CPAF	SAIC : McLean, VA	0.000	0.000		4.704	Nov 2015	5.105	Nov 2016	-		5.105	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		4.704		5.105		-		5.105	-	-	-
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	MIPR	NSWC PC : Panama City FL	0.000	0.000		0.247	Nov 2015	0.557	Nov 2016	-		0.557	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		0.247		0.557		-		0.557	-	-	-
Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	C/CPAF	SAIC : McLean, VA	0.000	0.000		2.398	Nov 2015	2.519	Nov 2016	-		2.519	Continuing	Continuing	Continuing
Subtotal			0.000	0.000		2.398		2.519		-		2.519	-	-	-
Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	MIPR	NSWC PC : Panama City FI	0.000	0.000		0.411	Nov 2015	0.729	Nov 2016	-		0.729	0.000	1.140	-
Subtotal			0.000	0.000		0.411		0.729		-		0.729	0.000	1.140	-
Project Cost Totals			0.000	0.000		7.760		8.910		-		8.910	-	-	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy																	Date: February 2016							
Appropriation/Budget Activity 1319 / 4										R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>							Project (Number/Name) 1235 / <i>Mine Warfare Planning and Analysis</i>							

MEDAL	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021							
	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				
Acquisition Milestones																																
MEDAL EA V1.X Development					MEDAL EA V1.X Development																											
																	MEDAL EA V2.X Development															
Test and Evaluation																																
MEDAL EA V1.X Development and Regression Test & Evaluation					MEDAL EA V1.X Development and Regression Test & Evaluation																											
MEDAL EA V2.X Development and Regression Test & Evaluation																	MEDAL EA V2.X Development and Regression Test & Evaluation															
Delivery Milestones																																
MEDAL EA V1.1 Fielding					MEDAL EA V1.1 Fielding																											
MEDAL EA V1.X Fielding									MEDAL EA V1.X Fielding																							
MEDAL EA V2.X Fielding																																

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 1235 / <i>Mine Warfare Planning and Analysis</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
MEDAL				
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.X Development	1	2016	4	2019
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V2.X Development	3	2018	4	2021
Test and Evaluation: MEDAL EA V1.X Development and Regression Test & Evaluation: MEDAL EA V1.X Development and Regression Test & Evaluation	1	2016	4	2019
Test and Evaluation: MEDAL EA V2.X Development and Regression Test & Evaluation: MEDAL EA V2.X Development and Regression Test & Evaluation	1	2019	4	2021
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.1 Fielding	1	2016	4	2017
Delivery Milestones: MEDAL EA V1.X Fielding: MEDAL EA V1.X Fielding	3	2017	2	2021
Delivery Milestones: MEDAL EA V2.X Fielding: MEDAL EA V2.X Fielding	3	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>				Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
2094.: <i>Unmanned Underwater Vehicle</i>	52.199	13.416	12.165	67.607	-	67.607	79.336	122.469	154.342	163.841	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The 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 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 Persistent Littoral Undersea Surveillance (PLUS) program provides effective, adaptive and persistent undersea surveillance targets over large littoral areas.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: LDUUV Product Development	2.268	7.843	61.114	0.000	61.114
Articles:	-	-	-	-	-
FY 2015 Accomplishments: Achieved Milestone A. Developed draft Request for Proposal (RFP) for Engineering Development Model (EDM) contracts. Completed Interface Control Documents (ICD), Capability Development Document (CDD), and System Requirement Document (SRD). Prepared draft Test and Evaluation Master Plan (TEMP). Continued risk reduction engineering efforts to include Battery Certification, Autonomy, Reliability, and Submarine integration tasking.					
FY 2016 Plans: Complete Test and Evaluation Master Plan (TEMP). Develop government conceptual design for LDUUV prototype. Prepare for and complete Preliminary Design Review (PDR). Continue risk reduction experimentation and prototyping efforts to prove LDUUV can meet targets for extended unmanned operation, and submarine and ship integration efforts enabling LDUUV launch and recovery from submarines and ships.					
FY 2017 Base Plans: Develop detailed government design for LDUUV prototype. Prepare for Critical Design Review (CDR).					

