Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	1,394.846	106.342	117.476	130.981	-	130.981	122.278	105.693	99.737	102.847	Continuing	Continuing
0219: *Sub Sonar Improvement (ENG)*	894.757	66.974	67.179	86.718	-	86.718	71.360	60.412	61.609	62.820	Continuing	Continuing
0742: *Sub Integrated Ant System*	282.342	23.969	27.080	15.652	-	15.652	14.745	13.936	14.179	14.455	Continuing	Continuing
0775: *Submarine Supt Equip Prog*	9.243	5.372	13.215	9.117	-	9.117	10.760	9.949	10.173	10.377	Continuing	Continuing
1411: *Sub Tact Comm System*	208.504	10.027	10.002	19.494	-	19.494	25.413	21.396	13.776	15.195	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Submarine Support Equipment Program develops and improves submarine Electronic Warfare Support (EWS) technology, components, equipment, and systems that will increase submarine operational effectiveness, safety of ship, and survivability in an increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex radar, communications, and navigation equipment of potential adversaries. Enhancements are necessary for submarine EWS to be operationally effective in the following mission areas: Joint Littoral Warfare, Joint Surveillance, Space and Electronic Warfare and Intelligence Collection, Maritime protection, and Joint Strike.

The Submarine Sonar Improvement Program delivers block updates to Sonar Systems and improved Sensors installed on SSN 688, 688I, SSN 21, VIRGINIA, SSBN, and SSGN Class Submarines to maintain clear acoustical, tactical and operational superiority over submarine and surface combatants in all scenarios through detection, classification, localization, and contact following. Current developments are focused on supporting Littoral Warfare, Regional Sea Denial, Battle Group Support, Diesel Submarine Detection, Surveillance, and Peacetime Engagement.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy					Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*		
B. Program Change Summary ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**
Previous President's Budget	109.893	117.476	123.012	-	123.012
Current President's Budget	106.342	117.476	130.981	-	130.981
Total Adjustments	-3.551	0.000	7.969	-	7.969
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.700	0.000			
• SBIR/STTR Transfer	-2.850	0.000			
• Program Adjustments	0.000	0.000	8.500	-	8.500
• Rate/Misc Adjustments	-0.001	0.000	-0.531	-	-0.531

Change Summary Explanation

FY 2016 funding was reduced by $0.700 million as a result of Navy Comptroller mid-year execution review in order to support higher departmental priorities.

Funding increases in FY 2018 support testing Low Probability of Intercept / Low Probability of Detection (LPI/LPD) communications systems enabling command and control (C2) in an environment where traditional communications are not available, thereby reducing platform susceptibility of detection and attack by the adversary. Increases also provide funding for Link 16, which enhances submarine communication system by providing a two-way Tactical Data Link (TDL) processing capability on all Submarine platforms.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*	Project (Number/Name) 0219 / *Sub Sonar Improvement (ENG)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
0219: *Sub Sonar Improvement (ENG)*	894.757	66.974	67.179	86.718	-	86.718	71.360	60.412	61.609	62.820	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program delivers block updates to Sonar Systems installed on SSN 688, 688I, SSN 21, VIRGINIA, SSBN, and SSGN Class Submarines to maintain clear acoustical, tactical and operational superiority over submarines and surface combatants in all scenarios through detection, classification, localization, and contact following.

Acoustics Rapid COTS Insertion (A-RCI) was a multi-phased evolutionary development geared toward addressing acoustic superiority issues through the rapid introduction of interim development products applicable to all classes of submarines. A-RCI Phase I and II introduced Towed Array processing improvements, Phase III introduced Spherical

Array processing improvements, and Phase IV provided High Frequency (HF) Array processing improvements for SSN 688I, SSGN, VIRGINIA, and SSN 21 Class Submarines. As part of CNO N972's plan to maintain acoustic superiority for in-service submarines, a joint cooperative effort with PEO IWS-5 was established to deliver annual Advanced Processing

Builds (APBs) to prevent obsolescence and deliver ongoing capability improvements. The capabilities in the APBs will be integrated as part of A-RCI certified systems. The development of the Large Vertical Array (LVA) will improve detection and enhanced tactical situational awareness capability for tracking targets of interest, and supports acoustic superiority objectives for the Virginia and OHIO class submarines.

Sensor efforts provide increased operational capabilities for littoral operations, situational awareness, and reliability improvements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: APB Productionization	12.000	11.904	12.724	0.000	12.724
Articles:	-	-	-	-	-
Description: APB productionization provides for the transition of APB capability improvements to the Fleet for the integration, testing and formal certification. FY 2018 transitions SSBN Combat System Modernization efforts into APB Productionization.					
FY 2016 Accomplishments: Continue Advanced Processing Build (APB) Sea Testing, Integration, and Certification. This effort is primarily the transition of APB software from development to A-RCI for integration, testing, and formal certification.					
FY 2017 Plans:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continue Advanced Processing Build (APB) Sea Testing, Integration, and Certification. This effort is primarily the transition of APB software from development to A-RCI for integration, testing, and formal certification. ***FY 2018 Base Plans:*** Continue Advanced Processing Build (APB) Sea Testing, Integration, and Certification. This effort transitions APB software from development to A-RCI for integration, testing, and formal certification. This effort incorporates conversion of the SSBN legacy sonar system to the TI/APB model and the introduction of signal processing associated with the Large Vertical Array (LVA). ***FY 2018 OCO Plans:*** N/A					
Title: Integration and Testing ***Articles:*** ***Description:*** Integration and Testing provides support to integrated and test APB's into all submarine classes with numerous sensor systems. FY 2018 transitions efforts associated with integration and testing for SSBN Combat System Modernization. ***FY 2016 Accomplishments:*** Support Advanced Processing Builds installed on SSN 688I, SSN 688, SSN 21, SSGN 726, SSBN, and VA Class Submarines. FY15 funding level incorporates a $14.3M higher Departmental priority cut, cancelling the TI12/APB13 software upgrade, breaking the TI/APB model which provides for a newer TI hardware baseline to receive two versions of software baselines. By cancelling TI12/APB 13 , eight SSN 688/688I, two SEAWOLF and three VIRGINIA Class submarines will not receive the latest software improvements as part of the APB 13 baseline. FY 2016 funding restores the funding to near (but below) FY 2014 level to enable planned upgrades to be incorporated into the TI14 baseline. ***FY 2017 Plans:*** Support Advanced Processing Builds installed on SSN 688I, SSN 688, SSN 21, SSGN 726, SSBN, and VA Class Submarines. FY 2017 funding provides integration and testing support to TI16 and prior TI baselines. ***FY 2018 Base Plans:*** Support Advanced Processing Builds installed on SSN 688I, SSN 688, SSN 21, SSGN 726, SSBN, and VA Class Submarines. Additional effort in FY 2018 incorporates the integration and testing associated with the refresh of technology and assimilation of capability required for conversion of the SSBN legacy sonar system to	33.493 -	33.972 -	37.128 -	0.000 -	37.128 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
the TI/APB model. These efforts also incorporate the integration and testing associated with the introduction of signal processing in support of the Large Vertical Array (LVA). ***FY 2018 OCO Plans:*** N/A					
Title: SSBN Combat System Modernization ***Articles:*** ***FY 2016 Accomplishments:*** This effort continues to incorporate SSBN combat systems into the APB/TI model. ***FY 2017 Plans:*** This effort completes the incorporation of SSBN combat systems into the APB/TI model. ***FY 2018 Base Plans:*** N/A ***FY 2018 OCO Plans:*** N/A	4.827 -	2.050 -	0.000 -	0.000 -	0.000 -
Title: Large Vertical Array (LVA) ***Articles:*** ***Description:*** Provides funding for the development of Large Vertical Array capability in the areas of detection and tracking for back-fit installation on Virginia Class and Ohio Class Submarines. ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** This effort initiates development of SSBN Large Vertical Array (LVA) mechanical fixtures required to manufacture, transport, and install an LVA shipset on a submarine. ***FY 2018 Base Plans:*** This effort continues development of Large Vertical Array (LVA) acoustic modules; to include acoustic sensors, array material, outboard electronics, fairings, and associated cabling, to effectively incorporate the required	0.000 -	13.265 -	33.283 -	0.000 -	33.283 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
capabilities into the APB/TI model. This effort also continues development and initiates fabrication of 2 mechanical fixtures required to manufacture, transport, and install an LVA shipset on a submarine. ***FY 2018 OCO Plans:*** N/A					
Title: TB-29X Development	13.200	2.475	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: Provides funding for the development of TB-29A equivalent Thin Line Array with long range detection and tracking with improved reliability, using improved telemetry. ***FY 2016 Accomplishments:*** Provides funding for the development of TB-29A equivalent Thin Line Array with long range detection and tracking with improved reliability, using improved telemetry. This effort incorporates TB-29X system development. Funding will provide for the procurement of a first article TB-29X array, testing and inspections in accordance with the Performance Specification. Testing will include environmental testing, acoustic calibration testing, self-noise tow testing and SONAR/TB-29X interface testing required to ensure the array meets all performance specifications. ***FY 2017 Plans:*** Completion of TB-29X system development. Funding will provide for first article TB-29X array testing and inspections in accordance with the Performance Specification. Testing will include environmental testing, acoustic calibration testing, self-noise tow testing and SONAR/TB-29X interface testing required to ensure the array meets all performance specifications. ***FY 2018 Base Plans:*** N/A ***FY 2018 OCO Plans:*** N/A					
Title: A-RCI Acoustic Superiority Integration	3.454	3.513	3.583	0.000	3.583
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Description: Maintain Acoustic Superiority for In-service Submarines to deliver biannual Advance Processing Builds (APBs) to prevent obsolescence and deliver emerging capability improvements for current and future threats. ***FY 2016 Accomplishments:*** This effort delivers emerging capability improvements for current and future threats by supporting development, integration, and testing of emerging capability improvements in passive long range detection/wide area search for current and future threats in support of CNO ltr Ser N00/S0100 dtd 7 Jan 13, Subj: SSN/SSBN Acoustic Superiority Campaign Plan. ***FY 2017 Plans:*** This effort continues to develop emerging capability improvements for current and future threats by supporting development, integration, and testing of emerging capability improvements in passive long range detection/wide area search for current and future threats in support of CNO ltr Ser N00/S0100 dtd 7 Jan 13, Subj: SSN/SSBN Acoustic Superiority Campaign Plan. ***FY 2018 Base Plans:*** This effort continues to develop emerging capability improvements for current and future threats by supporting development, integration, and testing of emerging capability improvements in passive long range detection/wide area search for current and future threats in support of CNO ltr Ser N00/S0100 dtd 7 Jan 13, Subj: SSN/SSBN Acoustic Superiority Campaign Plan. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	66.974	67.179	86.718	0.000	86.718

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• OPN/2150: *SSN Acoustic Equipment*	0.000	288.265	287.553	43.500	331.053	309.028	381.340	457.061	508.078	Continuing	Continuing
• OPN/2147: *SSN Acoustics*	232.134	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1,556.264

Remarks

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*

D. Acquisition Strategy

Acoustic Systems:

A-RCI utilizes an open architecture and Commercial Off-the-Shelf products in support of new and upgraded sonar systems. A follow-on development and production sole source cost plus incentive fee contract was awarded to General Dynamics, Advanced Information Systems in April 2015 and a sole source contract was awarded to Lockheed Martin Maritime Systems & Sensors in February 2015. Program Reviews with the Milestone Decision Authority are conducted granting approval for the production options.

E. Performance Metrics

The A-RCI program will modernize approximately 8-12 SSNs per year through executing bi-annual software Advanced Processor Builds (APBs) and bi-annual Technical Insertions (TIs). Beginning with FY 2017 installations, the A-RCI program will modernize approximately 2-3 SSBNs per year through bi-annual APB/TI.

