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 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0204228N *I Surface Support*							
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	11.611	28.210	21.156	24.829	-	24.829	19.071	19.453	20.388	14.347	Continuing	Continuing
3311: *Navigation Systems*	11.611	28.210	21.156	24.829	-	24.829	19.071	19.453	20.388	14.347	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Surface support RDT&E funding will be used for the research, design, development, integration testing, and documentation of a new Inertial Navigation System (INS) AN/WSN-12 for all Navy platforms. Efforts will include analysis and planning for the alignment and evolution of Afloat Navigation Systems for surface and submarine platforms. Development of Capability Phasing Planning (CPP) processes to drive engineering analysis. The program will implement systems engineering processes to investigate major navigation system error sources, define new functions, research new technologies, algorithms, and techniques to improve system performance, conduct analyses of alternatives, create preliminary and final design concepts, develop new hardware components and associated software, and conduct land based and shipboard testing. The INS provides mission critical ship's position and attitude data to shipboard sensors (such as radars), combat systems, gun, and missile systems. The INS uses data from the Global Positioning System (GPS) to periodically update (i.e., reset) its position and internal clock. The INS is the ship's primary position source in absence of GPS. The INS WSN-12 consists of an Inertial Sensor Module (ISM) and a Navigation Processing Module (NPM). The ISM being is designed, developed, and procured through competitive contract award to Northrop Grumman in November 2015. The NPM is a Government design. RDT&E funding will support continued system design to create a baseline for Pre-Production Units (PPU) and Low Rate Initial Production (LRIP). The system will go through Critical Design Review (CDR), Test Readiness Review (TRR), and Production Readiness Reviews (PRR). The system will go through extensive testing including Independent Validation and Verification (IV&V), Developmental Testing (DT) and Operational Testing (OT).

Cybersecurity funding will be used for the research, development, documentation and integration testing for cybersecurity hardening and enclave development for navigation systems. Efforts will include the development of boundary defense capabilities, platform specific architectures, Navy-Electronic Chart Display and Information System (Navy-ECDIS) secure solution for existing unclassified configurations and CYBERSAFE implementation. Conduct of cybersecurity risk and vulnerability assessments including development of system models, threat models, and mission models for representative groupings of Navigation systems and cyber security capabilities.

The MK27 gyrocompass provides a backup heading reference for SSBNs and LSD platforms and has become obsolete. The AN/WSN-11 (MK27-Replacement) is a form fit function replacement that provides the same functionality while addressing the obsolescence issues of the original MK27. RDT&E funding supports the development, testing and certification of the AN/WSN-11.

Military GPS User Equipment (MGUE) to provide assured Positioning, Navigation and Timing (PNT) in a GPS degraded environment funding will be used for MGUE integration into SSNs, Tomahawk, and Advanced Anti-Radiation Guided Missile (AARGM). Development of interface and performance requirements and shipboard system architectures to support MGUE integration.

Time and Frequency Distribution System-Replacement (TFDS-R) funding will be used for the research, development, documentation, and integration testing for the Submarine TFDS-R system. TFDS is a Commercial Off the Shelf (COTS) timing system utilizing the precision source signals of GPS to discipline two redundant

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 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0204228N *I Surface Support*

Rubidium clocks to Universal Coordinated Time (UTC). TFDS provides common time to submarine equipment that utilizes clocking pulses or sinusoidal waveforms for proper operation and maintains accurate time in the event of loss of GPS input (holdover). TFDS Uses multiple input power sources for redundancy and provides a built in battery backup. TFDS generates and distributes Precision Time and Timing Interval (PTTI) reference signals to support C4I capabilities needed for Joint, Naval and Allied missions. This funding will be used to conduct a system level Analysis of Alternatives (AoA) and develop a Technical Requirements Document (TRD). These documents will support detailed analysis of the program implementation strategy to replace obsolete TFDS systems in the Fleet including appropriate documentation and contracting strategies.