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>Continue the Risk Reduction experimentation efforts to include SG270 battery certification, advanced autonomy and reliability efforts to prove LDUUV can meet targets for extended unmanned operation, and submarine/ship integration efforts enabling LDUUV launch and recovery from submarines and ships.</p> <p>FY 2017 OCO Plans: N/A</p>					
<p>Title: LDUUV Support</p> <p align="right">Articles:</p> <p>FY 2015 Accomplishments: Conducted Milestone A. Developed statutory documents for Gate 4 and 5 reviews. Released draft RFP. Formulated proposal evaluation team to review bids. Conducted technology risk reduction efforts.</p> <p>FY 2016 Plans: Develop and update program documentation based on prototype conceptual design and PDR.</p> <p>FY 2017 Base Plans: Update program documentation based on prototype detail design. Prepare for CDR.</p> <p>FY 2017 OCO Plans: N/A</p>	7.725	2.863	4.839	0.000	4.839
	-	-	-	-	-
<p>Title: LDUUV Management</p> <p align="right">Articles:</p> <p>FY 2015 Accomplishments: Provided program management support and travel for the LDUUV 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.</p> <p>FY 2016 Plans: Provide program management support and travel for the LDUUV program. Program management shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts and</p>	0.705	1.459	1.654	0.000	1.654
	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
coordination with Navy and other DoD organizations and contractors as required to ensure successful execution of the program. FY 2017 Base Plans: Provide program management support and travel for the LDUUV 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. FY 2017 OCO Plans: N/A					
Title: Persistent Littoral Undersea Surveillance (PLUS) <p align="right">Articles:</p> Description: Persistent Littoral Undersea Surveillance (PLUS): The Persistent Littoral Undersea Surveillance (PLUS) program provides effective, adaptive and persistent undersea surveillance targets over large littoral areas. FY 2015 Accomplishments: -Continue all efforts from FY14 unless noted as completed above. -Complete the testing of the updated communications throughout the system -Complete construction and the testing and evaluation of the Revised and Optimized PLUS Sensor Vehicle FY 2016 Plans: N/A FY 2017 Base Plans: N/A FY 2017 OCO Plans: N/A	2.718	0.000	0.000	0.000	0.000
	-	-	-	-	-
Accomplishments/Planned Programs Subtotals	13.416	12.165	67.607	0.000	67.607

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

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>

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

Remarks

D. Acquisition Strategy

The LDUUV program will design, build, and test two prototype UUVs to Navy requirements followed by award of production contract. This effort will transition to PEO-LCS / PMS406 as a User Operational Evaluation System (UOES) in FY 2013.

E. Performance Metrics

LDUUV - PDR 4Q 2016

Performance metrics for this effort are classified.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
1319 / 4				PE 0603502N / Surface & Shallow Water MCM				2094. / Unmanned Underwater Vehicle							
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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 Experimentation and Prototype Design	WR	NUWC Newport : Newport, RI	2.347	2.097	Dec 2014	7.843	Mar 2016	61.114	Nov 2016	-		61.114	0.000	73.401	-
PLUS Prototype	Various	Various : Various	13.299	0.000		0.000		0.000		-		0.000	0.000	13.299	-
Arrays	C/CPFF	Ocean Acoustical Services and instrumentation : Lexington, MA	0.686	0.102	Oct 2014	0.000		0.000		-		0.000	0.000	0.788	-
TDA's	C/CPFF	Ocean Acoustical Services and instrumentation : Lexington, MA	0.411	0.050	Oct 2014	0.000		0.000		-		0.000	0.000	0.461	-
SP-Intergration	C/CPFF	Ocean Acoustical Services and instrumentation : Lexington, MA	0.686	0.050	Oct 2014	0.000		0.000		-		0.000	0.000	0.736	-
TDA's	C/CPFF	METRON : Reston, VA	0.411	0.050	Oct 2014	0.000		0.000		-		0.000	0.000	0.461	-
Navigation	C/FPRP	Woods Hole Oceanographic Institution : Woods Hole, MA	0.548	0.150	Oct 2014	0.000		0.000		-		0.000	0.000	0.698	-
SP-Intergration	Reqn	NAVSEA : Baltimore, MD	0.686	0.100	Oct 2014	0.000		0.000		-		0.000	0.000	0.786	-
TDA's	Reqn	NUWC : Newport, RI	0.411	0.150	Oct 2014	0.000		0.000		-		0.000	0.000	0.561	-
SP Intergration	Reqn	NUWC : Newport, RI	0.274	0.025	Oct 2014	0.000		0.000		-		0.000	0.000	0.299	-
Anti-Tamper	Reqn	Sandia Natl Lab : Livermore, CA	0.686	0.150	Oct 2014	0.000		0.000		-		0.000	0.000	0.836	-
Vehicle	C/CPFF	Hydroid Kongsberg Marine : Pocasset, MA	0.823	0.200	Oct 2014	0.000		0.000		-		0.000	0.000	1.023	-
Subtotal			21.268	3.124		7.843		61.114		-		61.114	0.000	93.349	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>
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Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LDUUV ILS & Engineering Support	Various	VAR : VAR	9.872	7.896	Dec 2014	2.863	Nov 2015	4.839	Nov 2016	-		4.839	0.000	25.470	-
PLUS ILS & Engineering Support	Various	VAR : VAR	8.321	0.000		0.000		0.000		-		0.000	0.000	8.321	-
Test	Reqn	NUWC : Newport, RI	0.041	0.150	Oct 2014	0.000		0.000		-		0.000	0.000	0.191	-
Test	Reqn	NSWD : Dahlgren, VA	0.082	0.150	Oct 2014	0.000		0.000		-		0.000	0.000	0.232	-
Test	Reqn	NUWC : Patuxent, MD	0.027	0.075	Oct 2014	0.000		0.000		-		0.000	0.000	0.102	-
IA	Reqn	NUWC : Newport, RI	0.205	0.075	Oct 2014	0.000		0.000		-		0.000	0.000	0.280	-
Subtotal			18.548	8.346		2.863		4.839		-		4.839	0.000	34.596	-

