Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy										Date: March 2019	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					**R-1 Program Element (Number/Name)** PE 0604127N I (U)Surface Mine Countermeasures						

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	160.299	12.525	15.527	18.735	-	18.735	18.700	15.020	14.530	14.821	Continuing	Continuing
0530: *Mine Hunt Systems*	0.000	9.483	7.579	6.961	-	6.961	8.374	5.207	4.548	4.639	Continuing	Continuing
1233: *Surface MCM Mid-life Upgrade*	160.299	0.000	0.000	1.011	-	1.011	1.031	1.054	1.075	1.097	Continuing	Continuing
1235: *Mine Warfare Planning and Analysis*	0.000	3.042	7.948	10.763	-	10.763	9.295	8.759	8.907	9.085	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element provides resources in support of development of mine countermeasures 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 minehunting 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. 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. The Surface Mine Countermeasures programs are in general platform independent and will provide detection, classification, localization, identification, neutralization, and influence clearance capabilities. Programs develop: (1) Unmanned minehunting capability for surface platforms; (2) the integration and improvement of new and existing systems (3) support for systems which detect, localize, classify, identify, and neutralize all mine types across MCM Avenger Class and other platforms.

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

2) 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.

3)Mine Warfare and Environmental Decision Aids Library (MEDAL) is the U.S. Navy's single Mine Warfare tactical decision support system for integrated mission planning, evaluation, and situational awareness. MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commander and to individual MCM units.

4) 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.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2020 Navy	**Date:** March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*

5) SSQ-94 MCM Trainer upgrade will incorporate the AN/SQQ-32 (V)4 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

B. Program Change Summary ($ in Millions)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Previous President's Budget	0.000	18.154	20.635	-	20.635
Current President's Budget	12.525	15.527	18.735	-	18.735
Total Adjustments	12.525	-2.627	-1.900	-	-1.900
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-2.627			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.375	0.000			
• Program Adjustments	0.000	0.000	-1.900	-	-1.900
• Congressional Directed Transfer Adjustments	12.900	-	-	-	-

Change Summary Explanation

Program Changes:
FY18: +$12,525K Total adjustments; +$12,900K Congressional transfer from PE 0603502N; -$375K SBIR reduction
FY19: -$2,627K for Excess Growth [MEDAL]
FY20: -$1,900K to account for availability of prior year funding
Technical: Not applicable
Schedule: Not applicable

The FY 2020 funding request was reduced by $1.900 million to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											**Date:** March 2019	
Appropriation/Budget Activity 1319 / 4					**R-1 Program Element (Number/Name)** PE 0604127N / (U)Surface Mine Countermeasures					**Project (Number/Name)** 0530 / Mine Hunt Systems		
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
0530: *Mine Hunt Systems*	0.000	9.483	7.579	6.961	-	6.961	8.374	5.207	4.548	4.639	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

FY 2017 and prior funding in Program Element (PE) 0603502N. Projects moved from PE 0603502N starting in FY 2018.

The FY 2020 funding request was reduced by $1.900 million to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

This project contains resources for systems, subsystems, and sensors integrated for use with the MCM Unmanned Surface Vehicle (MCM USV) for mine detection, classification, localization, identification, neutralization, and influence sweep 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 time for detection, classification, and identification.

The AN/AQS-20 is a minehunting and identification system with sensors housed in an underwater towed body. The sensors are designed for the detection, classification and localization of bottom, close-tethered, and volume targets, and also for the identification of bottom targets. The system will be deployed from the Littoral Combat Ship (LCS) as part of the MCM Mission Package or can be deployed from other Vessels of Opportunity (VOO). The MCM USV is the tow platform for the AN/AQS-20. The AN/AQS-20 Block 1 (the AQS-20A) underwent a Pre-Planned Product Improvement (P3I) program to upgrade the Forward Looking Sonar (FLS) and Side-Looking Sonars (SLS) to improve Probability of Classifying a Mine-like object as a Mine, reduce False Classification, and improve Depth Localization performance to meet Block 2 (the AQS-20C) performance. The Forward Looking Sonar is replaced with a new High Frequency Wideband Forward Looking Sonar (WBFLS) design. The SLS is replaced with a new Multifunction SLS with Synthetic Aperture Sonar (SAS) capability, as well as, improved signal processing and Signal to Noise Ratio. The Block 1 P3I program began in FY 2012 and completed in FY 2017. Award and management for Block 2 production units began in FY 2014 (the AQS-20C). Materiel Reliability, obsolescence, and performance Engineering Change Proposal (ECP) efforts continue beyond FY2024.

In FY 2018, the AN/AQS-20 Block 2 program (AQS-20C) initiated Developmental Testing (DT) (originally scheduled to start at end of FY17), initiated MCM USV integration, and initiated MCM improvements for post mission analysis tools in support of Net-centric Sensor Analysis for Mine Warfare (NSAM) integration for the Fleet Operators. The net effect of these tools combined with the more powerful AN/AQS-20 Block 2 sensors will be improved classification of mines, more accurate vertical localization, reduced false calls, and improved area coverage rate sustained. Improvements also include the collection and ingestion of in-situ environmental data used for mission planning to configure the sensor which optimizes sensor performance during missions. Development of these tools began in FY 2018 and will continue through FY 2021.

Exhibit R-2A, **RDT&E Project Justification:** PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604127N / (U)Surface Mine Countermeasures	**Project (Number/Name)** 0530 / Mine Hunt Systems

In FY 2019, the AN/AQS-20 Block 2 program will complete DT, continue MCM USV integration efforts and support NSAM initial integration. The AN/AQS-20A Block 2 P3I program SAS acoustic mine recognition development will continue to support the potential for automated in-situ mine identification. Additional P3I efforts to include Automated Target Recognition will continue beyond FY 2024. Efforts will include defining and developing necessary improvements for AN/AQS-20 Block 2 integration with the MCM USV.