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	SS/CPIF	LMC : Manassas, VA	330.645	16.826	Dec 2015	15.202	Dec 2016	15.647	Dec 2017	-		15.647	Continuing	Continuing	Continuing
Ancillary Hardware Development	SS/CPFF	ARL University of Texas : Austin, TX	33.808	3.595	Mar 2016	3.232	Mar 2017	3.468	Mar 2018	-		3.468	Continuing	Continuing	Continuing
Systems Engineering	SS/CPFF	Johns Hopkins APL : Baltimore, MD	35.940	3.585	Dec 2015	3.251	Dec 2016	3.488	Dec 2017	-		3.488	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	LMC : VA - Keyport	33.133	3.127	Jan 2016	3.439	Jan 2017	3.690	Jan 2018	-		3.690	Continuing	Continuing	Continuing
Primary Hardware Development	C/CPIF	Progeny Systems : Manassas, VA	57.039	6.965	Jan 2016	6.635	Jan 2017	7.119	Jan 2018	-		7.119	Continuing	Continuing	Continuing
Systems Engineering	WR	NUWC : Newport, RI	166.485	5.951	Dec 2015	6.115	Dec 2016	6.561	Dec 2017	-		6.561	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Carderock, MD	25.638	2.674	Dec 2015	2.910	Dec 2016	3.122	Dec 2017	-		3.122	Continuing	Continuing	Continuing
TB-29X Development	C/CPIF	TBD : TBD	0.000	13.200	Mar 2016	2.475	Mar 2017	0.000		-		0.000	0.000	15.675	-
LVA Development	C/CPIF	TBD : TBD	0.000	0.000		13.265	Nov 2016	33.283	Nov 2017	-		33.283	Continuing	Continuing	Continuing
		Subtotal	682.688	55.923		56.524		76.378		-		76.378	-	-	-

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Software Development	C/CPIF	General Dynamics, AIS : Fairfax, VA	154.376	5.569	Dec 2015	5.344	Dec 2016	5.184	Dec 2017	-		5.184	Continuing	Continuing	Continuing
Primary Software Development	C/CPFF	Sedna Digital, : Manassas, VA	32.458	4.141	Dec 2015	4.041	Dec 2016	3.920	Dec 2017	-		3.920	Continuing	Continuing	Continuing
		Subtotal	186.834	9.710		9.385		9.104		-		9.104	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*	Project (Number/Name) 0219 / *Sub Sonar Improvement (ENG)*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Test and Evaluation	WR	OPTEVFOR : Norfolk, VA	9.756	0.525	Dec 2015	0.500	Dec 2016	0.485	Dec 2017	-		0.485	Continuing	Continuing	Continuing
		Subtotal	9.756	0.525		0.500		0.485		-		0.485	-	-	-

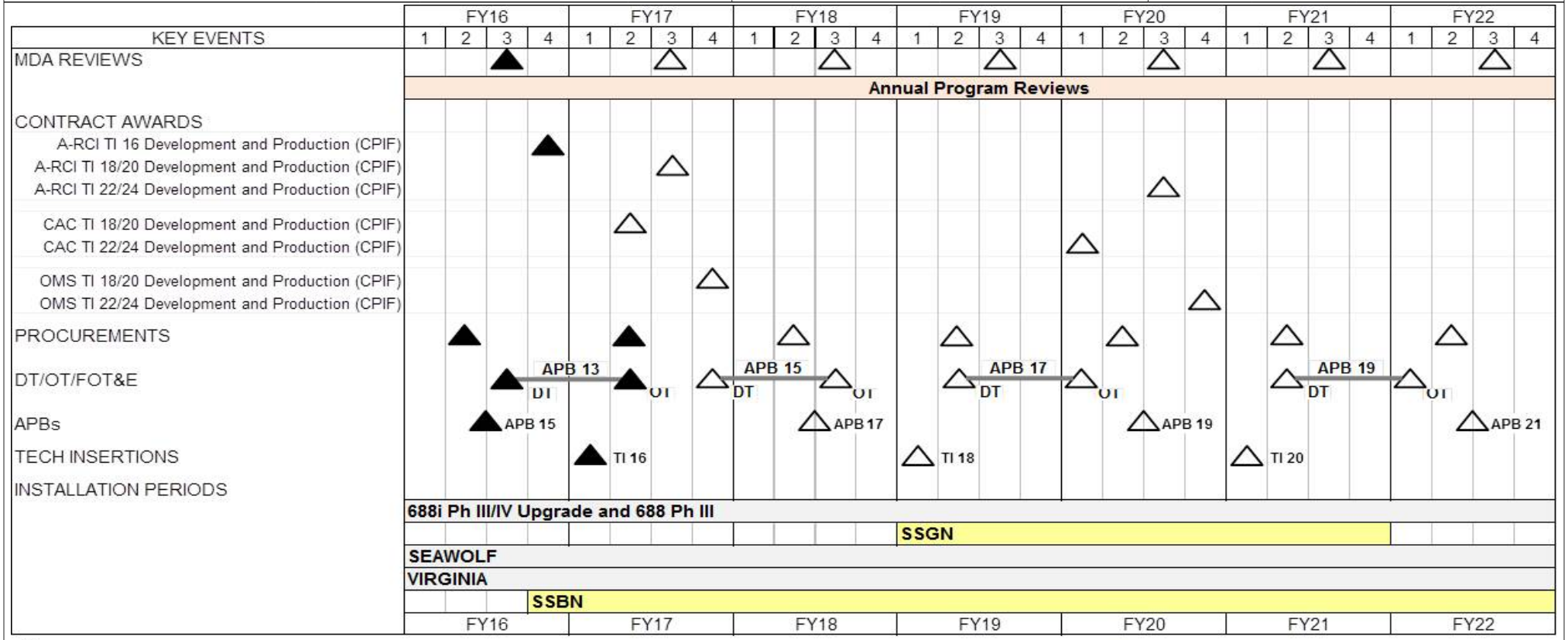
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Support Services	C/FFP	Alion, BAH, AECOM : Washington, DC	13.239	0.716	Dec 2015	0.673	Dec 2016	0.657	Dec 2017	-		0.657	Continuing	Continuing	Continuing
Travel	WR	NAVSEA : Washington, DC	2.240	0.100	Dec 2015	0.097	Dec 2016	0.094	Dec 2017	-		0.094	Continuing	Continuing	Continuing
		Subtotal	15.479	0.816		0.770		0.751		-		0.751	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	894.757	66.974		67.179		86.718		-		86.718	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*



▲ Completed Milestone
△ Upcoming Milestone

SSN Installation Period
SSGN/SSBN Installation Period

APB: Advanced Processing Builds
A-RCI: Acoustic – Rapid Commercial Off the Shelf (COTS) Insertion
CAC: Common Acoustic Cabinet
OMS: Ownship Monitoring System

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*

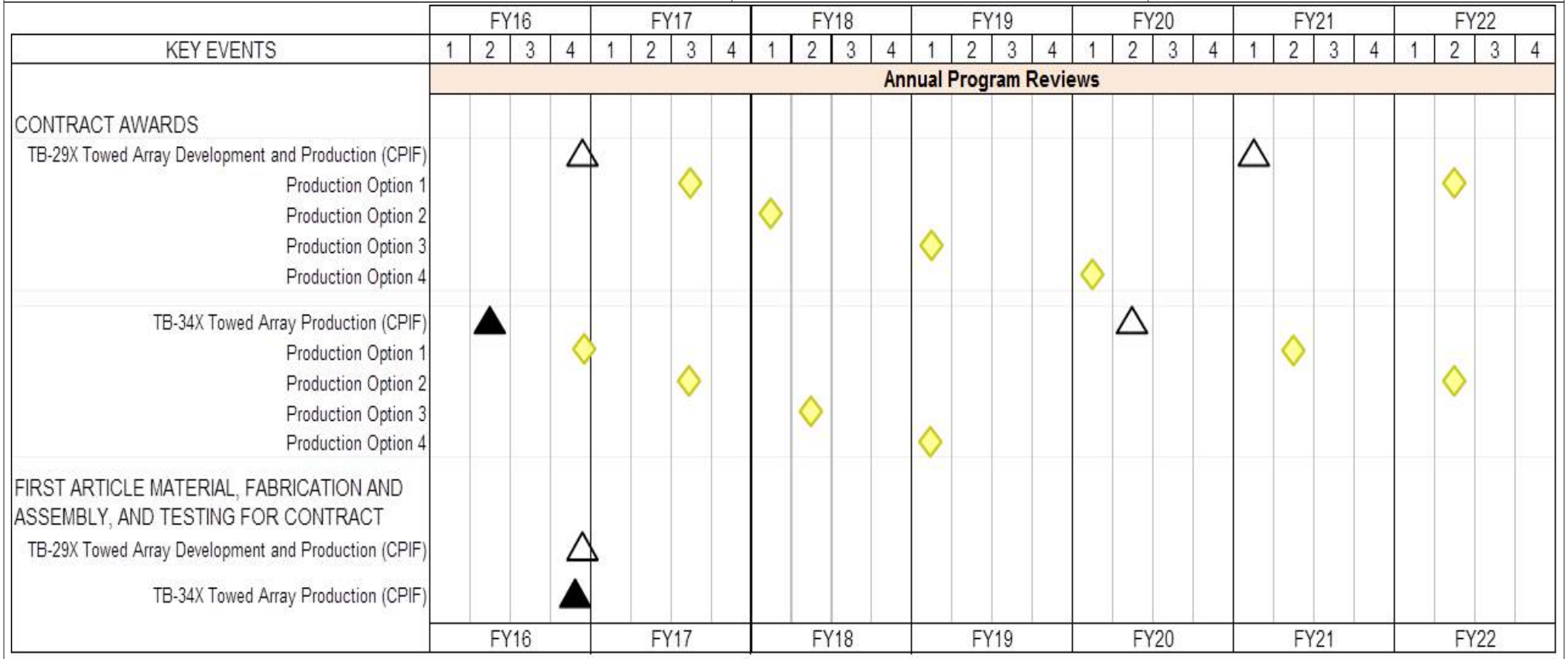


Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0219 / *Sub Sonar Improvement (ENG)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0219				
ACOUSTICS	1	2016	4	2022
---Acquisition Milestones	3	2016	3	2022
---Annual Program Review	1	2016	4	2022
---Contract Awards - Acoustics	2	2016	4	2020
---Procurements	2	2016	2	2022
---DT/OT/FOT&E Tests	3	2016	2	2021
---APB Deliveries	3	2016	3	2020
---Tech Insertions	1	2017	1	2021
---Installation Periods	1	2016	4	2022
TOWED SYSTEMS DEVELOPMENT	1	2016	4	2022
---Contract Awards - Towed Systems	2	2016	1	2021
---Production Options	4	2016	2	2021
---First Article Procurement & Assembly	4	2016	4	2016

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*				Project (Number/Name) 0742 / *Sub Integrated Ant System*			
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
0742: *Sub Integrated Ant System*	282.342	23.969	27.080	15.652	-	15.652	14.745	13.936	14.179	14.455	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The programs funded under the Submarine Integrated Antenna System project (0742) provide Nuclear Submarines (SSN), Ballistic Missile Submarines (SSBN) and Guided Missile Submarines (SSGN) with improved communications capabilities to support future Joint, Allied, and Naval operations. These efforts provide for the development and testing of submarine antennas designed to meet emerging submarine requirements: (a) Increased antenna performance while operating at speed and depth, (b) Increased stealth capability of existing and future antennas, (c) Antenna compatibility with new waveforms and transceiver equipment, (d) Increased capabilities of antennas and their interface to the External Communications System, and (e) Improved antenna design to reduce Total Ownership Cost. Specifically, this project funds research and development for submarine antennas including (1) Outboard Electronics (OE)-538/BRC Multi-Function Antenna, (2) OE-562 Submarine, High Data Rate (SubHDR), (3) New communications apertures to include Advanced High Data Rate (AdvHDR), (4) Low Probability of Intercept/Low Probability of Detection (LPI/LPD), and (5) Towed Buoy Antenna (AN/BRR- 6/6B) reliability improvements: (i) buoy shape, (ii) combined Radio Frequency (RF) and RF Depth Canister; and (iii) internal buoy Inertial Measurement Unit (IMU). Additional efforts funded under this project include (1) Antenna Improvements which develops Reliability, Maintainability, and Availability for legacy antennas, (2) Transition Engineering which develops future undersea communications capabilities for the 4th Generation Undersea Communications Architecture, and (3) the Optical Communications Project Arrangement with the United Kingdom which develops communications methods that will reduce the detectability of the submarines by the adversary. These efforts will help United States Naval Forces maintain information dominance in the undersea domain.

JUSTIFICATION FOR BUDGET ACTIVITY:

FY18 Antenna Transition Engineering: Development of future undersea communications capabilities in support of the 4th Generation Undersea Communications Architecture
FY18 SubHDR: Continue development of Reliability, Maintainability and Availability (RMA) components identified by research and analysis to maintain Operational Availability (Ao) throughout the life of the system.
FY18 AdvHDR: Continue Optical Communications Project Arrangement with United Kingdom to reduce the detectability of the submarines by the adversary.
FY18 Towed Buoy Antenna (AN/BRR-6/6B): Provides for the development, system integration, and testing of field change kits to improve system performance (measured by operational availability Ao) and reliability (measured by mean time between failures MTBF); of buoy shape, combined Radio Frequency (RF) and Depth Canisters, and Inertial Measurement Unit (IMU) which will reduce failures and increase reliability to improve the Strategic Communications posture for the SSBNs. Detection and risk mitigation of cybersecurity vulnerabilities to advance cybersecurity hardening. The Towed Buoy Antenna BRR-6/6B is a key component of the NC3 system and the primary means of receiving Emergency Action Messages (EAMs).