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PLUS Fleet Experimentation	Various	Various : Various	5.077	0.000		0.000		0.000		-		0.000	0.000	5.077	-
Test	C/CPFF	Ocean Acoustical Services and instrumentation : Lexington, MA	0.561	0.100	Oct 2014	0.000		0.000		-		0.000	0.000	0.661	-
Test	C/FPRP	Woods Hole Oceanographic Institution : Woods Hole, MA	1.223	0.150	Oct 2014	0.000		0.000		-		0.000	0.000	1.373	-
Testing	C/CPFF	Woods Hole Oceanographic Institution : Woods Hole, MA	0.480	0.125	Oct 2014	0.000		0.000		-		0.000	0.000	0.605	-
Testing	Reqn	NUWC : Newport, RI	0.437	0.175	Oct 2014	0.000		0.000		-		0.000	0.000	0.612	-
Testing	Reqn	NPS : Monterey, CA	0.034	0.025	Oct 2014	0.000		0.000		-		0.000	0.000	0.059	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / Surface & Shallow Water MCM	Project (Number/Name) 2094. / Unmanned Underwater Vehicle
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Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Testing	Reqn	SPAWAR : San Diego, CA	0.213	0.028	Oct 2014	0.000		0.000		-		0.000	0.000	0.241	-
Subtotal			8.025	0.603		0.000		0.000		-		0.000	0.000	8.628	-

Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LDUUV Program Management	WR	NUWC Newport : Newport, RI	0.965	0.400	Dec 2014	0.450	Dec 2015	0.525	Dec 2016	-		0.525	Continuing	Continuing	Continuing
LDUUV Program Management 2	TBD	TBD : TBD	0.835	0.240	Feb 2015	0.824	Dec 2015	0.970	Dec 2016	-		0.970	0.000	2.869	-
LDUUV Travel	Various	NAVSEA : Washington, DC	0.150	0.065	Dec 2014	0.185	Dec 2015	0.159	Dec 2016	-		0.159	0.000	0.559	-
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	-
Program	C/CPFF	Systems Planning & Analysis : Arlington, VA	0.400	0.150	Oct 2014	0.000		0.000		-		0.000	0.000	0.550	-
Program	SS/BA	Kentco : Sterling, VA	0.427	0.438	Oct 2014	0.000		0.000		-		0.000	0.000	0.865	-
Program	SS/BA	Mandex : Fairfax, VA	0.181	0.050	Oct 2014	0.000		0.000		-		0.000	0.000	0.231	-
Subtotal			4.358	1.343		1.459		1.654		-		1.654	-	-	-

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		52.199	13.416	12.165	67.607	-	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>
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	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021							
	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				
LDUUV Development																																
Acquisition Milestones																																
Milestones				MS A ▲	Gate 4 Review ▲																				Gate 5/6 Review ▲							
Milestone Documentation	Milestone A Documentation																															
System Development																																
Experimentation Risk Reduction	Experimentation Risk Reduction and TRL Maturation																															
Prototype Design and Fabrication (Modular Vehicle and Payload)									Conceptual Design				Detail Design				Fabrication															
Design Reviews									PDR ◆				CDR ◆																			
Testing																	DT/OA				IOT&E											
Production Contract																																
Production Request for Proposal (RFP)																	Draft RFP ◆				Issue RFP ◆											
LDUUV UOES (INPs)																																
INP Deliveries																	Operational Risk Reduction															
Fleet Familiarization Training and Exercises																	Tactics, Techniques, Procedures (TTPs) and CONOP development															

2017PB - 0603502N - 2094.L24

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>
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PE 0603502N PLUS SPEED TO FLEET R&D Initiative R-4	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
User Interface for the Operator consoles for the command and control <div style="text-align: right; margin-right: 20px;">Development A</div>	SRR																											
Evaluation of IA and Anti-Tamper on a test vehicle <div style="text-align: right; margin-right: 20px;">Development B</div>	SRR																											