In FY 2020, the AN/AQS-20 Block 2 program will conduct DT with the MCM USV, support the MCM USV User Operational Evaluation System (UOES), and support workups for the LCS Mission Package (MP) testing.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Title: AN/AQS-20 Product Development	3.036	3.000	2.100	0.000	2.100
Articles:	-	-	-	-	-

FY 2019 Plans:
- Initiate SAS Acoustic mine recognition development.
- Initiate SAS Acoustic mine recognition ECP.
- Continue algorithm development for AN/AQS-20 Block 2 PMA Improvements including NSAM integration.
- Continue AN/AQS-20 Block 2 improvements in support of MCM USV integration.
- Correct deficiencies identified during testing.
- Support MCM USV D&R integration, test, and fixes.
- Complete MCM USV integration.

FY 2020 Base Plans:
- Continue algorithm development for AN/AQS-20 Block 2 PMA Improvements including NSAM integration.
- Correct deficiencies identified during MCM USV developmental testing.
- Continue SAS Acoustic mine recognition development.

FY 2020 OCO Plans:
N/A

FY 2019 to FY 2020 Increase/Decrease Statement:
Decrease in funding as program moves into MCM USV DT in FY20.

Title: AN/AQS-20 Support	0.900	0.900	0.800	0.000	0.800
Articles:	-	-	-	-	-

FY 2019 Plans:
- Provide ongoing technical and management support to AN/AQS-20.
- Continue to conduct test minefield maintenance.

Exhibit R-2A, **RDT&E Project Justification:** PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 **/** 4	**R-1 Program Element (Number/Name)** PE 0604127N **/** *(U)Surface Mine Countermeasures*	**Project (Number/Name)** 0530 **/** *Mine Hunt Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
- Continue AN/AQS-20 Block 2 Mission Planning and Post Mission Analysis MCM USV for Concept of Employment development. - Complete Technical Insertion Plan. ***FY 2020 Base Plans:*** - Provide ongoing technical and management support to AN/AQS-20. - Continue to conduct test minefield maintenance. - Continue AN/AQS-20 Block 2 Mission Planning and Post Mission Analysis MCM USV Concept of Employment development. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Funding decreased from FY 2019 to FY 2020 due to the completion of the Technical Insertion Plan.					
Title: AN/AQS-20 Test and Evaluation ***Articles:***	5.047 -	3.179 -	3.561 -	0.000 -	3.561 -
FY 2019 Plans: - Complete AN/AQS-20 Block 2 DT. - Initiate SAS Acoustic recognition Testing. - Update Test and Evaluation Master Plan. - Conduct additional post DT AN/AQS-20C characterization and confidence testing to support tactics development. - Support MCM USV D&R integration and testing. ***FY 2020 Base Plans:*** - Continue SAS Acoustic recognition Testing. - Conduct contractor integration testing with the MCM USV. - Conduct DT with the MCM USV. - Refine tactics post MCM USV DT. - Support MCM USV User Operational Evaluation System (UOES) testing. ***FY 2020 OCO Plans:***					

Exhibit R-2A, **RDT&E Project Justification:** PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*	**Project (Number/Name)** 0530 *I Mine Hunt Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: Funding increase to support DT and UOES testing with MCM USV.					
Title: AN/AQS-20 Management Services	0.500	0.500	0.500	0.000	0.500
Articles:	-	-	-	-	-
FY 2019 Plans: - Provide planning and management for the AN/AQS-20 program. - Continue acquisition documentation in support of Full Rate Production (FRP) Decision Review. - Continue to provide Program Office travel support. ***FY 2020 Base Plans:*** - Provide planning and management for the AN/AQS-20 program. - Complete update of acquisition documentation in support of Full Rate Production (FRP) Decision Review. - Continue to provide Program Office travel support. - Conduct competitive procurement source selection efforts. ***FY 2020 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	9.483	7.579	6.961	0.000	6.961

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• OPN/1601: *LCS MCM Mission Modules*	45.146	98.901	197.129	-	197.129	222.831	222.523	233.151	243.503	1,213.078	2,655.367

Remarks

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

D. Acquisition Strategy

AN/AQS-20 LRIP procurement continued following Block 2 (AQS-20C units) competitive contract award in FY 2014. Continue to meet MCM MP requirements to support production of Block 2 units. Conduct competitive procurement in FY 2020 and align resources with the MCM USV program.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*	**Project (Number/Name)** 0530 *I Mine Hunt Systems*

E. Performance Metrics

 AN/AQS-20 - Successfully complete Block 2 DT in FY 2019. Achieve Full Rate Production (FRP) in FY 2020.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019	
Appropriation/Budget Activity 1319 / 4					**R-1 Program Element (Number/Name)** PE 0604127N / (U)Surface Mine Countermeasures						**Project (Number/Name)** 0530 / Mine Hunt Systems		

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 Block 2 Integration	C/CPFF	Lockheed Martin : Not Specified	0.000	0.300	Nov 2017	0.000		0.000		-		0.000	0.000	0.300	-
AN/AQS-20 P3I	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.509	Nov 2017	1.100	Nov 2018	1.800	Nov 2019	-		1.800	Continuing	Continuing	Continuing
AN/AQS-20 P3I	C/CPFF	ARL/UT : Austin, TX	0.000	0.000		0.250	Nov 2018	0.100	Dec 2019	-		0.100	Continuing	Continuing	Continuing
AN/AQS-20 Block 2 PMA	WR	NSWC, PC : Panama City FL	0.000	1.099	Nov 2017	0.800	Oct 2018	0.100	Oct 2019	-		0.100	Continuing	Continuing	Continuing
AN/AQS-20 Block 2 PMA	C/CPFF	ARL/UT : Austin, TX	0.000	1.128	Feb 2018	0.850	Nov 2018	0.100	Dec 2019	-		0.100	Continuing	Continuing	Continuing
Subtotal			0.000	3.036		3.000		2.100		-		2.100	Continuing	Continuing	N/A