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

FY18 Antenna Improvements: Engineering studies, simulation/modeling, prototyping and Science and Technology (S&T) related efforts for RMA improvements and continued Preplanned Product Improvement (P3I) assessments in support of legacy submarine antenna applications.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Antenna Transition Engineering	4.861	3.743	3.682	0.000	3.682
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Continued to provide emerging requirements and Satellite Communications (SATCOM) database/link analysis for other development programs in support of current & future undersea communication architectures. - Continued Preplanned Product Improvement (P3I) investigation and development efforts towards legacy antenna systems. (Funding moved to Antenna Improvements in FY17). - Continued concept engineering, new technology evaluations, and assessments in support of current and future undersea antenna applications, to include Hull, Mechanical and Electrical (HM&E) interfaces. - Continued to investigate multiple usage antennas, including antennas that can be used for communications and other functions in support of Undersea Unmanned Aerial Systems (UAS) Communication and other Off Hull Platforms. - Continued development of future undersea communication capabilities in support of the 4th Generation Undersea Communication Architecture. - Commenced High Altitude Electromagnetic Pulse (HEMP) testing in support of Undersea Unarmed Aerial Systems (UAS) Communication and other Off Hull Platforms.					
FY 2017 Plans: - Complete HEMP testing in support of Undersea Unarmed Aerial Systems (UAS) Communication and other Off Hull Platforms. - Continue to provide emerging requirements and SATCOM database/link analysis for other development programs in support of current & future undersea communication architectures. - Continue concept engineering, new technology evaluations, and assessments in support of current and future undersea antenna applications, to include HM&E interfaces. - Continue to investigate multiple usage antennas, including antennas that can be used for communications and other functions in support of Undersea Unmanned Aerial Systems (UAS) Communication and other Off Hull Platforms. - Continue development of future undersea communication capabilities in support of the 4th Generation Undersea Communication Architecture.					
FY 2018 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continue to provide emerging requirements and SATCOM database/link analysis for other development programs in support of current & future undersea communication architectures. - Continue concept engineering, new technology evaluations, and assessments in support of current and future undersea antenna applications, to include HM&E interfaces. - Continue to investigate multiple usage antennas, including antennas that can be used for communications and other functions in support of Undersea Unmanned Aerial Systems (UAS) Communication and other Off Hull Platforms. - Continue development of future undersea communication capabilities in support of the 4th Generation Undersea Communication Architecture. ***FY 2018 OCO Plans:*** N/A					
Title: Outboard Electronics (OE)-538	4.225	0.666	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Continued preparation for Developmental Test/Operational Test (DT/OT) in support of Full Rate Production (FRP). - Continued oversight for the development/integration of Global Positioning System (GPS) Anti-Jam (AJ)into OE-538 Increment 2. - Commenced development/update of required FRP acquisition documents. - Commenced and completed High Altitude Electromagnetic Pulse (HEMP) testing. - Commenced and completed OE-538A First Article Test. ***FY 2017 Plans:*** - Complete DT/OT in support of FRP. - Complete development/update of required FRP acquisition documents. - Complete oversight for the development/integration of GPS AJ into OE-538 Increment 2. - Commence and Complete FRP decision review and achieve Initial Operational Capability (IOC). ***FY 2018 Base Plans:*** N/A ***FY 2018 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
N/A					
Title: Submarine High Data Rate (SubHDR) Pre-Planned Product Improvement (P3I)	6.561	9.922	2.288	0.000	2.288
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Continued Underwater Explosion (UNDEX) development and testing. - Continued development of Reliability Maintainability, and Availability (RMA) components identified by research and analysis to maintain Operational Availability (Ao) throughout the life of the system. - Commenced Multivolt Power Supply (MVPS) development. - Commenced High Altitude Electromagnetic (HEMP) testing.					
FY 2017 Plans: - Complete UNDEX development and testing, and receive delivery of two functioning UNDEX prototype kits. - Continue development of MVPS. - Continue development of Reliability Maintainability, and Availability, (RMA) components identified by research and analysis to maintain Ao throughout the life of the system. - Commence development of the Traveling Wave Tube (TWT). - Commence Mast Motion Sensor (MMS) development. - Complete HEMP testing.					
FY 2018 Base Plans: - Continue development of RMA components identified by research and analysis to maintain Ao throughout the life of the system. - Continue development of the MVPS, MMS and TWT.					
FY 2018 OCO Plans: N/A					
Title: Advanced High Data Rate (AdvHDR)	3.805	3.534	3.508	0.000	3.508
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Commenced Optical Communications Project Arrangement with United Kingdom. - Commenced Low Probability of Intercept/Low Probability of Detection (LPI/LPD) Trade Study development.					
FY 2017 Plans:					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continue Optical Communications Project Arrangement with United Kingdom. - Complete LPI/LPD Phase 1 Trade Study Development. - Commenced research and analysis into communications payloads for the Tactically Oriented Technology Insertion Mast (TOTIM) to improve LPD. ***FY 2018 Base Plans:*** - Continue Optical Communications Project Arrangement with United Kingdom. - Commence LPI/LPD technology development phase. - Continue research and analysis into communications payloads for the Tactically Oriented TOTIM to improve LPD. ***FY 2018 OCO Plans:*** N/A					
Title: Submarine Communications Buoy (SCB) ***Articles:*** ***Description:*** A project arrangement between the United States and the United Kingdom. ***FY 2016 Accomplishments:*** - Completed Final Report. ***FY 2017 Plans:*** - N/A ***FY 2018 Base Plans:*** - N/A ***FY 2018 OCO Plans:*** N/A	0.240 -	0.000 -	0.000 -	0.000 -	0.000 -
Title: Towed Buoy Antenna (AN/BRR-6/6B) ***Articles:*** ***FY 2016 Accomplishments:*** - Continued failure analysis on tow cables to improve system reliability of failing antennas. - Continued component development, system integration, testing, design specification/modification for reliability improvements of antenna/amplifier.	4.277 -	6.624 -	3.681 -	0.000 -	3.681 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continued support for Towed Buoy Antenna (BRR-6) Program providing program, contract, logistics, and system engineering management. - Commenced component development, system integration, testing, design specification/modification for reliability improvements of buoy shape improvements and combine Radio Frequency (RF) and Depth Cans efforts. ***FY 2017 Plans:*** - Complete failure analysis on tow cables to improve system reliability of failing antennas. - Complete component development, system integration, testing, design specification/modification for reliability improvements of antenna/amplifier. - Continue support for BRR-6 Program providing program, contract, logistics and system engineering management. - Continue component development, system integration, testing, design specification/modification for reliability improvements of buoy shape improvements and combine RF and Depth Cans efforts. - Commence component development, system integration, testing, design specification/modification for reliability improvements of Inertial Measurement Unit (IMU) integration. ***FY 2018 Base Plans:*** - Complete component development, system integration, testing, design specification/modification for reliability improvements of buoy shape improvements and combine RF and Depth Cans efforts. - Continue component development, system integration, testing, design specification/modification for reliability improvements of IMU integration. - Continue support for BRR-6 Program providing program, contract, logistics and system engineering management. - Commence cybersecurity vulnerability detection and hardening. ***FY 2018 OCO Plans:*** N/A					
Title: Antenna Improvements	0.000	2.591	2.493	0.000	2.493
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Previously funded under Transition Engineering for legacy antennas. ***FY 2017 Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continue Pre-Planned Product Improvement (P3I) investigation and Reliability, Maintainability and Availability (RMA) development efforts previously funded under Transition Engineering for legacy antennas. ***FY 2018 Base Plans:*** - Continue P3I investigation and RMA development efforts for legacy antennas. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	23.969	27.080	15.652	0.000	15.652

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• OPN/3130: *Submarine Communication Equipment*	58.037	64.529	86.204	-	86.204	78.987	85.101	87.120	87.793	Continuing	Continuing

Remarks

Development of Submarine Anti-Jam GPS Enhancement (SAGE) capability in support of OE-538B future procurement is funded under project 0921.

D. Acquisition Strategy

Program Milestones (MS):
Outboard Electronics (OE)-538: 4th QTR FY17 Full Rate Production (FRP) Decision Review.

Test and Evaluation (T&E) Milestones:
OE-538: 2nd QTR FY17 Developmental (DT) for FRP; 3rd QTR FY17 Operational Test (OT) for FRP.

E. Performance Metrics

FY18 SubHDR: Reliability Maintainability, and Availability (RMA) development
FY18 AdvHDR: Tactically Oriented Technology Insertion Mast (TOTIM) Communications Payload performance specifications.
FY18 BRR-6: Development of reliability improvements for antenna/amplifier
FY18 Antenna Improvements: BRA-24 and OE-315 legacy antennas material solution investigation reports
FY18 Antenna Transition Engineering : Continue concept engineering, new technology evaluations, and assessments in support of current and future undersea antenna applications, to include Hull, Mechanical and Electric (HM&E) interfaces