2017DON - 0603502N - 2094.S14

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>LDUUV Development</i>				
Acquisition Milestones: Milestones: Milestone A	4	2015	4	2015
Acquisition Milestones: Milestones: Gate 4 Review	1	2016	1	2016
Acquisition Milestones: Milestones: Gate 5/6	4	2020	4	2020
Acquisition Milestones: Milestone Documentation: Milestone A Documentation	1	2015	2	2015
System Development: Expirementation Risk Reduction: Technology Risk Reduction	1	2015	4	2018
System Development: Prototype Design and Fabrication (Modular Vehicle and Payload): Prototype Conceptual Design	2	2016	4	2016
System Development: Prototype Design and Fabrication (Modular Vehicle and Payload): Prototype Detail Design	1	2017	1	2018
System Development: Prototype Design and Fabrication (Modular Vehicle and Payload): Prototype Fabrication	2	2018	4	2019
System Development: Design Reviews: PDRs	4	2016	4	2016
System Development: Design Reviews: CDRs	1	2018	1	2018
System Development: Testing: Developemental Testing/Operational Assessment	1	2020	3	2020
System Development: Testing: Initial Operation Test and Evaluation	2	2021	3	2021
Production Contract: Production Request for Proposal (RFP): Draft Production RFP	3	2020	3	2020
Production Contract: Production Request for Proposal (RFP): Issue Production RFP	1	2021	1	2021
LDUUV UOES (INPs): INP Deliveries: Risk Reduction	1	2019	4	2021
LDUUV UOES (INPs): Fleet Familiarization Training and Exercises: Schedule Detail	2	2019	3	2021
<i>PE 0603502N PLUS SPEED TO FLEET R&D Initiative R-4</i>				
User Interface for the Operator consoles for the command and control: Development A: SRR	1	2015	1	2015

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2094. / <i>Unmanned Underwater Vehicle</i>

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Evaluation of IA and Anti-Tamper on a test vehcile: Development B: SRR	1	2015	1	2015

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy										Date: February 2016		
Appropriation/Budget Activity 1319 / 4					R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>				Project (Number/Name) 2131 / <i>Assault Breaching System</i>			
COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
2131: <i>Assault Breaching System</i>	577.790	17.348	15.598	20.201	-	20.201	16.080	18.526	19.123	17.495	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

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. Under the umbrella of evolutionary acquisition, three increments of development are planned. Block I is a multispectral sensor capable of daytime detection of surface-laid minefields and obstacles in the Beach Zone. Block II 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 near real-time processing of multispectral imagery data. Block III adds an interferometric sensor that is capable of detecting buried mines. Blocks II and III will incorporate technology being developed by 6.3 S&T. COBRA consists of a modular payload architecture that can be integrated onto the MQ-8B Fire Scout Vertical Takeoff and Landing Unmanned Aerial Vehicle (VTUAV) or USN manned helicopters like the SH-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.

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2131 / <i>Assault Breaching System</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>Title: Product Development:</p> <p align="right">Articles:</p> <p>FY 2015 Accomplishments: COBRA - Continued Block 1 integration Flight Tests with VTUAV. Continued design and development of COBRA Block II capability.</p> <p>JABS - Designed and engineered weapon effectiveness for beach zones and surf zone.</p> <p>Precision Navigation/Marking (PN/M) - continued evaluation/assessment of EDMs supporting PN/M efforts.</p> <p>FY 2016 Plans: COBRA - Continue Block 1 integration Flight Tests with VTUAV. Continue design and development of COBRA Block II capability.</p> <p>JABS - Design and engineering of weapon effectiveness for beach zones and surf zone.</p> <p>Precision Navigation/Marking (PN/M) - continue evaluation/assessment of EDMs supporting PN/M efforts.</p> <p>FY 2017 Base Plans: COBRA - Complete Block 1 integration Flight Tests with VTUAV. Increased design and development of COBRA Block II capability.</p> <p>JABS - Design and engineering of weapon effectiveness for beach zones and surf zone.</p> <p>Precision Navigation/Marking (PN/M) - continue evaluation/assessment of EDMs supporting PN/M efforts.</p> <p>FY 2017 OCO Plans: N/A</p>	10.749	8.835	11.836	0.000	11.836
<p>Title: Technical Support:</p> <p align="right">Articles:</p> <p>FY 2015 Accomplishments:</p>	1.053	1.105	1.507	0.000	1.507