Remarks

FY 2017 and prior funding in Program Element (PE) 0603502N.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 Engineering Services	WR	NUWC/NPT : Newport, RI	0.000	0.365	Oct 2017	0.000		0.000		-		0.000	0.000	0.365	-
AN/AQS-20 Engineering Services	WR	NSWC, PC : Panama City, FL	0.000	0.135	Nov 2017	0.135	Oct 2018	0.140	Oct 2019	-		0.140	Continuing	Continuing	Continuing
AN/AQS-20 Engineering Services	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.200	Dec 2017	0.200	Nov 2018	0.200	Nov 2019	-		0.200	Continuing	Continuing	Continuing
AN/AQS-20 ILS Function	WR	NSWC, PC : Panama City FL	0.000	0.200	Nov 2017	0.565	Nov 2018	0.460	Nov 2019	-		0.460	Continuing	Continuing	Continuing
Subtotal			0.000	0.900		0.900		0.800		-		0.800	Continuing	Continuing	N/A

Remarks

FY 2017 and prior funding in Program Element (PE) 0603502N.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019

Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0604127N / (U)Surface Mine Countermeasures	Project (Number/Name) 0530 / Mine Hunt Systems

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 T&E Functions	WR	COTF : Norfolk, VA	0.000	0.200	Feb 2018	0.200	Nov 2018	0.200	Nov 2019	-		0.200	Continuing	Continuing	Continuing
AN/AQS-20 T&E Functions	WR	NSWC, PC : Panama City FL	0.000	4.247	Feb 2018	2.479	Oct 2018	2.851	Oct 2019	-		2.851	Continuing	Continuing	Continuing
AN/AQS-20 T&E Functions	C/CPFF	Raytheon : Portsmouth, RI	0.000	0.600	Feb 2018	0.500	Nov 2018	0.510	Nov 2019	-		0.510	Continuing	Continuing	Continuing
		Subtotal	0.000	5.047		3.179		3.561		-		3.561	Continuing	Continuing	N/A

Remarks

FY 2017 and prior funding in Program Element (PE) 0603502N.

COTF - Naval Command Operational Test and Evaluation Force

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AN/AQS-20 Management Services	TBD	Various : Various	0.000	0.470	Dec 2017	0.470	Dec 2018	0.470	Dec 2019	-		0.470	Continuing	Continuing	Continuing
AN/AQS-20 Travel	TBD	Various : Various	0.000	0.030	Mar 2018	0.030	Mar 2019	0.030	Mar 2020	-		0.030	Continuing	Continuing	Continuing
		Subtotal	0.000	0.500		0.500		0.500		-		0.500	Continuing	Continuing	N/A

Remarks

FY 2017 and prior funding in Program Element (PE) 0603502N.

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	9.483	7.579	6.961	-	6.961	Continuing	Continuing	N/A

Remarks

FY 2017 and prior funding in Program Element (PE) 0603502N.

Exhibit R-4, **RDT&E Schedule Profile:** PB 2020 Navy | **Date:** March 2019

| **Appropriation/Budget Activity** 1319 / 4 | **R-1 Program Element (Number/Name)** PE 0604127N / (U)Surface Mine Countermeasures | **Project (Number/Name)** 0530 / Mine Hunt Systems |

Proj 0530 — Schedule profile spanning FY 2018 through FY 2024

- **AN/AQS-20 Program Milestones:** FRPD Blk 2 (FY2020 3Q), IOC (FY2020 4Q)
- **AN/AQS-20 Development Phase:** Blk 2 P3I; Blk 2 ECP Development
- **iPMA Development:** Development; Integration & Test
- **Deploy and Retrieve (D&R) Development:** D&R Fabrication; D&R Int.; System Integration & Test
- **AN/AQS-20 Test and Evaluation:** Blk 2 CT; Blk 2 DT; DT; MCM USV UOES; Blk 2 DT/TechEval/IOT&E
- **MCM Mission Package Testing:** MCM MP DT; MCM MP TECHEVAL; MCM MP IOT&E
- **AN/AQS-20 Production:**
  - Production: Blk 2 Basic (2 Units); Blk 2 Option 1 (4 Units); Blk 2 Option 2 (2 Units); Blk 2 Option 3 (4 Units); Blk 2 Option 4 (4 Units)
  - Deliveries: Blk 2 (10 Units); Blk 2 Basic (2 Units); Blk 2 Option 1 (4 Units); Blk 2 Option 2 (2 Units)

2020PB – 0604127N – 0530

PE 0604127N: (U)Surface Mine Countermeasures
Navy

R-1 Line #81

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0604127N / (U)Surface Mine Countermeasures	**Project (Number/Name)** 0530 / Mine Hunt Systems