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Future Capabilites (Antenna Trans Eng)	WR	SSC Pacific : San Diego, CA	2.560	1.664	Nov 2015	1.574	Nov 2016	1.478	Nov 2017	-		1.478	Continuing	Continuing	Continuing
Systems Engineering (Antenna Trans Eng)	WR	MITRE : McLean, VA	0.798	1.152	Dec 2015	0.545	Nov 2016	0.545	Nov 2017	-		0.545	Continuing	Continuing	Continuing
Systems Engineering (Antenna Trans Eng)	WR	NPS : Monterey, CA	0.226	0.060	Apr 2016	0.100	Feb 2017	0.100	Feb 2018	-		0.100	Continuing	Continuing	Continuing
Systems Engineering (Antenna Trans Eng)	WR	NUWC : Newport, RI	37.843	1.670	Nov 2015	0.890	Nov 2016	0.890	Nov 2017	-		0.890	Continuing	Continuing	Continuing
Software Dev (OE-538)	WR	NUWC : Newport, RI	0.478	0.096	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering (OE-538)	C/CPFF	FSI : San Diego, CA	1.813	0.361	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering (OE-538)	WR	NSWC : Philadelphia, PA	0.000	0.290	Nov 2015	0.042	Nov 2016	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering (OE-538)	WR	NUWC : Newport, RI	9.524	1.524	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Research and Analysis Reliability Dev (SubHDR)	C/CPAF	BTP Systems : Ludlow, MA	1.734	1.675	Aug 2016	0.000		0.000		-		0.000	0.000	3.409	-
Research and Analysis Reliability Dev (SubHDR)	WR	NUWC : Newport, RI	5.041	1.000	Nov 2015	1.300	Nov 2016	0.991	Nov 2017	-		0.991	Continuing	Continuing	Continuing
Research and Analysis Reliability Dev (SubHDR)	C/CPIF	TBD : TBD	0.000	0.000		6.531	Jun 2017	0.967	Feb 2018	-		0.967	Continuing	Continuing	Continuing
Systems Engineering (SubHDR)	WR	NUWC : Newport, RI	18.420	0.700	Nov 2015	0.481	Nov 2016	0.000		-		0.000	Continuing	Continuing	Continuing
UNDEX Kit Development (SubHDR)	C/CPFF	Raytheon : Marlboro, MA	5.732	1.685	Jan 2016	0.000		0.000		-		0.000	0.000	7.417	-
OCOMMS PA Demonstration Systems Development (AdvHDR	C/CPAF	Aerospace : San Diego, CA	0.000	0.159	Feb 2016	0.144	Feb 2017	0.144	Feb 2018	-		0.144	Continuing	Continuing	Continuing
OCOMMS PA Demonstration Systems Development (AdvHDR)	C/CPAF	TBD : TBD	0.000	0.000		2.000	Jul 2017	1.250	May 2018	-		1.250	0.000	3.250	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering (AdvHDR)	WR	SSC Pacific : San Diego, CA	8.062	2.348	Nov 2015	1.000	Nov 2016	1.000	Nov 2017	-		1.000	Continuing	Continuing	Continuing
Systems Engineering (AdvHDR)	WR	NUWC : Newport, RI	4.346	0.639	Nov 2015	0.000		0.000		-		0.000	0.000	4.985	-
Technology Development (AdvHDR)	C/CPAF	TBD : TBD	0.000	0.000		0.000		0.750	Feb 2018	-		0.750	0.000	0.750	-
Systems/Hardware Dev (Submarine Communications Buoy - SCB)	WR	NSWC : Philadelphia	7.344	0.150	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering (BRR-6)	C/CPFF	FSI : San Diego, CA	0.272	0.175	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/ Hardware Dev (BRR-6)	WR	NSWC : Philadelphia, PA	1.890	2.656	Nov 2015	2.531	Nov 2016	1.486	Nov 2017	-		1.486	Continuing	Continuing	Continuing
Systems Engineering/ Hardware Dev (BRR-6)	WR	NUWC : Newport, RI	1.510	0.850	Nov 2015	2.238	Nov 2016	1.356	Nov 2017	-		1.356	Continuing	Continuing	Continuing
Systems Engineering (BRR-6)	WR	NSWC : Carderock	0.000	0.371	Nov 2015	0.670	Nov 2016	0.063	Nov 2017	-		0.063	Continuing	Continuing	Continuing
Systems Engineering/ Hardware Dev (Antenna Improvements)	WR	NSWC : Philadelphia, PA	0.000	0.000		2.341	Nov 2016	2.243	Nov 2017	-		2.243	Continuing	Continuing	Continuing
Systems Engineering/ Hardware Dev (Antenna Improvements)	C/CPFF	G2 OPS : San Diego, CA	0.000	0.000		0.125	Nov 2016	0.125	Nov 2017	-		0.125	Continuing	Continuing	Continuing
Systems Engineering (BRR-6)	C/CPFF	G2 OPS : San Diego, CA	0.000	0.000		0.350	Nov 2016	0.175	Nov 2017	-		0.175	Continuing	Continuing	Continuing
Cybersecurity (BRR-6)	C/CPFF	G2 OPS : San Diego, CA	0.000	0.000		0.000		0.100	Nov 2017	-		0.100	Continuing	Continuing	Continuing
Product Development Prior Years	Various	Various : Various	133.535	0.000		0.000		0.000		-		0.000	0.000	133.535	110.707
		Subtotal	241.128	19.225		22.862		13.663		-		13.663	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Security Engineering (Antenna Trans Eng)	C/CPFF	G2 Ops : San Diego, CA	0.000	0.300	Nov 2015	0.250	Nov 2016	0.250	Nov 2017	-		0.250	Continuing	Continuing	Continuing
Cost Estimating (OE-538)	C/CPFF	TASC : San Diego, CA	0.406	0.098	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Logistics Support (OE-538)	WR	NSWC : Philadelphia, PA	0.000	0.036	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Logistics Support (OE-538)	WR	NUWC : Newport, RI	0.000	0.183	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Logistics Support (SubHDR)	C/CPFF	CSA : San Diego, CA	0.000	0.275	Feb 2016	0.217	Feb 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Cost Estimating (AdvHDR)	C/CPFF	TASC : San Diego, CA	0.000	0.075	Feb 2016	0.075	Feb 2017	0.075	Feb 2018	-		0.075	Continuing	Continuing	Continuing
Integrated Logistics Support (AdvHDR)	C/CPFF	CSA : San Diego, CA	0.000	0.075	Feb 2016	0.075	Feb 2017	0.075	Feb 2018	-		0.075	Continuing	Continuing	Continuing
Cost Estimating (BRR-6)	C/CPFF	TASC : San Diego, CA	0.059	0.050	Nov 2015	0.000		0.000		-		0.000	0.000	0.109	-
Integrated logistics Support (BRR-6)	C/CPFF	CSA : San Diego, CA	0.050	0.050	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated logistics Support (BRR-6)	WR	NUWC : Newport, RI	0.047	0.050	Nov 2015	0.277	Nov 2016	0.126	Nov 2017	-		0.126	Continuing	Continuing	Continuing
Integrated logistics Support (BRR-6)	WR	NSWC : Philadelphia, PA	0.000	0.000		0.438	Nov 2016	0.300	Nov 2017	-		0.300	Continuing	Continuing	Continuing
Integrated Logistics Support (Antenna Improvements)	C/CPFF	CSA : San Diego, CA	0.000	0.000		0.050	Feb 2017	0.050	Feb 2018	-		0.050	Continuing	Continuing	Continuing
Support Prior Years	Various	Various : Various	7.377	0.000		0.000		0.000		-		0.000	0.000	7.377	6.630
		Subtotal	7.939	1.192		1.382		0.876		-		0.876	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*	Project (Number/Name) 0742 / *Sub Integrated Ant System*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental/ Operational T&E (OE-538)	WR	NUWC : Newport, RI	6.305	1.351	Nov 2015	0.314	Nov 2016	0.000		-		0.000	Continuing	Continuing	Continuing
Test & Evaluation (OE-538)	WR	COTF : Norfolk, VA	1.023	0.286	Nov 2015	0.250	Nov 2016	0.000		-		0.000	Continuing	Continuing	Continuing
Test & Evaluation (SubHDR)	WR	NUWC : Newport, RI	1.295	0.750	Nov 2015	1.013	Feb 2017	0.164	Feb 2018	-		0.164	Continuing	Continuing	Continuing
Test & Evaluation (SCB)	WR	NUWC : Newport, RI	0.950	0.090	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Test and Evaluation Prior Years	Various	Various : Various	4.207	0.000		0.000		0.000		-		0.000	0.000	4.207	4.207
		Subtotal	13.780	2.477		1.577		0.164		-		0.164	-	-	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support (Antenna Trans Eng)	C/CPFF	CSA : San Diego, CA	3.881	0.296	Nov 2015	0.384	Feb 2017	0.384	Feb 2018	-		0.384	Continuing	Continuing	Continuing
Program Management Support (SubHDR)	C/CPFF	CSA : San Diego, CA	3.346	0.476	Feb 2016	0.440	Feb 2017	0.166	Feb 2018	-		0.166	Continuing	Continuing	Continuing
Program Management Support (AdvHDR)	C/CPFF	CSA : San Diego, CA	7.563	0.228	Feb 2016	0.240	Feb 2017	0.249	Feb 2018	-		0.249	Continuing	Continuing	Continuing
Program Management Support (BRR-6)	C/CPFF	CSA : San Diego, CA	0.097	0.075	Nov 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Management/ Integrated Logistics Support (BRR-6)	C/CPFF	CSA : San Diego, CA	0.000	0.000		0.120	Feb 2017	0.075	Feb 2018	-		0.075	Continuing	Continuing	Continuing
Program Management Support (Antenna Improvements)	C/CPFF	CSA : San Diego, CA	0.000	0.000		0.075	Feb 2017	0.075	Feb 2018	-		0.075	Continuing	Continuing	Continuing
Management Services Prior Years	Various	Various : Various	4.608	0.000		0.000		0.000		-		0.000	0.000	4.608	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	19.495	1.075		1.259		0.949		-		0.949	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	282.342	23.969		27.080		15.652		-		15.652	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

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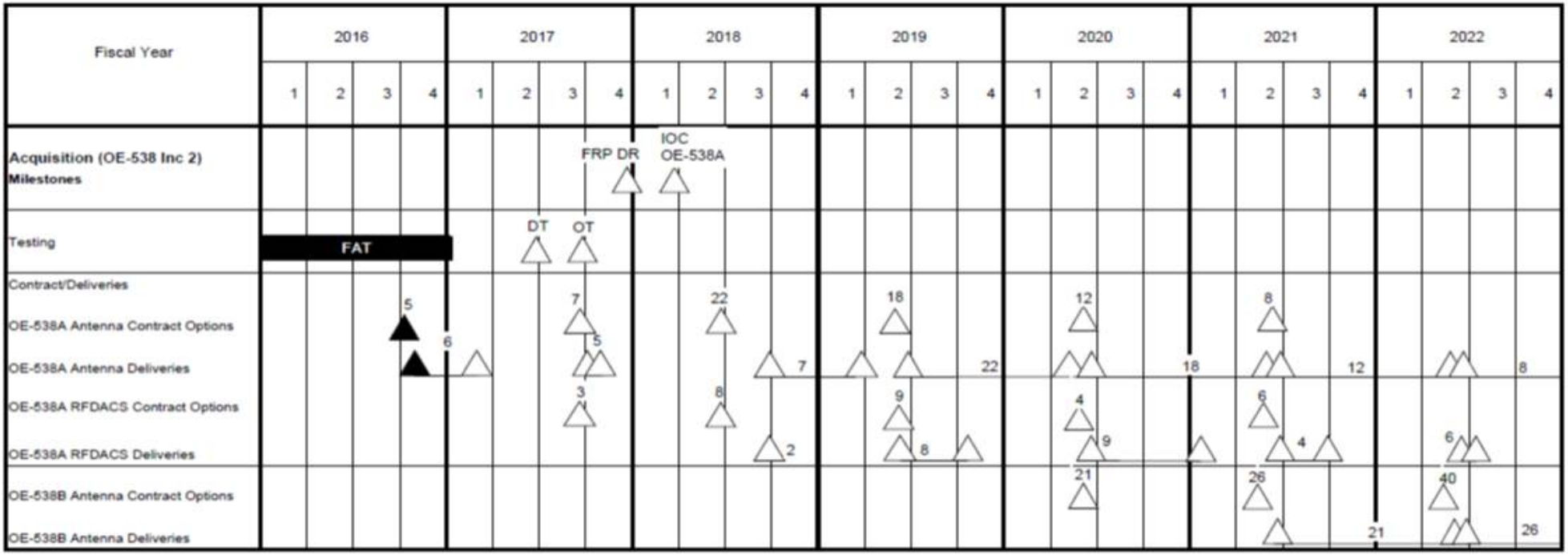
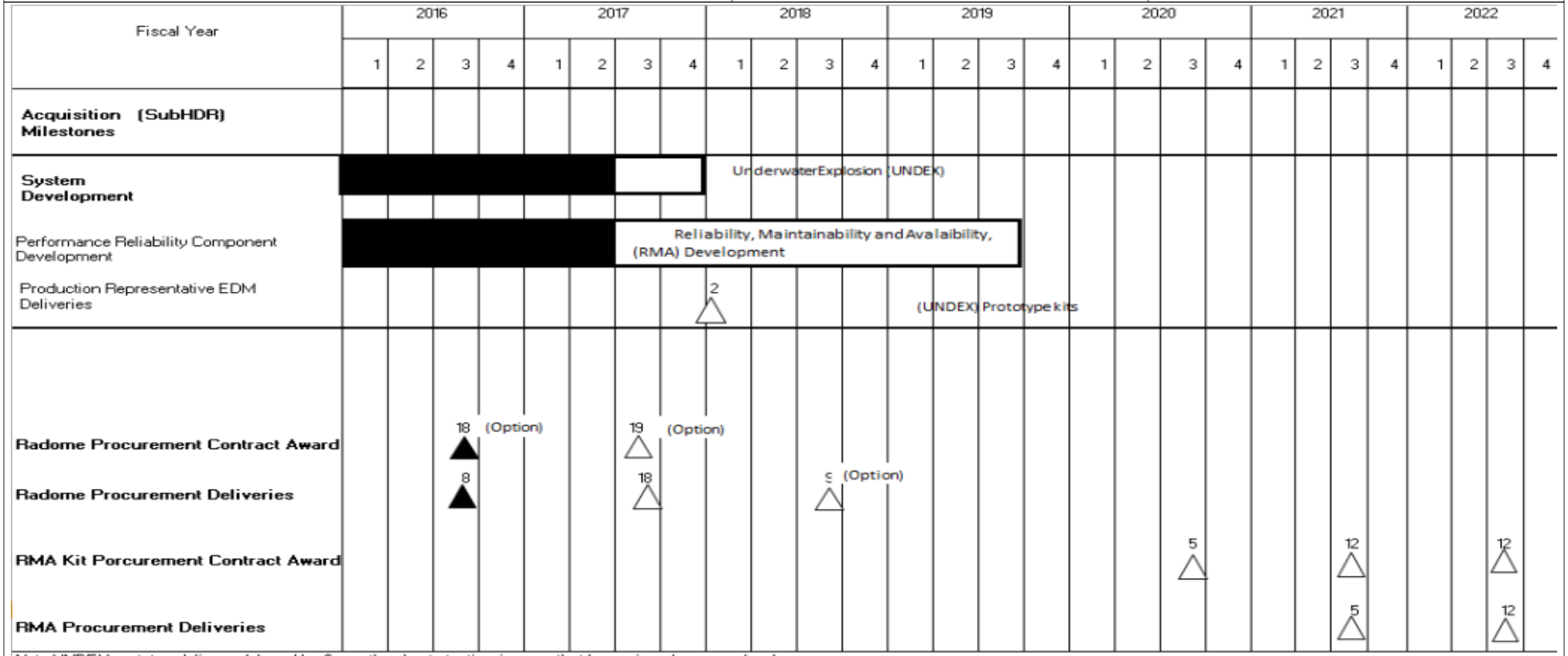


ACRONYMS:

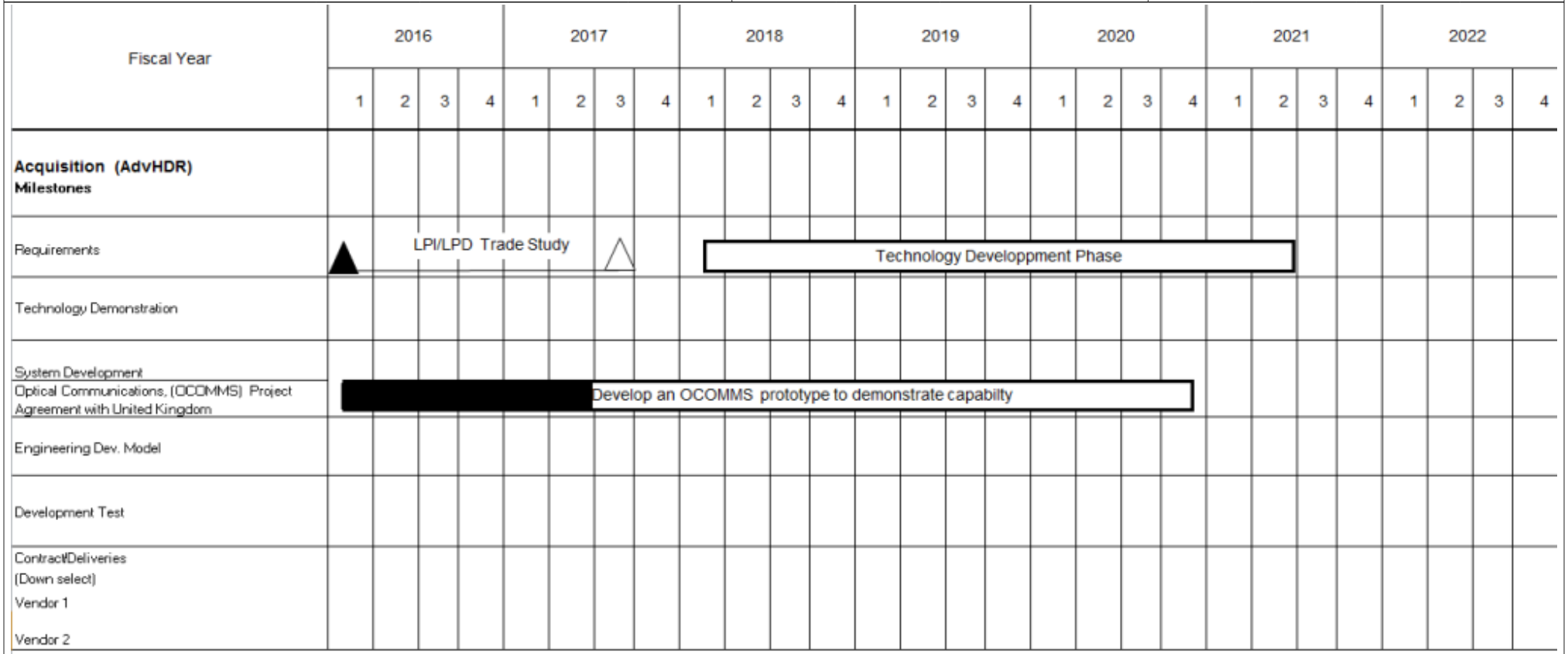
DT - Developmental Test	IOC - Initial Operational Capability
DR - Decision Review	OT - Operational Test
FAT - First Article Test	RFDACS - Radio Frequency Distribution and control System

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*



Note UNDEX prototye delivery delayed by 6 months due to testing issues that have since been resolved.

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		**Date:** May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*



Acronyms:
AoA Analysis Of Alternatives
LPI/LPD Low Probability of Intercept/Low Probability of Detection

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*	

Fiscal Year	2016				2017				2018				2019				2020				2021				2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition (SCB) Milestones																												
Project Arrangement with United Kingdom	Complete Final Report																											

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

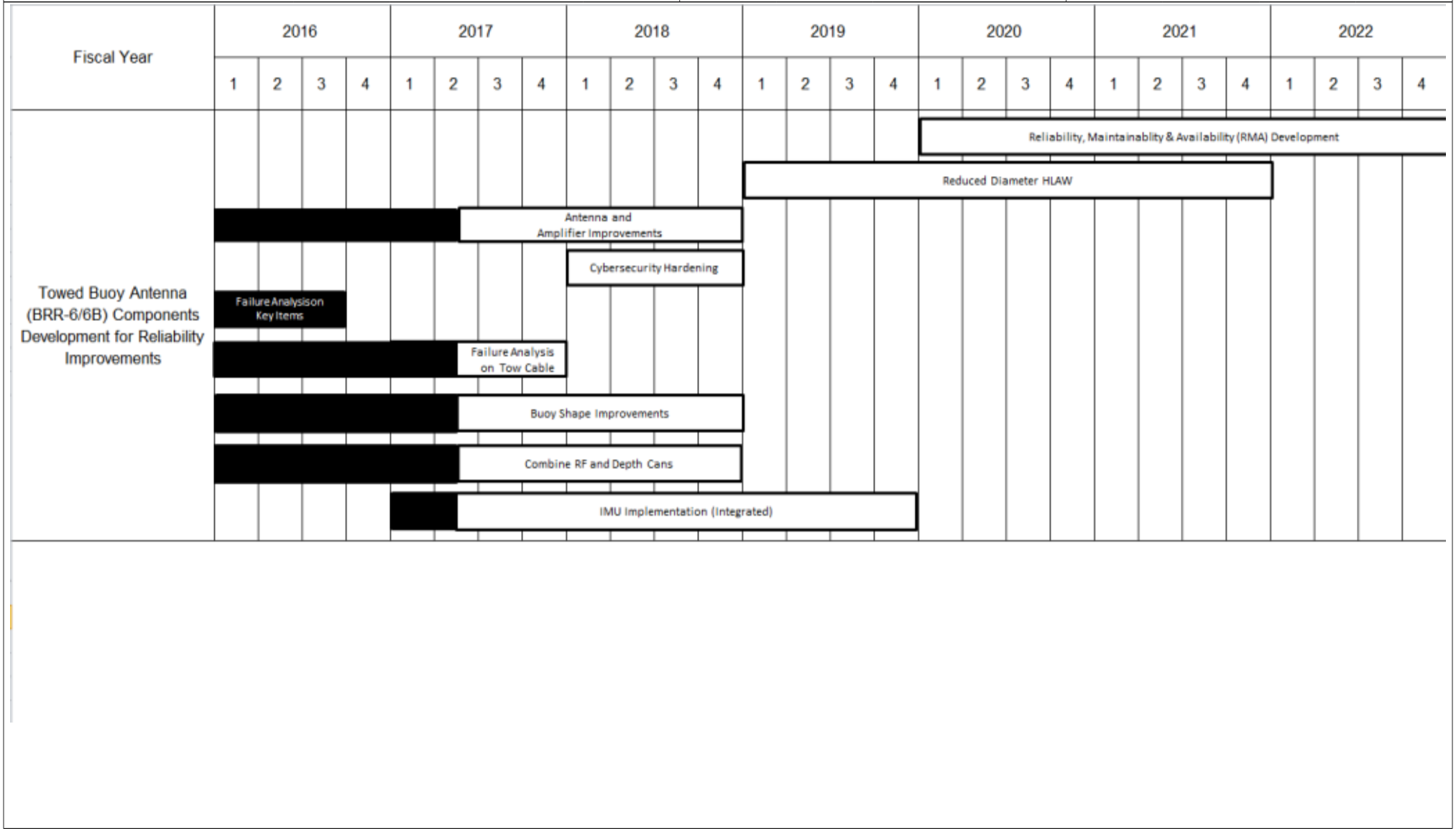


Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*	

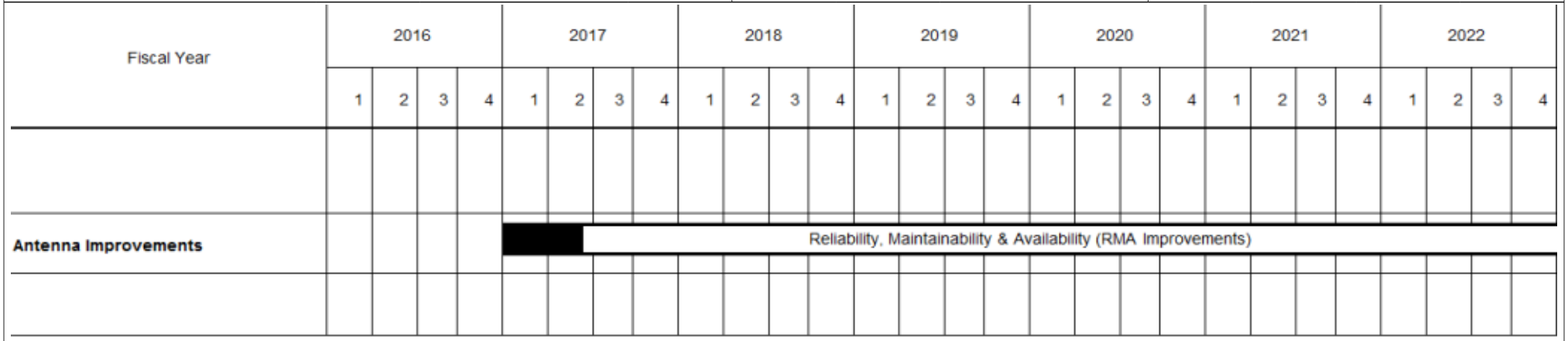


Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0742				
OE-538A Full Rate Production Decision Review (FRP DR)	4	2017	4	2017
OE-538A Initial Operational Capability (IOC)	1	2018	1	2018
OE-538A First Article Test (FAT)	1	2016	4	2016
OE-538A DT for Full Rate Production (FRP)	2	2017	2	2017
OE-538A Operational Test (OT)	3	2017	3	2017
OE-538A Antenna Deliveries Year 1	4	2016	1	2017
OE-538A Antenna Contract Option Year 2	4	2016	4	2016
OE-538A Antenna Deliveries Year 2	3	2017	3	2017
OE-538A Antenna Contract Option Year 3	3	2017	3	2017
OE-538A Antenna Deliveries Year 3	3	2018	1	2019
OE-538A Antenna Contract Option Year 4	2	2018	2	2018
OE-538A Antenna Deliveries Year 4	2	2019	2	2020
OE-538A Antenna Contract Option Year 5	2	2019	2	2019
OE-538A Antenna Deliveries Year 5	2	2020	2	2021
OE-538A Antenna Contract Option Year 6	2	2020	2	2020
OE-538A Antenna Deliveries Year 6	2	2021	2	2022
OE-538A Antenna Contract Option Year 7	2	2021	2	2021
OE-538A Antenna Deliveries Year 7	2	2022	4	2022
OE-538A RFDACS Contract Options Year 1	3	2017	3	2017
OE-538A RFDACS Deliveries Year 1	3	2018	4	2018
OE-538A RFDACS Contract Option Year 2	2	2018	2	2018

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
OE-538A RFDACS Deliveries Year 2	2	2019	4	2019
OE-538A RFDACS Contract Option Year 3	2	2019	2	2019
OE-538A RFDACS Deliveries Year 3	2	2020	1	2021
OE-538A RFDACS Contract Option Year 4	2	2020	2	2020
OE-538A RFDACS Deliveries Year 4	2	2021	3	2021
OE-538A RFDACS Contract Option Year 5	2	2021	2	2021
OE-538A RFDACS Deliveries Year 5	2	2022	3	2022
OE-538B Antenna Contract Option Year 1	2	2020	2	2020
OE-538B Antenna Deliveries Year 1	2	2021	2	2022
OE-538B Antenna Contract Option Year 2	2	2021	2	2021
OE-538B Antenna Deliveries Year 2	2	2022	4	2022
OE-538B Antenna Contract Option Year 3	2	2022	2	2022
Submarine High Data Rate (SubHDR) Under Water Explosion (UNDEX) Development	1	2016	4	2017
SubHDR Performance Reliability Component Development/Test	1	2016	3	2019
SubHDR Production Representative UNDEX Engineering Development Model (EDM) Deliveries	4	2017	1	2018
SubHDR Radome Procurement Contract/Option Awards	3	2016	2	2017
SubHDR Radome Production Deliveries	3	2016	3	2018
SubHDR RMA Kit Procurement Contract Award	3	2020	3	2022
SubHDR RMA Kit Deliveries	3	2021	3	2022
AdvHDR Technology Phase	1	2018	2	2021
AdvHDR Trade Study for LPI/LPD	1	2016	3	2017
AdvHDR Optical Communications Project Agreement with United Kingdom	1	2016	4	2020
SCB Project arrangement with United Kingdom (UK)	1	2016	4	2016
BRR-6/6B Antenna and Amplifier Improvements	1	2016	4	2018
BRR-6/6B Failure Analysis on Key Items	1	2016	3	2016

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
BRR-6/6B Failure Analysis on Tow Cable	1	2016	4	2017
BRR-6/6B Buoy shape Improvements	1	2016	4	2018
BRR-6/6B Combine RF and Depth Cans	1	2016	4	2018
BRR-6/6B IMU Implementation (Integrated)	1	2017	4	2019
BRR-6/6B Cybersecurity Hardening	1	2018	4	2018
BRR-6/6B Reduced Diameter	1	2019	4	2021
BRR-6/6B Reliability, Maintainability & Availability (RMA) Development	1	2020	4	2022
Antenna Improvements Reliability, Maintainability & Availability (RMA) Development	1	2017	4	2022

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*	Project (Number/Name) 0775 / *Submarine Supt Equip Prog*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
0775: *Submarine Supt Equip Prog*	9.243	5.372	13.215	9.117	-	9.117	10.760	9.949	10.173	10.377	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

FY 18 budget finalizes development of future capabilities for High Speed Network, Multifunctional Modular Mast (MMM) payload, spectrum digitization, and Communications Digital Aperture Correlation and Emitter improvements. Develop or transition from the Advanced Submarine Support Equipment Program (ASSEP) and Future Naval Capability (FNC) efforts to all Technical Insertions (TIs) capabilities for Electronic Attack (EA), tactical communications, Electronic Warfare (EW) sensor for future Task-Oriented Technology Insertion Mast (TOTIM) planned for TI-20 platforms, improved digitizers, and EW data processing. Develop advanced technology demonstrations for feasibility of systems capable of meeting later increments of AN/BLQ-10(B) for performance and digital data delivery.