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2131 / <i>Assault Breaching System</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>COBRA - Provided mine magazine inventory management and shipping, contract and test/studies, C4I Data Fusion. Provided technical /acquisition support and documenttation (ILS, training, data, drawings).</p> <p>FY 2016 Plans: COBRA - Provide mine magazine inventory management and shipping, contract and test/studies, C4I Data Fusion. Provide technical /acquisition support and documenttation (ILS, training, data, drawings).</p> <p>FY 2017 Base Plans: COBRA - Provide mine magazine inventory management and shipping, contract and test/studies, C4I Data Fusion. Provide technical /acquisition support and documenttation (ILS, training, data, drawings).</p> <p>FY 2017 OCO Plans: N/A</p>					
<p>Title: Test and Evaluation:</p> <p align="right">Articles:</p>	4.427	4.523	5.723	0.000	5.723
<p>FY 2015 Accomplishments: COBRA - Conducted Block I Operational Assessment (OA). Advanced component Block II compnent Development Testing.</p> <p>JABS - Surf Zone (SZ) and Beach Zone (BZ) characterization testing.</p> <p>PN/M - Continue to test the Precision Navigation and Marking design capability.</p> <p>FY 2016 Plans: COBRA - Block I Development Testing (DT) and IOT&E. Continue Block II component Development Testing (DT).</p> <p>JABS - Surf Zone (SZ) and Beach Zone (BZ) characterization testing.</p> <p>PN/M - Continue to test the Precision Navigation and Marking design capability</p> <p>FY 2017 Base Plans: COBRA - Continue advanced component Block II compnent Development Testing.</p> <p>JABS - Surf Zone (SZ) and Beach Zone (BZ) characterization testing.</p>	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2131 / <i>Assault Breaching System</i>

B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
PN/M - Continue to test the Precision Navigation and Marking design capability. FY 2017 OCO Plans: N/A					
Title: Management: Articles:	1.119 -	1.135 -	1.135 -	0.000 -	1.135 -
FY 2015 Accomplishments: Mine magazine inventory management and shipping, contract management and tests/studies, C4I/Data fusion.					
FY 2016 Plans: Mine magazine inventory management and shipping, contract management and tests/studies, C4I/Data fusion.					
FY 2017 Base Plans: Mine magazine inventory management and shipping, contract management and tests/studies, C4I/Data fusion.					
FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	17.348	15.598	20.201	0.000	20.201

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPN/2624: SHALLOW WATER Mine CM SHIP	0.000	0.000	8.875	-	8.875	8.770	5.485	5.608	5.721	0.002	82.934

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. COBRA Block II technology transferred from ONR and will achieve MS B in 2nd QTR FY17. COBRA Block III technology will transition in FY18.

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
1319 / 4	PE 0603502N / <i>Surface & Shallow Water MCM</i>	2131 / <i>Assault Breaching System</i>

Precision Navigation & Marking System (PNMS) - The navigation upgrades for the Landing Craft, Air Cushion (LCAC) and Landing Craft, Utility (LCU) are in progress. AAV enhancements will be achieved through an ECP (PMA AAV (Marine Corps)) in 2nd QTR FY 2015.

All of the above systems continue to meet or exceed their Key Performance Parameters.

E. Performance Metrics

Successful COBRA integration, flight tests: Operational Assessment (OA) and Development Testing (DT) into the Vertical Take-off Unmanned Aerial Vehicle (VTUAV).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2131 / <i>Assault Breaching System</i>
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Primary Hardware Dev, COBRA	C/CPAF	Arete : MELBOURNE, FL	158.942	7.974	Nov 2014	5.827	Nov 2015	9.054	Nov 2016	-		9.054	0.000	181.797	-
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	Unknown : Unknown	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		0.000		0.000		-		0.000	0.000	20.860	-
Software Dev, COBRA	WR	NAVAIR : PANAMA CITY, FL	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	Continuing	Continuing	Continuing
JABS	WR	NSWC PC : NSWC IH	5.418	1.244	Nov 2014	1.801	Nov 2015	1.656	Nov 2016	-		1.656	0.000	10.119	-
Training Dev, COBRA	WR	NSWC, PC : PANAMA CITY, FL	9.336	0.775	Nov 2014	0.475	Nov 2015	0.775	Nov 2016	-		0.775	0.000	11.361	-
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	8.463	0.351	Nov 2014	0.251	Nov 2015	0.351	Nov 2016	-		0.351	0.000	9.416	-
Precision Navigation & Marking	WR	NSWC, PC : PANAMA CITY, FL	15.640	0.405	Nov 2014	0.481	Nov 2015	0.000		-		0.000	0.000	16.526	-
Subtotal			386.034	10.749		8.835		11.836		-		11.836	-	-	-