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Proj 0530				
AN/AQS-20 Program Milestones: AN/AQS-20 Full Rate Production (FRP) Decision Block 2	3	2020	3	2020
AN/AQS-20 Program Milestones: Initial Operational Capability (IOC)	4	2020	4	2020
AN/AQS-20 Development Phase: AN/AQS-20 Block 2 P3I	1	2018	4	2024
AN/AQS-20 Development Phase: AN/AQS-20 Materiel Reliability, Obsolesence, and Performance ECP Development (Block 2)	1	2018	4	2024
iPMA Development: iPMA Development	1	2018	1	2019
iPMA Development: iPMA/NSAM Integration and Test	2	2019	1	2021
Deploy and Retrieve (D&R) Development: Raytheon D&R Fabrication	1	2018	1	2019
Deploy and Retrieve (D&R) Development: D&R Integration	2	2019	2	2019
Deploy and Retrieve (D&R) Development: System Integration and Test	3	2019	4	2019
AN/AQS-20 Test and Evaluation: AN/AQS-20 Block 2 CT	2	2018	2	2018
AN/AQS-20 Test and Evaluation: AN/AQS-20 Block 2 DT	4	2018	2	2019
AN/AQS-20 Test and Evaluation: AN/AQS-20/MCM USV DT	3	2020	3	2020
AN/AQS-20 Test and Evaluation: MCM USV UOES	3	2020	1	2021
AN/AQS-20 Test and Evaluation: DT/TechEval/IOT&E w/ MCM MP	3	2021	3	2022
MCM Mission Package Testing: MCM MP Developmental Testing	3	2021	3	2021
MCM Mission Package Testing: MCM MP Tech Eval	4	2021	1	2022
MCM Mission Package Testing: MCM MP IOT&E	1	2022	2	2022
AN/AQS-20 Production: Production: AN/AQS-20 Block 2 New Basic Award (2 Units)	4	2020	4	2020
AN/AQS-20 Production: Production: AN/AQS-20 Block 2 Option 1 Award (4 Units)	2	2021	2	2021
AN/AQS-20 Production: Production: AN/AQS-20 Block 2 Option 2 Award (2 Units)	2	2022	2	2022

Exhibit R-4A, **RDT&E Schedule Details:** PB 2020 Navy					**Date:** March 2019	

Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*	**Project (Number/Name)** 0530 *I Mine Hunt Systems*

	Start		**End**	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AN/AQS-20 Production: Production: AN/AQS-20 Block 2 Option 3 Award (4 Units)	2	2023	2	2023
AN/AQS-20 Production: Production: AN/AQS-20 Block 2 Option 4 Award (4 Units)	2	2024	2	2024
AN/AQS-20 Production: Deliveries: AN/AQS-20 Block 2 Systems (10 Units)	4	2018	2	2019
AN/AQS-20 Production: Deliveries: AN/AQS-20 Block 2 New Basic Award Systems (2 Units)	4	2022	4	2022
AN/AQS-20 Production: Deliveries: AN/AQS-20 Block 2 Option 1 Systems (4 Units)	2	2023	2	2023
AN/AQS-20 Production: Deliveries: AN/AQS-20 Block 2 Option 2 Systems (2 Units)	2	2024	2	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										Date: March 2019	
Appropriation/Budget Activity 1319 *I* 4				**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*					**Project (Number/Name)** 1233 *I Surface MCM Mid-life Upgrade*		

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
1233: *Surface MCM Mid-life Upgrade*	160.299	0.000	0.000	1.011	-	1.011	1.031	1.054	1.075	1.097	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

This project is a new start in FY2020

A. Mission Description and Budget Item Justification

This project provides resources for development, improvement and integration of SSQ-94 MCM Trainer. Trainer upgrade will incorporate the AN/SQQ-32 (V)4 sonar, SSN2(V)5 PINS and Mine Neutralization System Team Trainer.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Product Development	0.000	0.000	1.011	0.000	1.011
Articles:	-	-	-	-	-
Description: SSQ-94 MCM Trainer Development *FY 2019 Plans:* N/A *FY 2020 Base Plans:* Integrate MEDAL planning into the SSQ-94 MCM Trainer. *FY 2020 OCO Plans:* N/A *FY 2019 to FY 2020 Increase/Decrease Statement:* Increase in funding to integrate MEDAL Planning into the SSQ-94 MCM Trainer.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	1.011	0.000	1.011

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, **RDT&E Project Justification:** PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*	**Project (Number/Name)** 1233 *I Surface MCM Mid-life Upgrade*

D. Acquisition Strategy

  SSQ-94 - Naval Surface Warfare Center, Panama City (NSWC, PC) and ARL UT designed and developed the SSQ-94 MCM Trainer.

E. Performance Metrics

  SSQ-94 Trainer upgrade completion

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy | | | | | | | | | | | | | | **Date:** March 2019 |

| Appropriation/Budget Activity
1319 I 4 | R-1 Program Element (Number/Name)
PE 0604127N I (U)Surface Mine Countermeasures | Project (Number/Name)
1233 I Surface MCM Mid-life Upgrade |

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MNS Development	Various	TBD : TBD	22.455	0.000		0.000		0.000		-		0.000	0.000	22.455	-
SSQ-94 Trainer	WR	NSWC, PC : NSWC, PC	16.344	0.000		0.000		1.011	Dec 2019	-		1.011	0.000	17.355	-
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	ARL UT : TEXAS	15.511	0.000		0.000		0.000		-		0.000	0.000	15.511	-
Primary Hardware Development 2	WR	ARL-UT : AUSTIN, TX	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
HFWB: Tow Cable Development	C/CPAF	ARL UT : 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	ARL UT : TEXAS	9.065	0.000		0.000		0.000		-		0.000	0.000	9.065	-
Software Development MEDAL EA	C/CPFF	SAIC : McLean, VA	41.180	0.000		0.000		0.000		-		0.000	0.000	41.180	-
Subtotal			113.136	0.000		0.000		1.011		-		1.011	Continuing	Continuing	N/A

PE 0604127N: (U)Surface Mine Countermeasures
Navy

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy				**Date:** March 2019
Appropriation/Budget Activity 1319 I 4		**R-1 Program Element (Number/Name)** PE 0604127N I (U)Surface Mine Countermeasures		**Project (Number/Name)** 1233 I Surface MCM Mid-life Upgrade