The Submarine Support Equipment Program (SSEP) is responsible for the development and improvement of Submarine EW systems in support of effective operations in the following mission areas: Joint Littoral Warfare; Joint Intelligence Surveillance Reconnaissance (ISR), Indications and Warnings; Electronic Warfare; Information Operations including Cyber; and Special Operations Force (SOF) support. The rapid proliferation of complex radar, communications and navigation equipment available to potential adversaries creates an increasingly dense and sophisticated electromagnetic environment. Sustained and significant improvements to submarine EW systems are required to maintain tactical ship safety and operation effectiveness. As such, EW was raised to a submarine primary mission area in FY2012 by Commander Submarine Forces, and EW is listed as the number one modernization requirement by the Submarine Tactical Requirements Group (STRG). OPNAV letter dated 17 June 12, SER N97/12U144401 further codified this need by directing development of a digital Next Generation EW system as an evolution of the AN/BLQ-10 EW program. SSEP efforts in support of these needs include: integration of technology developed and transitioned from the Advanced Submarine Support Equipment Program (ASSEP) and Future Naval Capability (FNC) efforts into tactical EW systems, interface and capability integration with Submarine Warfare Federated Tactical System (SWFTS) Modernization efforts and development of the Next Generation EW AN/BLQ-10 system.

RDTE Funding line supports the entire AN/BLQ-10 EW procurement program. Increases in RDTE budget starting in FY15 supports development of EW Next Generation Architecture (NGA). The increase supports critical enabling technologies that will provide maximized electronic spectrum digitization and processing as well as Electronic Attack capability. Specific NGA technology development focus areas include simultaneous transmit and receive apertures, improved antenna sensors, high bandwidth digitizers, high speed networking, large capacity data storage and retrieval, and advanced algorithms for improved system performance and new capability. Specific increases in FY17 and FY19 are for Submarine Launched Decoy (SLD) and Tactical Data Link (TDL) Communications efforts respectively. SLD is a tactical speed-to-fleet initiative that meets Fleet concerns about submarine littoral operations. TDL communications is a program designed to increase submarine capability for joint operations.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Submarine Support Equipment Program	5.372	13.215	9.117	0.000	9.117

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0775 / *Submarine Supt Equip Prog*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Articles:	-	-	-	-	-
FY 2016 Accomplishments: TI-14 DT. Updated AN/BLQ-10 software baseline changes for SWFTS and Non-Propulsion Electronic Systems (NPES), Software Problem Report (SPR) Resolution and Software Enhancement. Completed partial testing of TI-16 Processor Upgrades and incorporate ETIS set into TI16 baseline including procurement of Signal Distribution Subsystem (SDS) Engineering Development Model (EDM) Radio Frequency modules for initial integration testing. Demonstrations included the successful testing of capability and technology improvements in the extreme electronic warfare environment of the Vigilant Hammer II exercise. Held advanced technology demonstrations for feasibility of systems capable of meeting later increments of AN/BLQ-10(B) for performance and digital data delivery.					
FY 2017 Plans: Perform TI-14 Operational Test (OT). Update AN/BLQ-10 software baseline changes for SWFTS and NPES, SPR Resolution and Software Enhancement. Completion of TI-16 Next Generation EW AN/BLQ-10 system development, integration and testing. Develop TI-18 Processor Upgrades. Complete TI-18 NRE updates to Next Generation EW AN/BLQ-10 system incorporating Digital Onboard Trainer (OBT), Wideband Digital Apertures, and Embedded Built in Test (BIT). Start development of TI-20 capabilities for High Speed Network, Multi-function Modular Mast (MMM) payload, spectrum digitization, and Communications Digital Aperture Correlation and Emitter improvements. Develop or transition from Advanced Submarine Support Equipment Program (ASSEP) and Future Naval Capabilities (FNC) efforts to TI-20 capabilities, EW sensor for future Task-Oriented Technology Insertion Mast (TOTIM) planned for TI-20 platforms, improved digitizers, and EW data processing. Develop advanced technology demonstrations for feasibility of systems capable of meeting later increments of AN/BLQ-10(B) for performance and digital data delivery. Develop the final specifications for the Submarine Launched Decoy (SLD).					
FY 2018 Base Plans: Update AN/BLQ-10 software baseline changes for SWFTS and NPES, SPR Resolution and Software Enhancement. Completion of TI-18 Next Generation EW AN/BLQ-10 system development, integration and testing. Continued development of TI-20 capabilities for High Speed Network, MMM payload Next Generation EW System, and Communications Digital Aperture Correlation and Emitter improvements. Develop or transition from FNC and ASSEP efforts to TI-20 capabilities, EW sensor for future TOTIM planned for TI-20 platforms, improved digitizers, and EW data processing. Develop advanced technology demonstrations for feasibility of systems capable of meeting later increments of AN/BLQ-10(B) for performance and digital data delivery.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 0775 / *Submarine Supt Equip Prog*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Development of TI-20 configuration and architecture documentation and initial efforts for the development of the TI-20 software design. Testing for MMM Payload, submarine launched decoy buoy, high speed network, improvements to emitter algorithms, improvements to correlation algorithms, improvements to vulnerability assessment algorithms, and digital OBT include side by side laboratory testing, at sea testing (inclusive of TEMPALT development and crew training), Fleet experimentation coordination and support, and technology demonstrations. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	5.372	13.215	9.117	0.000	9.117

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• OPN/2560: *Submarine Supt Equip Prog*	83.472	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	958.736
• SCN/2013: *VIRGINIA Class Submarine*	5,318.210	4,955.219	5,225.911	-	5,225.911	7,181.369	7,209.343	6,534.775	5,263.896	48,161.837	150,856.878
• RDT&E/0604558N: *New Design SSN*	150.442	113.013	120.087	-	120.087	100.116	82.832	88.828	90.507	Continuing	Continuing
• RDT&E/0603562N: *Submarine Tactical Warfare Sys*	10.172	8.782	13.834	-	13.834	9.545	11.448	11.680	11.910	Continuing	Continuing
• OPN/0840: *Sub Periscope, Imaging and Supt Equip Prog*	0.000	154.421	151.240	-	151.240	203.895	244.660	228.294	220.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

AN/BLQ-10 (V) EW System - Procurements are executed/managed in accordance with Acquisition Plan (Rev 10) for AN/BLQ-10(V) EW System dtd 02/01/17 and the Single Acquisition Management Plan dtd 06/12/14.

E. Performance Metrics

The RDD program goal is to respond to urgent operational needs within 30 days and provide for rapid development and fielding of prototype solutions within 270 days.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*				Project (Number/Name) 1411 / *Sub Tact Comm System*			
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
1411: *Sub Tact Comm System*	208.504	10.027	10.002	19.494	-	19.494	25.413	21.396	13.776	15.195	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Submarine Tactical Communications System budget item (1411) funds the Common Submarine Radio Room (CSRR) program, which provides a fully integrated and tested communications architecture of Command, Control, Communications, Computers, and Intelligence (C4I) program of record components, providing secure voice and data communications for all submarine classes. The CSRR program, via an end-to-end integrated test environment, ensures that submarine communications systems: (a) enhance assured information transfer via automated and integrated network management; (b) support assured command and control, (c) provide submarine Internet Protocol (IP) connectivity; (d) are interoperable with Nuclear Command, Control, and Communications (NC3), United States and allied/coalition military networks; (e) meet NC3 strategic messaging requirements; and (f) provide improved reliability, maintainability, and availability. The CSRR program includes the development of a network-controlled computer based trainer to support training requirements. The CSRR program provides systems engineering efforts associated with implementation of new technology allowing submarines to connect to the global information grid. The new technology will also ensure the submarine's continued ability to participate in network-centric warfare and exploit its inherent stealth capabilities in support of the Navy, NC3, Joint, and allied/coalition fight to achieve total battlespace information dominance.

Additional efforts funded under the Submarine Tactical Communications System budget item include (1) Undersea Platforms Special Communications, which provides fully integrated and tested Low Probability of Intercept / Low Probability of Detection (LPI/LPD) communications systems enabling command and control (C2) in an environment where traditional communications are not available, thereby reducing platform susceptibility of detection and attack by the adversary and (2) Link 16, which provides an enhanced submarine communication system by providing a two-way Tactical Data Link (TDL) processing capability on all Submarine (Nuclear) (SSN), Guided Missile Submarine (Nuclear) (SSGN) and Ballistic Missile Submarine (Nuclear) (SSBN) platforms. The Link 16 program provides submarine Command & Control systems with Link 16 tactical network communications capabilities for situational awareness in a contested environment and is a key element in naval tactical networking. The new technology ensures the submarine's continued ability to participate in network-centric warfare and exploit its inherent stealth capabilities in support of the Navy, Nuclear Command, Control, and Communications (NC3), Joint, and allied/coalition fight to achieve total battlespace information dominance. These efforts are a continuation of the LPI/LPD and Link 16 efforts previously funded under the Submarine Integrated Antenna System Project (0742)/Advanced High Data Rate (HDR) program/project.

JUSTIFICATION FOR BUDGET ACTIVITY:
These programs are funded under ENGINEERING and MANUFACTURING DEVELOPMENT because they encompass development and demonstration of new end-items.

CSRR: Funding in FY18 is to complete CSRR Increment 1 Version 4 systems engineering development for OHIO Class ballistic missile (SSBN), OHIO Class guided missile (SSGN), VIRGINIA, LOS ANGELES, and SEAWOLF Class attack (SSN) submarines and ensure Supply Chain Risk Management (SCRM) compliance. Complete development of platform specific builds for Control and Management (C&M) software incorporating Increment 1 Version 4 capabilities and award follow-on

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

C&M Software contract. Conduct CSRR Increment 1 Version 4 Developmental Testing (DT), Operational Testing (OT), Emergency Action Message (EAM) certification testing as well as data analysis and Targeting Change Message (TCM) testing. Complete development of the Multi-purpose Reconfigurable Training System (MRTS) software for Increment 1 Version 4 capabilities and commence development of the MRTS software for Increment 1 Version 5. Continue CSRR Increment 1 Version 5 systems engineering development and modernization. CSRR Increment 1 Version 4 is planned to address equipment obsolescence and End of Support issues. CSRR Increment 1 Version 5 will be another more complex modernization to the CSRR suite and address work station obsolescence.

Acquisition Decision Memorandum signed by Assistant Secretary of Navy for Research, Development & Acquisition dated 15 July 2008 approved consolidating Increments 1 and 2 to a single Increment 1 with multiple block upgrades (Versions). CSRR is currently post Milestone C and in Full Rate Production (FRP) and Deployment until FY 2030.
LPI/LPD: Funding in FY18 is to commence shore integration of LPI/LPD solution sets to support DoD Teleports and DoN Submarine Broadcast Control Authorities. Commence afloat integration of LPI/LPD solution sets on LOS ANGELES, SSBN, VIRGINIA, SSGN and SEAWOLF Class submarines. Commence Environmental Qualification Testing (EQT) and LPI/LPD Phase 2 Trade Study Development.
Link 16: Funding in FY18 is to complete the Link 16 tactical network communications capability Analysis of Alternatives (AoA). Commence systems engineering development of Link 16 tactical network communications capability and porting of the Tactical Data Link (TDL) Processor Software to a different processor for integration. Commence Lab integration of the TDL processor with Multifunctional Information Distribution System (MIDS) into the submarine architecture.