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	36.045	21.156	13.529	-	13.529
Current President's Budget	28.210	21.156	24.829	-	24.829
Total Adjustments	-7.835	0.000	11.300	-	11.300
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-7.050	0.000			
• SBIR/STTR Transfer	-0.785	0.000			
• Program Adjustments	0.000	0.000	11.250	-	11.250
• Rate/Misc Adjustments	0.000	0.000	0.050	-	0.050

Change Summary Explanation

The Department reduced FY 2016 funding to finance higher priority Navy needs.

The Department added additional FY 2018 funding for additional Military GPS equipment and to properly price efforts based on planned expenditures.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy											Date: May 2017	
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0204228N / *Surface Support*				Project (Number/Name) 3311 / *Navigation Systems*			
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**
3311: *Navigation Systems*	11.611	28.210	21.156	24.829	-	24.829	19.071	19.453	20.388	14.347	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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Cybersecurity funding will be used for the research, development, documentation and integration testing for cybersecurity hardening and enclave development for navigation systems. Efforts will include the development of boundary defense capabilities, platform specific architectures, Navy-Electronic Chart Display and Information System (Navy-ECDIS) secure solution for existing unclassified configurations and CYBERSAFE implementation. Conduct of cybersecurity risk and vulnerability assessments including development of system models, threat models, and mission models for representative groupings of Navigation systems and cyber security capabilities.

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proper operation and maintains accurate time in the event of loss of GPS input (holdover). TFDS Uses multiple input power sources for redundancy and provides a built in battery backup. TFDS generates and distributes Precision Time and Timing Interval (PTTI) reference signals to support C4I capabilities needed for Joint, Naval and Allied missions. This funding will be used to conduct a system level Analysis of Alternatives (AoA) and develop a Technical Requirements Document (TRD). These documents will support detailed analysis of the program implementation strategy to replace obsolete TFDS systems in the Fleet including appropriate documentation and contracting strategies.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: WSN-12 Inertial Navigation System - Replacement (INS-R)	20.724	15.180	11.803	0.000	11.803
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Completed Inertial Sensor Model (ISM) Preliminary Design Review (PDR). Continued Navigation Processor Model (NPM) Engineering Development Model (EDM) design. Built 2 NPMs and delivered 1 for integration testing. Began build activities on 6 ISM EDM units. Conducted system level software integration testing. Began conduct of long range inertial testing on the ISM unit. Baselined the system test and evaluation strategy. Conducted the Integrated Baseline Review (IBR)					
FY 2017 Plans: Complete development of the ISM EDMs. Begin ISM EDM and NPM EDM hardware (HW) and software (SW) integration. Complete the system test plans to support Environmental Qualification Testing (EQT). Continue vendor testing on the ISM EDM. Hold system level PDR. Begin ISM Critical Design Review (CDR) and Pre Production Unit (PPU) production effort. Prepare for Environmental Qualification Testing (EQT) on the NPM EDM. Complete program documentation.					
FY 2018 Base Plans: Conduct ISM CDR. Conduct system level CDR. Award the Production Readiness Review (PRR) CLIN for ISM development of LRIP units. Build ISM and NPM PPU's. Build WSN-12 lab. Conclude ISM / NPM EDM integration testing. Begin PPU ISM/NPM EDM testing.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204228N / *Surface Support*	**Project (Number/Name)** 3311 / *Navigation Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Conduct Environmental Qualification Testing (EQT). ***FY 2018 OCO Plans:*** N/A					
Title: Cybersecurity	4.377	1.918	4.804	0.000	4.804
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Began development of notional, boundary defense capabilities. Initiated development of navigation Cybersecurity requirements based on mandated requirements, threats and standards. Developed platform specific Cybersecurity architecture for protections of navigation equipment. ***FY 2017 Plans:*** Complete Cybersecurity requirements definition and finalize boundary defense architecture for the Navigation Suite/Enclave. Design a Navy ECDIS Cybersecurity solution for upgrading fielded unclassified configurations to support Secret level operations. Develop disconnect and operational procedures to support implemented threat based cyber conditions. ***FY 2018 Base Plans:*** Demonstrate Navigation Suite/Enclave boundary defense and centrally managed capabilities. Demonstrate Navigation Suite/Enclave cybersecurity operational procedures. ***FY 2018 OCO Plans:*** N/A					
Title: WSN-11 MK27 Gyrocompass Replacement	0.083	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Completed design, development, and testing of WSN-11 Gyrocompass for surface, amphibious and submarine platforms. Built three prototypes (one of each variant). ***FY 2017 Plans:*** Transition to OPN under budget line item 0204228N ***FY 2018 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204228N / *Surface Support*	**Project (Number/Name)** 3311 / *Navigation Systems*