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Develop Logistics Products	WR	NSWC, PC : PANAMA CITY, FL	0.243	0.000		0.000		0.000		-		0.000	0.000	0.243	-
Software Development 1	C/CPFF	SAIC : McLean, VA	0.350	0.000		0.000		0.000		-		0.000	0.000	0.350	-
Software Development 2	C/CPFF	SAIC : McLean, Va	0.914	0.000		0.000		0.000		-		0.000	0.000	0.914	-
HFWB Software Development	C/CPAF	ARL-UT : TEXAS	8.450	0.000		0.000		0.000		-		0.000	0.000	8.450	-
HFWB Integrated Logistics Support	WR	NSWC, PC : PANAMA CITY, FL	2.765	0.000		0.000		0.000		-		0.000	0.000	2.765	-
Software Engineering 1 MCM CES	WR	NSWC, PC : PANAMA CITY, FL	1.517	0.000		0.000		0.000		-		0.000	0.000	1.517	-
Software Engineering 2 MEDAL	WR	NSWC, PC : PANAMA CITY, FL	2.458	0.000		0.000		0.000		-		0.000	0.000	2.458	-
Subtotal			16.697	0.000		0.000		0.000		-		0.000	0.000	16.697	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL Test and Evaluation	C/FP	SAIC : McLean, VA	7.636	0.000		0.000		0.000		-		0.000	0.000	7.636	-
MCM CES Test and Evaluation 1	C/CPAF	VARIOUS : VARIOUS	1.782	0.000		0.000		0.000		-		0.000	0.000	1.782	-
HFWB: Developmental Test and Evaluation	C/CPAF	ARL-UT : TEXAS	5.925	0.000		0.000		0.000		-		0.000	0.000	5.925	-
Test and Evaluation 2	C/CPAF	VARIOUS : VARIOUS	5.204	0.000		0.000		0.000		-		0.000	0.000	5.204	-
Subtotal			20.547	0.000		0.000		0.000		-		0.000	0.000	20.547	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy													Date: March 2019	
Appropriation/Budget Activity 1319 I 4							**R-1 Program Element (Number/Name)** PE 0604127N I (U)Surface Mine Countermeasures						**Project (Number/Name)** 1233 I Surface MCM Mid-life Upgrade	

Management Services ($ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	**Contract Method & Type**	**Performing Activity & Location**	**Prior Years**	**Cost**	**Award Date**	**Cost**	**Award Date**	**Cost**	**Award Date**	**Cost**	**Award Date**	**Cost**	**Cost To Complete**	**Total Cost**	**Target Value of Contract**
Program Management Support 1	C/CPFF	CACI : WASHINGTON, DC	0.263	0.000		0.000		0.000		-		0.000	0.000	0.263	-
Travel 1	WR	NAVSEA : WNY, DC	0.084	0.000		0.000		0.000		-		0.000	0.000	0.084	-
Government Engineering Support1	WR	NSWC, PC : PANAMA CITY, FL	0.325	0.000		0.000		0.000		-		0.000	0.000	0.325	-
MEDAL Program Management Support 2	Various	VARIOUS : VARIOUS	2.827	0.000		0.000		0.000		-		0.000	0.000	2.827	-
SBIR Assessment 2	Various	VARIOUS : VARIOUS	0.019	0.000		0.000		0.000		-		0.000	0.000	0.019	-
Program Management Support 3	C/CPFF	CACI : WASHINGTON, DC	1.341	0.000		0.000		0.000		-		0.000	0.000	1.341	-
Program Management Support 4	C/CPFF	CACI : WASHINGTON, DC	0.080	0.000		0.000		0.000		-		0.000	0.000	0.080	-
Government Engineering Support3	WR	NSWC, PC : PANAMA CITY, FL	0.090	0.000		0.000		0.000		-		0.000	0.000	0.090	-
Travel 3	C/CPAF	NAVSEA : WNY, DC	0.256	0.000		0.000		0.000		-		0.000	0.000	0.256	-
Program Management Support 5	C/CPFF	CACI : WASHINGTON, DC	0.167	0.000		0.000		0.000		-		0.000	0.000	0.167	-
Government Engineering Support4	WR	NSWC, PC : PANAMA CITY, FL	0.010	0.000		0.000		0.000		-		0.000	0.000	0.010	-
Travel4	C/CPAF	NSWC, PC : PANAMA CITY, FL	0.069	0.000		0.000		0.000		-		0.000	0.000	0.069	-
HFWB: Program Management Support 6	C/CPAF	VARIOUS : VARIOUS	1.442	0.000		0.000		0.000		-		0.000	0.000	1.442	-
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	-

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy													Date: March 2019	
Appropriation/Budget Activity 1319 *I* 4								**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*				**Project (Number/Name)** 1233 *I Surface MCM Mid-life Upgrade*		

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	Award Date	FY 2019 Cost	Award Date	FY 2020 Base Cost	Award Date	FY 2020 OCO Cost	Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support 7	C/CPAF	VARIOUS : VARIOUS	0.350	0.000		0.000		0.000		-		0.000	0.000	0.350	-
Acquisition Workforce Fund	Various	VARIOUS : VARIOUS	0.122	0.000		0.000		0.000		-		0.000	0.000	0.122	-
Subtotal			9.919	0.000		0.000		0.000		-		0.000	0.000	9.919	N/A

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	160.299	0.000	0.000	1.011	-	1.011	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*	**Project (Number/Name)** 1233 *I Surface MCM Mid-life Upgrade*

SSQ-94 Trainer

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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