Requirements documented in Commander Naval Surface Force (CNSF) letter dated 24 October 2005.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Common Submarine Radio Room (CSRR)	10.027	10.002	10.994	0.000	10.994
Articles:	-	-	-	-	-
FY 2016 Accomplishments: - Continued updating the Common Submarine Radio Room (CSRR) Acquisition Plan, Acquisition Strategy, Systems Engineering Plan (SEP) and Program Protection Plan to reflect changes for Increment 1 Version 4 through Version 6. - Continued CSRR Increment 1 Version 4 systems engineering development and modernization for the LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class submarines. - Continued development of platform specific builds of Increment 1 Version 4 Control and Management software for LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class capabilities. - Continued Multi-purpose Reconfigurable Training System (MRTS) software upgrade for Increment 1 Version 4 CSRR baseline for LOS ANGELES, SSBN, and SSGN Class operator trainer and VIRGINIA Class maintenance trainer.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Continued implementation of Increment 1 Version 4 security upgrades to meet Cybersecurity and multiple certification requirements for General Service (GENSER) and Sensitive Compartmented Information (SCI) for all CSRR platforms. - Continued Federal Information Security Management Act (FISMA) statutory requirement for Cybersecurity compliance and correction of Increment 1 Version 1 - Version 4 Cybersecurity deficiencies. - Continued Supply Chain Risk Management (SCRM) assessment as part of Program Protection Plan revision. - Commenced planning for CSRR Increment 1 Version 3 Joint Interoperability Test Command (JITC) Re-Certification. - Commenced development of the Test and Evaluation Master Plan (TEMP) and all preparations for Increment 1 Version 4 Developmental Test (DT) and Operational Test (OT) events.					
FY 2017 Plans: - Complete CSRR Increment 1 Version 3 Joint Interoperability Test Command (JITC) Re-Certification. - Continue updating the CSRR Acquisition Plan, Acquisition Strategy, Systems Engineering Plan (SEP) and Program Protection Plan (PPP) to reflect changes for Increment 1 Version 4 through Version 6. - Continue CSRR Increment 1 Version 4 systems engineering development and modernization for the LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class submarines. - Continue development of platform specific builds of Increment 1 Version 4 Control and Management software for LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class capabilities. - Continue Multi-purpose Reconfigurable Training System (MRTS) software upgrade for Increment 1 Version 4 CSRR baseline for LOS ANGELES, SSBN, and SSGN Class operator trainer and VIRGINIA Class maintenance trainer. - Continue implementation of Increment 1 Version 4 security upgrades to meet Cybersecurity and multiple certification requirements for General Service (GENSER) and Sensitive Compartmented Information (SCI) for all CSRR platforms. - Continue Federal Information Security Management Act (FISMA) statutory requirement for Cybersecurity compliance and correction of Increment 1 Version 1 - Version 4 Cybersecurity deficiencies. - Continue Supply Chain Risk Management (SCRM) assessment as part of Program Protection Plan revision. - Continue development of the Test and Evaluation Master Plan (TEMP) and all preparations for Increment 1 Version 4 Developmental Test (DT) and Operational Test (OT) events. - Commence contract planning for Control and Management Software contract recompete. - Commence CSRR Increment 1 Version 5 systems engineering development and modernization for the LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class submarines.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Commence development of platform specific builds of Increment 1 Version 5 Control and Management software for LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class capabilities.					
FY 2018 Base Plans: - Complete CSRR Increment 1 Version 4 systems engineering development and modernization for the LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class submarines. - Complete development of platform specific builds of Increment 1 Version 4 Control and Management software for LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class capabilities. - Complete Multi-purpose Reconfigurable Training System (MRTS) software upgrade for Increment 1 Version 4 CSRR baseline for LOS ANGELES, SSBN, and SSGN Class operator trainer and VIRGINIA Class maintenance trainer. - Complete development of the Test and Evaluation Master Plan (TEMP) and all preparations for Increment 1 Version 4 Developmental Test (DT) and Operational Test (OT) events. - Complete contract planning and award Control and Management Software contract. - Commence/Complete Follow-on Operational Test & Evaluation (FOT&E) of the CSRR Increment 1 Version 4 baseline on the LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class submarines. - Commence/Complete required Increment 1 Version 4 SSBN Class Emergency Action Message (EAM) certification testing, data analysis and Targeting Change Message (TCM) testing. - Commence/Complete successful Full Fielding Decision for Increment 1 Version 4. - Continue implementation of Increment 1 Version 4 security upgrades to meet Cybersecurity and multiple certification requirements for General Service (GENSER) and Sensitive Compartmented Information (SCI) for all CSRR platforms. - Continue Federal Information Security Management Act (FISMA) statutory requirement for Cybersecurity compliance and correction of Increment 1 Version 1 - Version 4 Cybersecurity deficiencies. - Continue Supply Chain Risk Management (SCRM) assessment as part of Program Protection Plan revision. - Continue CSRR Increment 1 Version 5 systems engineering development and modernization for the LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class submarines. - Continue development of platform specific builds of Increment 1 Version 5 Control and Management software for LOS ANGELES, SSBN, VIRGINIA, SSGN, and SEAWOLF Class capabilities. - Commence implementation of Increment 1 Version 5 security upgrades to meet Cybersecurity and multiple certification requirements for General Service (GENSER) and Sensitive Compartmented Information (SCI) for all CSRR platforms.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
- Commence Federal Information Security Management Act (FISMA) statutory requirement for Cybersecurity compliance and correction of Increment 1 Version 5 Cybersecurity deficiencies. - Commence Multi-purpose Reconfigurable Training System (MRTS) software upgrade for Increment 1 Version 5 CSRR baseline for LOS ANGELES, SSBN, and SSGN Class operator trainer and VIRGINIA Class maintenance trainer. ***FY 2018 OCO Plans:*** N/A					
Title: Low Probability of Intercept/Low Probability of Detection (LPI/LPD) ***Articles:*** ***FY 2016 Accomplishments:*** - Previously funded under the Submarine Integrated Antenna System Project (0742)/Advanced High Data Rate (HDR) program/project. ***FY 2017 Plans:*** - Previously funded under the Submarine Integrated Antenna System Project (0742)/Advanced High Data Rate (HDR) program/project. ***FY 2018 Base Plans:*** - Continue/Complete LPI/LPD technology development phase 1. - Commence shore integration of LPI/LPD solution sets to support Department of Defense (DoD) Teleports. - Commence shore integration of LPI/LPD solution sets to support Department of Navy (DoN) Submarine Broadcast Control Authority. - Commence afloat integration of LPI/LPD solution sets on LOS ANGELES, SSBN, VIRGINIA, SSGN and SEAWOLF Class submarines. - Commence Environmental Qualification Testing (EQT). - Commence LPI/LPD Phase 2 Trade Study Development. ***FY 2018 OCO Plans:*** N/A	0.000 -	0.000 -	6.000 -	0.000 -	6.000 -
Title: Link 16 ***Articles:*** ***FY 2016 Accomplishments:***	0.000 -	0.000 -	2.500 -	0.000 -	2.500 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
N/A ***FY 2017 Plans:*** - Previously funded under the Submarine Integrated Antenna System Project(0742). ***FY 2018 Base Plans:*** - Continue/Complete Link 16 tactical network communications capability Analysis of Alternatives (AoA). - Commence systems engineering development of Link 16 tactical network communications capability. - Commence porting of the Tactical Data Link (TDL) Processor Software to a different processor for integration. - Commence Lab integration of the TDL processor with Multifunctional Information Distribution System (MIDS) into the submarine architecture. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	10.027	10.002	19.494	0.000	19.494

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• OPN/3130: *Submarine Communication Equipment*	58.037	64.529	86.204	-	86.204	78.987	85.101	87.120	87.793	Continuing	Continuing
• OPN/2560: *Submarine Supt Equip Prog*	83.472	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	958.736
• OPN/0840: *Sub Periscope, Imaging and Supt Equip Prog*	0.000	154.421	151.240	-	151.240	203.895	244.660	228.294	220.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

Program Milestones: Increment 1 Version 4 Preliminary Design Review (PDR) 1Q FY16, Critical Design Review (CDR) 3Q FY17, Developmental Test (DT) 3Q FY18, Operational Test (OT) 4Q FY18, Fielding Decision 4Q FY18. Increment 1 Version 5 PDR 4Q FY18, CDR 3Q FY19, DT 2Q FY21, OT 3Q FY21, and Fielding Decision 4Q FY21. Increment 1 Version 6 PDR 4Q FY21 and CDR 3Q FY22.
Link 16 Program Milestones: Developmental Test (DT) 1Q FY21, Operational Test (OT) 2Q FY21.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

E. Performance Metrics

FY18 CSRR: Complete successful Full Fielding Decision for Increment 1 Version 4.
FY18 LPI/LPD: Complete Low Probability of Intercept/Low Probability of Detection (LPI/LPD) Technology Development Phase 1.
FY18 Link 16: Complete Link 16 tactical network communications capability Analysis of Alternatives (AoA).

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Multi-Purpose Reconfigurable Training System (MRTS) Development (CSRR)	WR	SSC LANT : Charleston, SC	2.898	1.193	Mar 2016	1.214	Dec 2016	1.332	Dec 2017	-		1.332	Continuing	Continuing	Continuing
Systems Eng/Design Version 4 (CSRR)	WR	NUWC : Newport, RI	9.693	4.098	Jan 2016	4.142	Jan 2017	4.535	Jan 2018	-		4.535	Continuing	Continuing	Continuing
Site Platform Integration/ Certification (CSRR)	WR	NUWC : Newport, RI	12.937	0.130	Jan 2016	0.145	Jan 2017	0.156	Jan 2018	-		0.156	Continuing	Continuing	Continuing
Software Development (CSRR)	TBD	TBD : TBD	0.000	0.000		0.000		2.541	Mar 2018	-		2.541	Continuing	Continuing	Continuing
Software Development (CSRR)	C/CPIF	Lockheed Martin : San Diego, CA	6.555	2.118	Mar 2016	2.338	Mar 2017	0.000		-		0.000	0.000	11.011	11.011
Systems Eng/Integration (LPI/LPD)	WR	NUWC : Newport, RI	0.000	0.000		0.000		2.350	Nov 2017	-		2.350	Continuing	Continuing	Continuing
Design (LPI/LPD)	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		1.200	Nov 2017	-		1.200	Continuing	Continuing	Continuing
Hardware Development (Link 16)	TBD	TBD : TBD	0.000	0.000		0.000		0.500	Nov 2017	-		0.500	Continuing	Continuing	Continuing
Systems Engineering (Link 16)	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.750	Nov 2017	-		0.750	Continuing	Continuing	Continuing
Site Platform integration/ Certification (Link 16)	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.560	Nov 2017	-		0.560	Continuing	Continuing	Continuing
Software Development (Link 16)	TBD	TBD : TBD	0.000	0.000		0.000		0.420	Nov 2017	-		0.420	Continuing	Continuing	Continuing
Product Development Prior Years	Various	Various : Various	124.155	0.000		0.000		0.000		-		0.000	0.000	124.155	124.155
		Subtotal	156.238	7.539		7.839		14.344		-		14.344	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604503N / *SSN-688 & Trident Modernization*	Project (Number/Name) 1411 / *Sub Tact Comm System*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistics Support (CSRR)	WR	NUWC : Newport, RI	3.688	0.192	Nov 2015	0.268	Nov 2016	0.290	Nov 2017	-		0.290	Continuing	Continuing	Continuing
Software Engineering (CSRR)	WR	SSC PAC : San Diego, CA	3.651	0.185	Nov 2015	0.207	Nov 2016	0.248	Nov 2017	-		0.248	Continuing	Continuing	Continuing
Information Security/ Cyber Security (INFOSEC) Certification/Supply Chain Risk Management (SCRM) Assessment (CSRR)	Various	SSC PAC/SSC LANT/NUWC/ MITRE : San Diego, CA/Charleston, SC/ Newport, RI/San Diego	22.841	1.536	Nov 2015	1.076	Nov 2016	1.212	Nov 2017	-		1.212	Continuing	Continuing	Continuing
Integrated Logistics Support (LPI/LPD)	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.650	Nov 2017	-		0.650	Continuing	Continuing	Continuing
Trade Study (LPI/LPD)	WR	MITRE : San Diego, CA	0.000	0.000		0.000		0.500	Nov 2017	-		0.500	0.000	0.500	0.500
Integrated Logistics Support (Link 16)	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.050	Nov 2017	-		0.050	Continuing	Continuing	Continuing
Software Engineering (Link 16)	WR	SSC PAC : San Diego, CA	0.000	0.000		0.000		0.045	Nov 2017	-		0.045	Continuing	Continuing	Continuing
		Subtotal	30.180	1.913		1.551		2.995		-		2.995	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental/ Operational Test and Evaluation (T&E) (CSRR)	WR	COTF, JITC : Various	11.285	0.000		0.020	Nov 2016	0.060	Nov 2017	-		0.060	Continuing	Continuing	Continuing
Test and Evaluation (T&E) (LPI/LPD)	WR	TBD : TBD	0.000	0.000		0.000		0.700	Nov 2017	-		0.700	Continuing	Continuing	Continuing
Developmental/ Operational Test and Evaluation (T&E) (Link 16)	WR	COTF, JITC : Various	0.000	0.000		0.000		0.025	Nov 2017	-		0.025	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			11.285	0.000		0.020		0.785		-		0.785	-	-	-