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 2018 OCO Plans:*** N/A					
Title: Time Frequency Distribution System (TFDS) Replacement	0.820	0.800	2.000	0.000	2.000
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Developed design documentation to adapt surface design to a submarine configuration and began development of prototype. Began Analysis of Alternatives (AoA). Procured 2 TFDS systems for lab testing. ***FY 2017 Plans:*** Continue AoA Begin the Technical Requirements Document (TRD). ***FY 2018 Base Plans:*** Complete AoA Draft Request for Information (RFI) Develop acquisition approach including ACAT strategy, if applicable Finalize the Technical Requirements Document (TRD) Draft System Acquisition Management Plan (SAMP) ***FY 2018 OCO Plans:*** N/A					
Title: Military GPS User Equipment	0.000	0.000	3.906	0.000	3.906
Articles:	-	-	-	-	-
FY 2016 Accomplishments: N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** Development of a Technical Requirements Document (TRD) and trade studies for MGUE integration.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204228N / *Surface Support*	**Project (Number/Name)** 3311 / *Navigation Systems*

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 a program acquisition strategy and accompanying documentation. Upgrade of the submarine integration lab and upgrade of the Electronic Control Display Unit (ECDU) to support MGUE card integration ***FY 2018 OCO Plans:*** N/A					
Title: Submarine Speed Sensors	1.138	0.491	0.800	0.000	0.800
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Developed test plans, procedures, and test fixtures for Environment Qualification Testing (EQT) testing. Conducted EQT testing on Doppler sensor and High Speed Probe Sensor. ***FY 2017 Plans:*** Develop prototype sensors based on results from EQT testing. ***FY 2018 Base Plans:*** Complete prototype development and conduct flow tank testing. ***FY 2018 OCO Plans:*** N/A					
Title: Navigation Support	1.068	2.767	1.516	0.000	1.516
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Provided engineering, logistics, and programmatic support to WSN-11, WSN-12, TFDS, Cyber security and Submarine Speed Sensor efforts. ***FY 2017 Plans:*** Provide engineering, logistics, and programmatic support for, WSN-12, TFDS, Cyber security and Submarine Speed Sensor Support S&T transitions to LRIP 1 fleet. ***FY 2018 Base Plans:*** Provide engineering, logistics, and programmatic support for, WSN-12, TFDS, and Cyber security. ***FY 2018 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204228N / *Surface Support*	Project (Number/Name) 3311 / *Navigation Systems*

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					
Accomplishments/Planned Programs Subtotals	28.210	21.156	24.829	0.000	24.829

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/0670: *Other Navigation*	63.481	63.942	65.943	-	65.943	107.588	122.148	124.705	57.665	Continuing	Continuing

Remarks

D. Acquisition Strategy

Inertial Navigation System (INS) contract competitively awarded in FY 2016.

E. Performance Metrics

FY16
Completed ISM Preliminary Design Review (PDR).
Built 2 WSN-12 NPMs and delivered 1 for integration testing.
Began build activities on 6 WSN-12 ISM EDM units.
Initiated Development of navigation Cybersecurity requirements based on mandated requirements, threats and standards.
Completed design, development, and testing of WSN-11 (MK27 gyrocompass replacement).
Began TFDS Analysis of Alternatives (AoA).