SSQ-94 MCS Trainer

MCS Trainer Development

MCS Integration and Testing

2020DON - 0604127N - 1233

Exhibit R-4A, **RDT&E Schedule Details:** PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*	**Project (Number/Name)** 1233 *I Surface MCM Mid-life Upgrade*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SSQ-94 Trainer				
System Development: SSQ-94 MCS Trainer: SSQ-94 MCS Trainer Development	1	2020	4	2022
System Development: SSQ-94 MCS Trainer: SSQ-94 MCS Integration and Testing	1	2023	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy										**Date:** March 2019	
Appropriation/Budget Activity 1319 I 4				**R-1 Program Element (Number/Name)** PE 0604127N I (U)Surface Mine Countermeasures						**Project (Number/Name)** 1235 I Mine Warfare Planning and Analysis	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
1235: *Mine Warfare Planning and Analysis*	0.000	3.042	7.948	10.763	-	10.763	9.295	8.759	8.907	9.085	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mine Warfare (MIW) and Environmental Decision Aids Library (MEDAL) is a software intensive software acquisition program and is U.S. Navy's single Mine Warfare tactical decision support system for integrated mission planning, evaluation, and situational awareness. MEDAL provides mine and mine warfare planning and evaluation tools and databases to the MCM Commanders and is employed at the MCM unit level to perform MCM sortie planning and evaluation. The most recent MEDAL increment, known as MEDAL Enterprise Architecture (EA) and is no longer dependent on Global Command and Control System - Maritime (GCCS-M) for fielding this capability to MIW fleet users. MINEnet Tactical is the MCM operational component of MEDAL EA. It has been developed to be fielded to standard Navy networks, Consolidated Afloat Networks and Enterprise Services (CANES), Integrated Shipboard Network System (ISNS), and Navy Marine Corps Intranet (NMCI) servers and uses common web browser to support the user interface to all user client components. Completion of initial MINEnet Tactical fielding will allow MEDAL Build 11 to be retired.

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

	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: MEDAL Product Development	1.336	4.245	4.818	0.000	4.818
Articles:	-	-	-	-	-

FY 2019 Plans:
FY19 funding will initiate development of the MIW Integrated Synthetic Trainer (MIST). MIST is the means to conduct Integrated Phase training for MIW forces similar to a Fleet Synthetic Training (FST) event for a Carrier Strike Group/Expeditionary Strike Group (CSG/ESG). This tool will provide the capability to train the U.S. Navy's four MIW staffs that include one Theater Mine Warfare Commander (MIWC) and three Mine Countermeasures Commanders (MCMCs) against near peer threats. MIST will be a separate tool that executes in conjunction with the MEDAL mission planning and evaluation system used by MIW staffs and units. It will incorporate the laydown of simulated threat minefields expected to be used to blockade ports, defend against landing assaults, or deny access to sea lines of communication and to control the training event. It will use MIW staff created MEDAL MCM plans, underlying MIW databases, and real world environmental databases to generate simulated mission sorties and interactions with the defined minefields. These generated mission files will allow staffs to use MEDAL to evaluate each day's progress determining achieved clearance and remaining risk to ship traffic. MIST will have an adjustable "Game Clock" allowing staffs in faster than real time to conduct multi-week long MCM operations in a classroom environment. FY19 work will initially focus on defining user requirements,

Exhibit R-2A, **RDT&E Project Justification:** PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*	**Project (Number/Name)** 1235 *I Mine Warfare Planning and Analysis*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
software design, and transition to an Agile Software development process. FY19 funding will also support the MINEnet Tactical development to enhance the Minefield Planning capabilities, support interface changes, and provide updates to sortie planning and databases for the transition of AQS-20A to the AQS-20C configuration. The MEDAL EA course curriculum for MINEnet Tactical 1.3 will be updated and updated software will be fielded to the Mine Warfare Training Center. *FY 2020 Base Plans:* Work will also begin on MINEnet Tactical v1.4, which will provide the replacement of all commercial-off-the-shelf (COTS) components, which are either near end-of-life or no longer approved in Department of the Navy (DoN) Application and Database Management System (DADMS). Update application as required to support new and approved COTS components. Continue MIST V1.0 development. *FY 2020 OCO Plans:* N/A *FY 2019 to FY 2020 Increase/Decrease Statement:* FY20 funding increase will support the continued development of the MIW Integrated Synthetic Trainer and the initial efforts for MINEnet Tactical v1.4.					
Title: MEDAL Engineering Support	0.423	2.395	4.128	0.000	4.128
Articles:	-	-	-	-	-
FY 2019 Plans: Perform MIW Integrated Synthetic Trainer (MIST) requirements analysis, draft a software function and software requirements specification with sufficient detail to begin agile development of software to support post System Functional Review/System Requirements Review (SFR/SRR). Complete the development of MEDAL EA MINEnet Tactical v1.3 capability to include Joint Direct Attack Munition (JDAM) Assault Breaching System (JABS) and surface MCM mechanical sweep planning and evaluation. Complete standup of MINEnet Tactical software support activity (SSA) and integrated systems engineering activity (ISEA). SSA and ISEA support will address fixing software defects and high-priority fleet change requests reported in MINEnet Tactical v1.2.2 and release the upgrades in the MINEnet Tactical v1.3 development baseline. Finally, the support effort will 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. FY19 work will					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019		
Appropriation/Budget Activity 1319 *I* 4	R-1 Program Element (Number/Name) PE 0604127N *I (U)Surface Mine Countermeasures*		Project (Number/Name) 1235 *I Mine Warfare Planning and Analysis*		

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
also complete cybersecurity transition from Department of Defense Information Assurance Certification and Accreditation Process (DIACAP) to Risk Management Framework (RMF). ***FY 2020 Base Plans:*** Provide system engineering support to initiate the development of MEDAL EA MINEnet Tactical v1.4 capability and Planning on Risk (PoR). Provide technical integration of developed algorithms and models that have demonstrated effectiveness with respect to objective requirements. Provide SSA and ISEA roles and functions. Field MINEnet Tactical Minefield Planning V1.0 at NSMWDC, Point Loma, San Diego replacing MEDAL B11 Minefield Planning. Begin initial fielding of MINEnet Tactical V1.3. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 funding increase supports the fielding of MINEnet Tactical to replace Build 11.					
Title: MEDAL Test and Evaluation	0.675	0.620	1.041	0.000	1.041
Articles:	-	-	-	-	-
FY 2019 Plans: Continue System Development annual testing activities with multiple platforms including LCS MCM Mission Package Application Software (MPAS), ISNS, CANES, ONENET, NMCI integration tests. Continue Cybersecurity patching and assessments. Deliver to Fleet in accordance with the MEDAL EA Fielding Plan. Conduct government acceptance test (GAT) for contractor delivered MEDAL Minefield Planning V1.0. Conduct GAT for MINEnet Tactical V1.3. ***FY 2020 Base Plans:*** Continue System Development annual testing activities with multiple platforms including LCS MCM MPAS, ISNS, CANES, ONENET, NMCI integration tests. Continue Cybersecurity patching and assessments. Deliver MEDAL EA to Fleet in accordance with the Fielding Plan. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY20 funding increase will support the delivery of MEDAL EA to the Fleet.					
Title: MEDAL Management Services	0.608	0.688	0.776	0.000	0.776