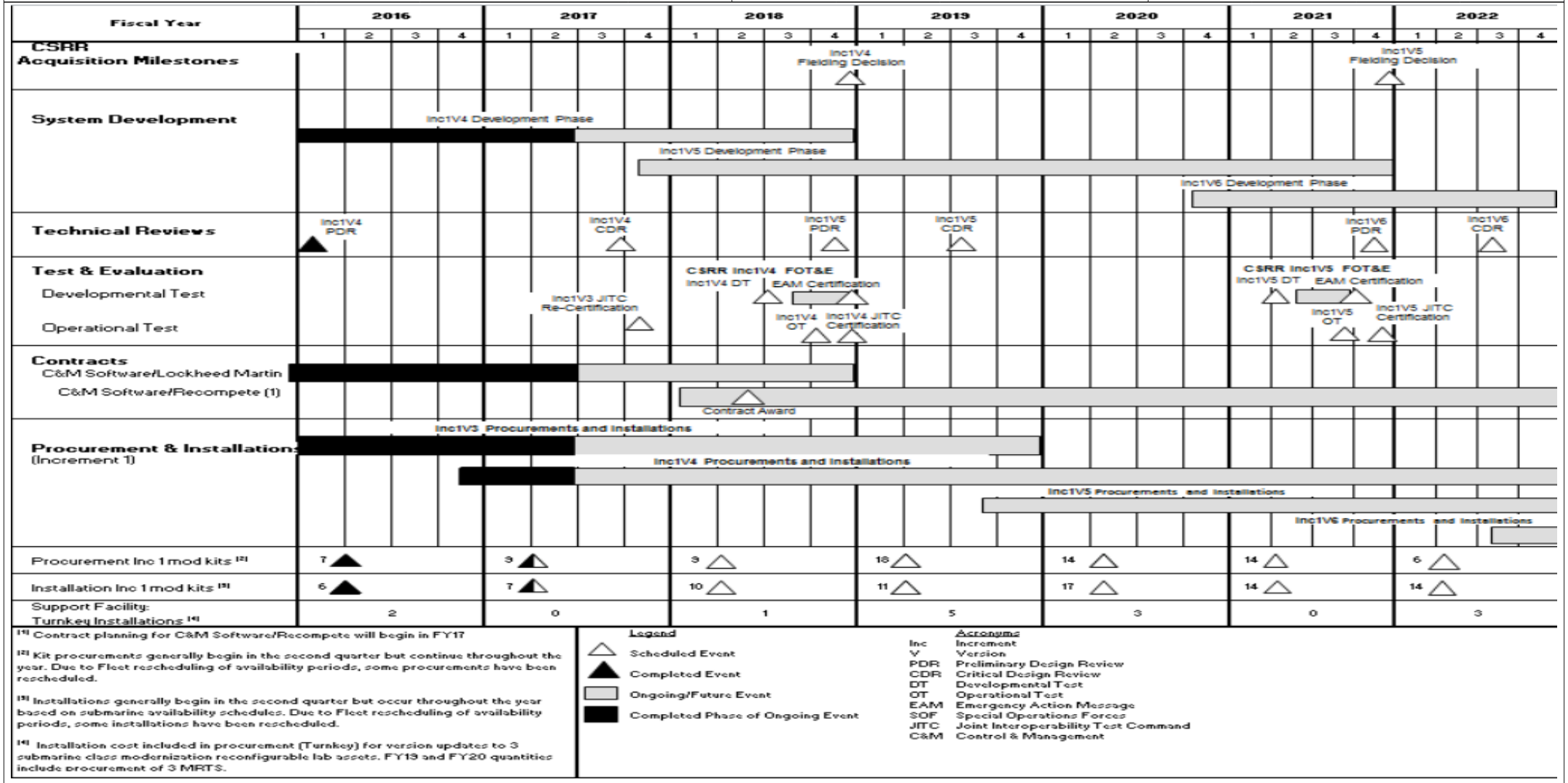
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support (CSRR)	C/CPFF	CSA : San Diego, CA	10.801	0.575	Dec 2015	0.592	Nov 2016	0.620	Nov 2017	-		0.620	Continuing	Continuing	Continuing
Program Management Support (LPI/LPD)	C/CPFF	CSA : San Diego, CA	0.000	0.000		0.000		0.600	Nov 2017	-		0.600	Continuing	Continuing	Continuing
Program Management Support (Link 16)	C/CPFF	CSA : San Diego, CA	0.000	0.000		0.000		0.150	Nov 2017	-		0.150	Continuing	Continuing	Continuing
Subtotal			10.801	0.575		0.592		1.370		-		1.370	-	-	-

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	208.504	10.027		10.002		19.494		-		19.494	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*



[1] Contract planning for C&M Software/Recompete will begin in FY17

[2] Kit procurements generally begin in the second quarter but continue throughout the year. Due to Fleet rescheduling of availability periods, some procurements have been rescheduled.

[3] Installations generally begin in the second quarter but occur throughout the year based on submarine availability schedules. Due to Fleet rescheduling of availability periods, some installations have been rescheduled.

[4] Installation cost included in procurement (Turnkey) for version updates to 3 submarine class modernization reconfigurable lab assets. FY19 and FY20 quantities include procurement of 3 MRTS.

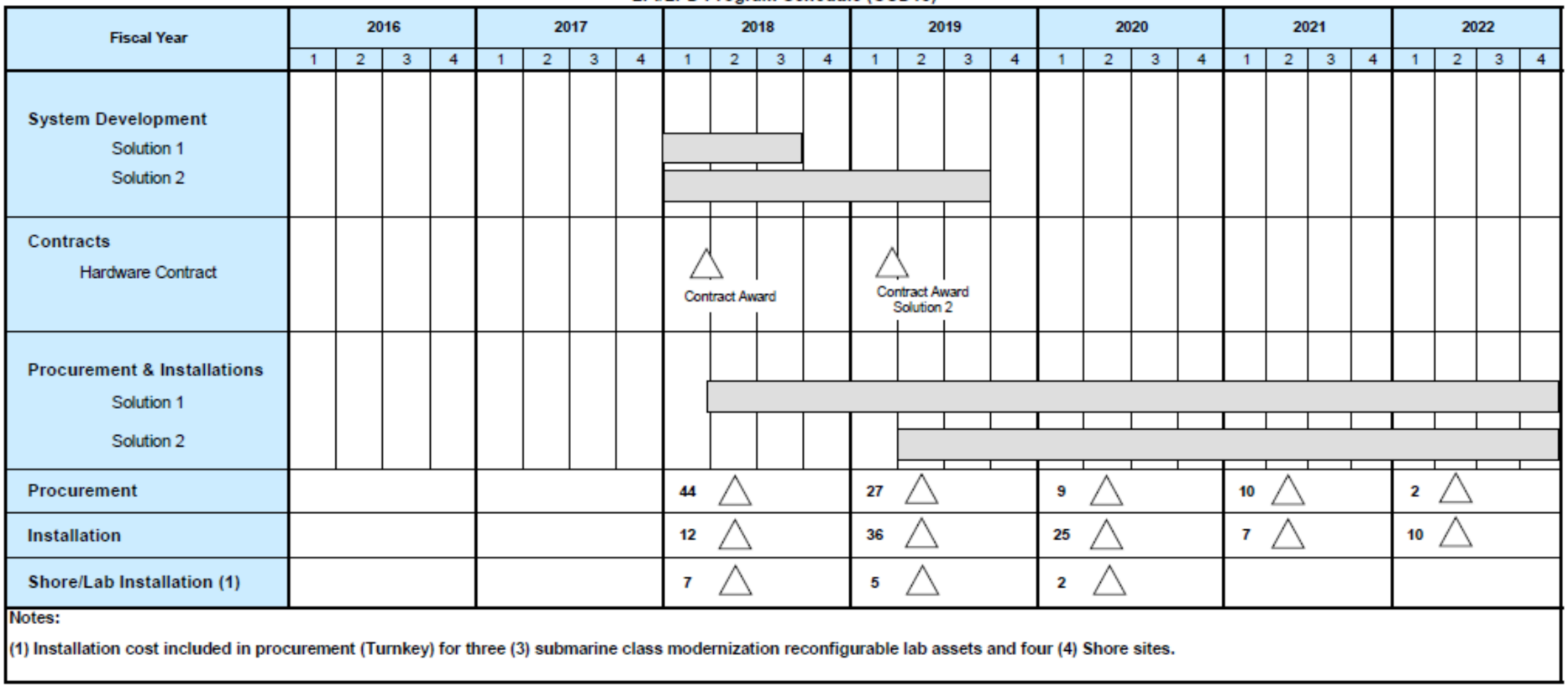
Legend
- Scheduled Event
- Completed Event
- Ongoing/Future Event
- Completed Phase of Ongoing Event

Acronyms

Inc	Increment
V	Version
PDR	Preliminary Design Review
CDR	Critical Design Review
DT	Developmental Test
OT	Operational Test
EAM	Emergency Action Message
SOF	Special Operations Forces
JITC	Joint Interoperability Test Command
C&M	Control & Management

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

LPI/LPD Program Schedule (OSD18)



Notes:

(1) Installation cost included in procurement (Turnkey) for three (3) submarine class modernization reconfigurable lab assets and four (4) Shore sites.

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

Link 16 Program Schedule (OSD18)

Fiscal Year	2016				2017				2018				2019				2020				2021				2022			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
System Development																												
Test & Evaluation																					DT	OT						
Contracts																		Contract Award										
Procurement & Installations																												
Procurements (1)																	8				10				12			
Installations																					6				9			

Notes:
(1) Installation cost included in procurement (Turnkey) for two (2) submarine class modernization reconfigurable lab assets in FY20 and one (1) in FY21

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1411				
Fielding Decision (Increment 1 Version 4)	4	2018	4	2018
Fielding Decision (Increment 1 Version 5)	4	2021	4	2021
Technical Reviews (Increment 1 Version 4 Preliminary Design Review (PDR))	1	2016	1	2016
Technical Reviews (Increment 1 Version 4 Critical Design Review (CDR))	3	2017	3	2017
Technical Reviews (Increment 1 Version 5 Preliminary Design Review (PDR))	4	2018	4	2018
Technical Reviews (Increment 1 Version 5 Critical Design Review (CDR))	3	2019	3	2019
Technical Reviews (Increment 1 Version 6 Preliminary Design Review (PDR))	4	2021	4	2021
Technical Reviews (Increment 1 Version 6 Critical Design Review (CDR)	3	2022	3	2022
System Development (Increment 1 Version 4)	1	2016	4	2018
System Development (Increment 1 Version 5)	4	2017	4	2021
System Development (Increment 1 Version 6)	4	2020	4	2022
Contracts (Software---Lockheed Martin)	1	2016	4	2018
Contracts (Software-Follow-on to include planning)	2	2018	4	2022
Emergency Action Message (EAM) Certification (Increment 1 Version 4)	3	2018	4	2018
Emergency Action Message (EAM) Certification (Increment 1 Version 5)	2	2021	3	2021
Increment 1 Version 3 Joint Interoperability Test Command (JITC) Re-Certification	4	2017	4	2017
Increment 1 Version 4 Joint Interoperability Test Command (JITC) Re-Certification	4	2018	4	2018
Increment 1 Version 5 Joint Interoperability Test Command (JITC) Re-Certification	4	2021	4	2021
Developmental Test (DT) (Increment 1 Version 4)	3	2018	3	2018
Operational Test (OT) (Increment 1 Version 4)	4	2018	4	2018
Developmental Test (DT) (Increment 1 Version 5)	2	2021	2	2021

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604503N / *SSN-688 & Trident Modernization*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Operational Test (OT) (Increment 1 Version 5)	3	2021	3	2021
Procurement/Installation (Increment 1 Version 3 Modernization Kits)	1	2016	4	2019
Procurement/Installation (Increment 1 Version 4 Modernization Kits)	4	2016	4	2022
Procurement/Installation (Increment 1 Version 5 Modernization Kits)	3	2019	4	2022
Procurement/Installation (Increment 1 Version 6 Modernization Kits)	3	2022	4	2022
System Integration (Low Probability of Intercept/Low Probability of Detection (LPI/LPD) Solution 1)	1	2018	3	2018
System Integration ((LPI/LPD) Solution 2)	1	2018	3	2019
Contract Award ((LPI/LPD) Solution 1)	1	2018	1	2018
Contract Award ((LPI/LPD) Solution 2)	1	2019	1	2019
Procurement/Installation ((LPI/LPD) Solution 1)	2	2018	4	2022
Procurement/Installation ((LPI/LPD) Solution 2)	2	2019	4	2022
System Development (Link 16)	1	2018	4	2018
Developmental Test (DT) (Link 16)	1	2021	1	2021
Operational Test (OT) (Link 16)	2	2021	2	2021
Procurement (Link 16)	2	2020	4	2022
Award (Link 16)	2	2020	2	2020