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Support Equipment	WR	NSWC, PC : PANAMA CITY, FL	19.285	0.797	Nov 2014	0.849	Nov 2015	0.849	Nov 2016	-		0.849	0.000	21.780	-
Software Development	WR	NSWC, PC : PANAMA CITY, FL	8.037	0.000		0.000		0.202	Nov 2016	-		0.202	0.000	8.239	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2131 / <i>Assault Breaching System</i>
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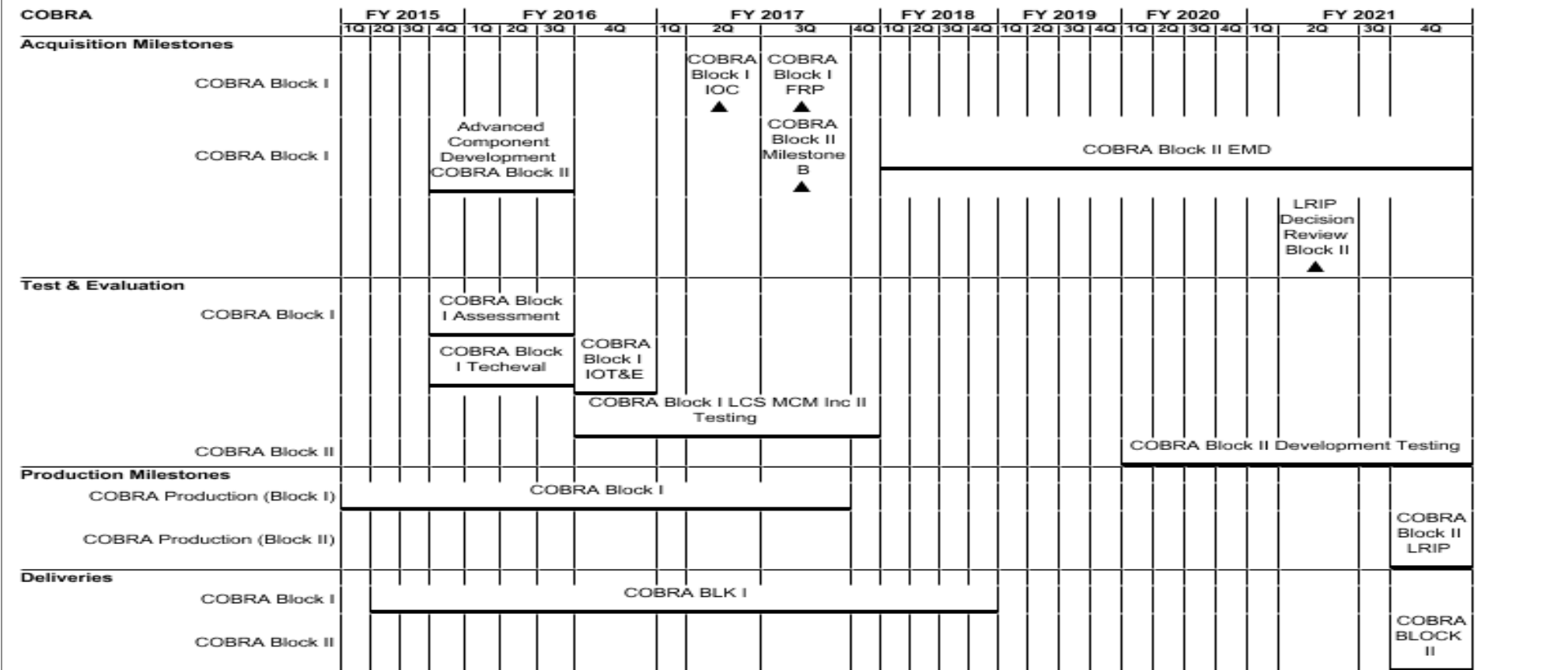
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Integrated Logistics Support	WR	NSWC, IH : NDIAN HEAD, MD	2.712	0.000		0.000		0.100	Nov 2016	-		0.100	0.000	2.812	-
Configuration Management	WR	NSWC, PC : PANAMA CITY, FL	3.744	0.000		0.000		0.100	Nov 2016	-		0.100	0.000	3.844	-
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, PC : PANAMA CITY, FL	5.864	0.256	Nov 2014	0.256	Nov 2015	0.256	Nov 2016	-		0.256	0.000	6.632	-
GFE	WR	NSWC, PC : PANAMA CITY, FL	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
Subtotal			42.630	1.053		1.105		1.507		-		1.507	0.000	46.295	-

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Development Test & Evaluation	WR	NSWC, IH : NDIAN HEAD, MD	56.000	2.424	Nov 2014	2.474	Nov 2015	2.525	Nov 2016	-		2.525	0.000	63.423	-
Operational Test & Evaluation	WR	NSWC/ IH, PC : NDIAN HEAD, PANAMA CITY	8.655	0.000		0.000		1.175	Nov 2016	-		1.175	0.000	9.830	-
Tooling	WR	NSWC/ IH, PC : NDIAN HEAD, PANAMA CITY	0.700	0.000		0.000		0.000		-		0.000	0.000	0.700	-
GFE	WR	NSWC/ IH, PC : NDIAN HEAD, PANAMA CITY	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	-
Development Test	C/FP	NSWC PC : Panama City, FL	9.582	2.003	Nov 2014	2.049	Nov 2015	2.023	Nov 2016	-		2.023	0.000	15.657	-
Subtotal			75.337	4.427		4.523		5.723		-		5.723	0.000	90.010	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2131 / <i>Assault Breaching System</i>
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2017DON - 0603502N - 2131