Exhibit R-2A, **RDT&E Project Justification:** PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)*Surface Mine Countermeasures	**Project (Number/Name)** 1235 *I Mine Warfare Planning and Analysis*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Articles:	-	-	-	-	-

FY 2019 Plans:
Continue to provide program management support and travel for MEDAL program. Program management (PM) shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts. Coordination with Navy and other DoD organizations (MIW Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance [C4ISR], LCS and LCS MCM Mission Package, Expeditionary MCM C4ISR, MIW tactics development, long term planning, Assault Breaching System (ABS), and other programs as they relate to MCM command staff and MCM system sortie Mission Planning, Evaluation, and C4ISR), as required to ensure successful execution of the program. Communicate and coordinate with other program office tasking to include briefings, demonstrations, project planning, and project status as required.

FY 2020 Base Plans:
Continue to provide program management support and travel for MEDAL program. Program management (PM) shall include overall technical guidance and leadership for the program. Oversight of financial and logistics efforts. Coordination with Navy and other DoD organizations as required to ensure successful execution of the program. Communicate and coordinate with other program office tasking to include briefings, demonstrations, project planning, and project status as required.

FY 2020 OCO Plans:
N/A

FY 2019 to FY 2020 Increase/Decrease Statement:
FY20 funding increase will support required management support to successfully field MEDAL EA.

	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Accomplishments/Planned Programs Subtotals	3.042	7.948	10.763	0.000	10.763

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• 2622/LV075: *Mine Sweeping Replacement (MEDAL).*	3.585	1.021	0.000	-	0.000	0.000	0.362	0.611	0.623	0.000	14.383

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*	**Project (Number/Name)** 1235 *I Mine Warfare Planning and Analysis*

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 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. The current sole source contract with SAIC completes OY4 on 30 Sept 2019. A new full competition contract that will allow indefinite delivery and indefinite quantity (IDIQ) options will be awarded by 30 July 2019.

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy												Date: March 2019		
Appropriation/Budget Activity 1319 I 4						**R-1 Program Element (Number/Name)** PE 0604127N I (U)Surface Mine Countermeasures						**Project (Number/Name)** 1235 I Mine Warfare Planning and Analysis		

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	C/CPAF	SAIC : McLean, VA	0.000	1.336	Oct 2017	1.885	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing
MEDAL EA & MIW Integrated Synthetic Training (MIST)	SS/IDIQ	TBD : TBD	0.000	0.000		0.000		0.700	Oct 2019	-		0.700	Continuing	Continuing	Continuing
Medal EA & MIW Integrated Synthetic Training (MIST)	WR	NSWC PCD : Panama City FL	0.000	0.000		2.360	Oct 2018	4.118	Oct 2019	-		4.118	Continuing	Continuing	Continuing
Subtotal			0.000	1.336		4.245		4.818		-		4.818	Continuing	Continuing	N/A

Remarks
FY 2017 and prior funding in Program Element (PE) 0603502N.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA & MIW Integrated Synthetic Training (MIST)	WR	NSWC PC : Panama City FL	0.000	0.423	Oct 2017	2.395	Oct 2018	3.278	Oct 2019	-		3.278	Continuing	Continuing	Continuing
MEDAL EA & MIW Integrated Synthetic Training (MIST)	C/IDDQ	TBD : TBD	0.000	0.000		0.000		0.850	Oct 2019	-		0.850	Continuing	Continuing	Continuing
Subtotal			0.000	0.423		2.395		4.128		-		4.128	Continuing	Continuing	N/A

Remarks
FY 2017 and prior funding in Program Element (PE) 0603502N.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA	C/CPAF	SAIC : McLean, VA	0.000	0.675	Oct 2017	0.124	Oct 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4	**R-1 Program Element (Number/Name)** PE 0604127N *I* (U)Surface Mine Countermeasures	**Project (Number/Name)** 1235 *I* Mine Warfare Planning and Analysis

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL EA & MIW Integrated Synthetic Training (MIST)	WR	NSWC PCD : Panama City, FL	0.000	0.000		0.496	Oct 2018	1.041	Oct 2019	-		1.041	Continuing	Continuing	Continuing
Subtotal			0.000	0.675		0.620		1.041		-		1.041	Continuing	Continuing	N/A

Remarks
 FY 2017 and prior funding in Program Element (PE) 0603502N.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEDAL	WR	NSWC PC : Panama City Fl	0.000	0.608	Oct 2017	0.688	Oct 2018	0.776	Oct 2019	-		0.776	Continuing	Continuing	Continuing
Subtotal			0.000	0.608		0.688		0.776		-		0.776	Continuing	Continuing	N/A

Remarks
 FY 2017 and prior funding in Program Element (PE) 0603502N.