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 2131 / <i>Assault Breaching System</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
COBRA				
Acquisition Milestones: COBRA Block I: COBRA Block I IOC	2	2017	2	2017
Acquisition Milestones: COBRA Block I: COBRA Block I FRP	3	2017	3	2017
Acquisition Milestones: COBRA Block I: Advanced Component Development Block II	4	2015	3	2016
Acquisition Milestones: COBRA Block I: COBRA Block II EMD	1	2018	4	2021
Acquisition Milestones: COBRA Block I: COBRA Block II Milestone B	3	2017	3	2017
Acquisition Milestones: COBRA Block I: LRIP Decision Review Block II	2	2021	2	2021
Test & Evaluation: COBRA Block I: COBRA Block I Assessment	4	2015	3	2016
Test & Evaluation: COBRA Block I: COBRA Block I Techeval	4	2015	3	2016
Test & Evaluation: COBRA Block I: COBRA Block I IOT&E	4	2016	4	2016
Test & Evaluation: COBRA Block I: COBRA Block I LCS MCM Inc II Testing	4	2016	4	2017
Test & Evaluation: COBRA Block II: COBRA Block II Development Testing	1	2020	4	2021
Production Milestones: COBRA Production (Block I): COBRA Block I	1	2015	3	2017
Production Milestones: COBRA Production (Block II): COBRA Block II LRIP	4	2021	4	2021
Deliveries: COBRA Block I: Block I	2	2015	4	2018
Deliveries: COBRA Block II: Block II	4	2021	4	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 3123 / <i>SMCM UUV</i>
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
3123: <i>SMCM UUV</i>	102.998	17.609	15.392	11.557	-	11.557	25.239	16.945	20.990	21.842	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Knifefish Surface Mine Countermeasure Unmanned Undersea Vehicle (SMCM UUV) program develops Unmanned Underwater Vehicles to support clandestine mine detection capability against volume and bottom mines including buried mine detection. Equipment includes vehicles and associated systems support equipment. Potential P3I candidates to start in FY 2017 include 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 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Knifefish SMCM UUV LFBB	17.609	15.392	11.557	0.000	11.557
Articles:	-	-	-	-	-
FY 2015 Accomplishments: Completed vehicle fabrication. Systems integration and environmental testing. Continued Engineering and Manufacturing Development (E&MD)phase. Performed initial contractor in-water trials.					
FY 2016 Plans: Continue Engineering and Manufacturing Development (E&MD)phase. Complete Developmental Testing/Operational Assessment. Prepare Milestone C documentation.					
FY 2017 Base Plans: Conduct Operational Testing. Achieve Milestone C. Begin Pre-Planned Product Improvement (P3I) development efforts to increase sonar swath width sonar 6-10 times, add onboard data processing, and increase vehicle endurance 2.5 times.					
FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	17.609	15.392	11.557	0.000	11.557

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

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 3123 / <i>SMCM UUV</i>

D. Acquisition Strategy

The Knifefish program was initiated in FY11 to develop Surface Mine Countermeasure Unmanned Undersea Vehicles (SMCM UUV) equipped with Low Frequency Broadband (LFBB) sonar that provides volume and bottom mine detection including buried mine detection capability. Initial procurement of the SMCM UUV with LFBB begins in FY 2017.

E. Performance Metrics

Successful Milestone C in Q2 FY 2017.
Reach Full Rate Production Decision in Q4 FY 2018.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy												Date: February 2016			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
1319 / 4				PE 0603502N / Surface & Shallow Water MCM					3123 / SMCM UUV						
Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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
SMCM UOES Development	C/CPAF	BLUEFIN : CAMBRIDGE, MA	15.142	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Knifefish Development	C/CPIF	Various : Various	17.033	0.464	Dec 2014	0.000		0.000		-		0.000	0.000	17.497	-
Knifefish Development 2	C/CPIF	General Dynamics AIS : McLeansville, NC	43.510	14.749	Dec 2014	11.590	Dec 2015	4.369	Dec 2016	-		4.369	Continuing	Continuing	Continuing
Software Development	WR	NSWC, PC : PANAMA CITY, FL	0.805	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Knifefish P3I Contractor	C/CPIF	TBD : Unknown, Unknown	0.000	0.000		0.000		4.047	Dec 2016	-		4.047	0.000	4.047	-
Subtotal			76.490	15.213		11.590		8.416		-		8.416	-	-	-
Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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 1	WR	NSWC, PC : PANAMA CITY, FL	13.962	0.875	Dec 2014	1.320	Dec 2015	0.508	Dec 2016	-		0.508	Continuing	Continuing	Continuing
Engineering Support 2	WR	NUWC, Newport : NEWPORT, RI	4.290	0.636	Dec 2014	0.542	Dec 2015	0.200	Dec 2016	-		0.200	Continuing	Continuing	Continuing
Engineering Support 3	WR	VARIOUS : VARIOUS	3.079	0.620	Dec 2014	0.946	Dec 2015	0.562	Dec 2016	-		0.562	Continuing	Continuing	Continuing
Engineering Support P3I	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000		0.000		0.211	Dec 2016	-		0.211	0.000	0.211	-
Engineering Support P3I	WR	NUWC, Newport : NEWPORT, RI	0.000	0.000		0.000		0.085	Dec 2016	-		0.085	0.000	0.085	-
Engineering Support P3I	WR	VARIOUS : VARIOUS	0.000	0.000		0.000		0.200	Dec 2016	-		0.200	0.000	0.200	-
Subtotal			21.331	2.131		2.808		1.766		-		1.766	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 3123 / <i>SMCM UUV</i>
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Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Developmental Test & Evaluation	WR	NOMWC : STENNIS, MS	0.526	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Government T&E Support	WR	VARIOUS : VARIOUS	1.213	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test and Evaluation	WR	COMOPTEVFOR : NORFOLK, VA	0.481	0.000	Dec 2014	0.195	Dec 2015	0.280	Dec 2016	-		0.280	Continuing	Continuing	Continuing
Government T&E Support	WR	NSWC, PC : PANAMA CITY, FL	0.000	0.000	Dec 2014	0.449	Dec 2015	0.500	Dec 2016	-		0.500	0.000	0.949	-
Subtotal			2.220	0.000		0.644		0.780		-		0.780	-	-	-

Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Need Item Text	C/BA	Not Specified : Not Specified	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Program Management Support	C/CPFF	VARIOUS : WASHINGTON, DC	2.650	0.240	Jan 2015	0.300	Dec 2015	0.520	Dec 2016	-		0.520	Continuing	Continuing	Continuing
Travel	WR	NAVSEA : WNY, DC	0.260	0.025	Dec 2014	0.050	Dec 2015	0.075	Dec 2016	-		0.075	Continuing	Continuing	Continuing
Acquisition Workforce	WR	VARIOUS : VARIOUS	0.047	0.000		0.000		0.000		-		0.000	0.000	0.047	-
Subtotal			2.957	0.265		0.350		0.595		-		0.595	-	-	-

	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	102.998	17.609	15.392	11.557	-	11.557	-	-	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Navy **Date:** February 2016

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 3123 / <i>SMCM UUV</i>
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Proj 3123	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Knifefish Acquisition Program																												
Knifefish Milestones																												
Knifefish Development																												
Knifefish Design Reviews																												
Knifefish Test Events																												
Knifefish LRIP																												
Knifefish Full Rate Production Decision																												
Knifefish Full Rate Production																												
Knifefish P3I																												
Extended Sonar Range																												
On Board Data Processing Design																												
Energy Section Design																												
Fuel Cell																												
System Testing																												
On Board Processing Upgrades																												

2017PB - 0603502N - 3123

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Navy		Date: February 2016
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603502N / <i>Surface & Shallow Water MCM</i>	Project (Number/Name) 3123 / <i>SMCM UUV</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 3123				
Knifefish Acquisition Program: Knifefish Milestones: Milestone C	2	2017	2	2017
Knifefish Acquisition Program: Knifefish Milestones: IOC	3	2018	3	2018
Knifefish Acquisition Program: Knifefish Development:	1	2015	4	2017
Knifefish Acquisition Program: Knifefish Test Events: DT/OA	2	2016	1	2017
Knifefish Acquisition Program: Knifefish Test Events: OT	4	2017	2	2018
Knifefish Acquisition Program: Knifefish LRIP:	3	2017	3	2018
Knifefish Acquisition Program: Knifefish Full Rate Production Decision:	4	2018	4	2018
Knifefish Acquisition Program: Knifefish Full Rate Production:	4	2018	4	2021
Knifefish P3I: Extended Sonar Range: Extended Range Prelim Design	1	2017	3	2017
Knifefish P3I: Extended Sonar Range: Extended Range Detailed Design	4	2017	1	2018
Knifefish P3I: Extended Sonar Range: Extended Range Fabrication/Test	2	2018	3	2018
Knifefish P3I: On Board Data Processing Design:	1	2017	4	2017
Knifefish P3I: Energy Section Design: Energy Section Design	2	2017	4	2017
Knifefish P3I: Fuel Cell: Fuel Cell Prelim Design	4	2017	2	2018
Knifefish P3I: Fuel Cell: Fuel Cell Detailed Design	3	2018	4	2018
Knifefish P3I: Fuel Cell: Fuel Cell Fabrication	1	2019	2	2019
Knifefish P3I: Fuel Cell: Fuel Cell Test/Safety Cert	3	2019	1	2020
Knifefish P3I: System Testing: System Testing	2	2020	4	2020
Knifefish P3I: On Board Processing Upgrades: Upgrades	1	2021	4	2021