	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	3.042	7.948	10.763	-	10.763	Continuing	Continuing	N/A

Remarks

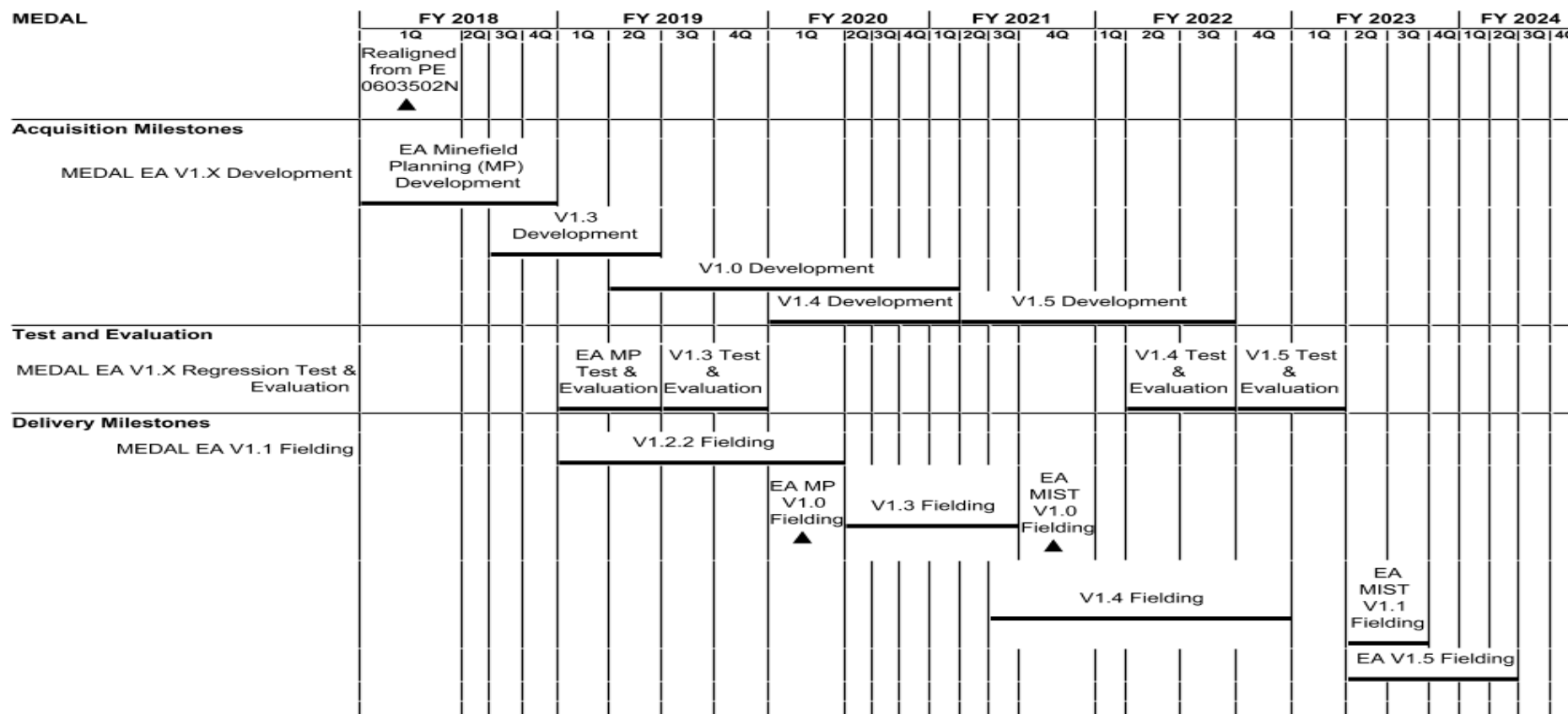| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 I 4	R-1 Program Element (Number/Name) PE 0604127N I (U)Surface Mine Countermeasures	Project (Number/Name) 1235 I Mine Warfare Planning and Analysis

2020DON - 0604127N - 1235

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		**Date:** March 2019
Appropriation/Budget Activity 1319 I 4	**R-1 Program Element (Number/Name)** PE 0604127N I (U)Surface Mine Countermeasures	**Project (Number/Name)** 1235 I Mine Warfare Planning and Analysis

Schedule Details

Events by Sub Project	Start		End	
	Quarter	**Year**	**Quarter**	**Year**
MEDAL				
Realigned from PE 0603502N	1	2018	1	2018
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA Minefield Planning (MP) Development	1	2018	4	2018
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.3X	3	2018	2	2019
Acquisition Milestones: MEDAL EA V1.X Development: MIW Integrated Synthetic Training (MIST) V1.0 Development	2	2019	1	2021
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.4X Development	1	2020	1	2021
Acquisition Milestones: MEDAL EA V1.X Development: MEDAL EA V1.5X and MIST V1.1 Development	2	2021	3	2022
Test and Evaluation: MEDAL EA V1.X Regression Test & Evaluation: MEDAL EA MP Test & Evaluation	1	2019	2	2019
Test and Evaluation: MEDAL EA V1.X Regression Test & Evaluation: MEDAL EA V1.3X Test & Evaluation	3	2019	4	2019
Test and Evaluation: MEDAL EA V1.X Regression Test & Evaluation: MEDAL EA V1.4 & MIST V1.0 Test & Evaluation	2	2022	3	2022
Test and Evaluation: MEDAL EA V1.X Regression Test & Evaluation: MEDAL EA V1.5 & MIST V1.1 Test & Evaluation	4	2022	1	2023
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.2.2 Fielding	1	2019	1	2020
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA MP V1.0 Fielding	1	2020	1	2020
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.3 Fielding	2	2020	3	2021
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA MIST V1.0 Fielding	4	2021	4	2021
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.4 Fielding	3	2021	4	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy					**Date:** March 2019
Appropriation/Budget Activity 1319 *I* 4		**R-1 Program Element (Number/Name)** PE 0604127N *I (U)Surface Mine Countermeasures*		**Project (Number/Name)** 1235 *I Mine Warfare Planning and Analysis*	

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA MIST V1.1 Fielding	2	2023	3	2023
Delivery Milestones: MEDAL EA V1.1 Fielding: MEDAL EA V1.5 Fielding	2	2023	2	2024