FY17
Complete development of the WSN -12 ISM EDMs.
Conduct WSN-12 Preliminary Design Review (PDR).
Begin WSN-12 ISM Critical Design Review (CDR) and Pre Production Unit (PPU) production effort.
Complete cybersecurity requirements definition for navigation enclave.
Continue TFDS AoA.
Start Submarine Speed Sensor environmental qualification testing.

FY18
WSN-12 Critical Design Review (CDR).
Build WSN-12 ISM PPU's.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204228N / *Surface Support*	**Project (Number/Name)** 3311 / *Navigation Systems*

Conduct WSN-12 PRR.
Execute TFDS Program of Record activities.
Complete Submarine Speed Sensor temporary alteration efforts.
Completion of GPS MGUE TRD
Completion of GPS MGUE Systems Engineering Plan
Completion of GPS MGUE Trade Studies
Completion of GPS MGUE System Acquisition Management Plan

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204228N / *Surface Support*	Project (Number/Name) 3311 / *Navigation Systems*	

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/ Design	WR	SPAWAR Atlantic : Little Creek, VA	3.451	2.119	Nov 2015	0.480	Feb 2017	3.977	Jan 2018	-		3.977	Continuing	Continuing	Continuing
Systems Engineering/ Design	WR	SPAWAR Pacific : San Diego, CA	0.000	0.440	Mar 2016	0.220	Feb 2017	0.720	Jan 2018	-		0.720	Continuing	Continuing	Continuing
Systems Engineering/ Design	C/CPFF	WR Systems : Norfolk, VA	3.213	4.524	Aug 2016	1.749	Sep 2017	3.539	Jan 2018	-		3.539	Continuing	Continuing	Continuing
Systems Engineering/ Design	C/CPFF	Penn State/ARL : Warminster, PA	2.020	0.530	Sep 2016	0.925	Jun 2017	0.600	Jan 2018	-		0.600	Continuing	Continuing	Continuing
Systems Engineering/ Design	WR	NSWC Dahlgren : Dahlgren, VA	0.383	0.260	Aug 2016	0.000		0.339	Dec 2017	-		0.339	Continuing	Continuing	Continuing
Systems Engineering/ Design	WR	NSWC Dam Neck : Dam Neck, VA	0.000	0.340	Mar 2016	0.000		2.000	Dec 2017	-		2.000	Continuing	Continuing	Continuing
Systems Engineering/ Design	WR	NSWC PHD : Port Hueneme, CA	0.000	0.000		0.122	Mar 2017	0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/ Design	WR	NUWC Newport : Newport, RI	0.000	0.180	Apr 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/ Design	C/CPFF	Old Dominion University : Suffolk, VA	0.450	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/ Design	C/CPFF	Northrop Grumman : Charlottesville, VA	0.000	15.338	Dec 2016	12.755	Sep 2017	9.359	Dec 2017	-		9.359	Continuing	Continuing	Continuing
Systems Engineering/ Design	WR	SPAWAR Atlantic : Charleston, SC	1.200	0.330	Sep 2016	0.000		0.196	Dec 2017	-		0.196	Continuing	Continuing	Continuing
Systems Engineering/ Design	WR	NSWC Philadelphia : Philadelphia, PA	0.000	0.110	Mar 2016	0.440	Jun 2017	0.660	Dec 2017	-		0.660	Continuing	Continuing	Continuing
Systems Engineering/ Design	C/CPFF	Electric Boat : Groton, CA	0.000	0.953	Mar 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/ Design	C/CPFF	John Hopkins, APL : Laurel, MD	0.000	0.000		1.638	May 2017	1.816	Dec 2017	-		1.816	Continuing	Continuing	Continuing
Systems Engineering/ Design	C/CPFF	Draper : Cambridge, MA	0.000	1.475	Aug 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Systems Engineering/ Design	WR	NSWC Crane : Crane, IN	0.000	0.000		0.060	Jan 2017	0.000		-		0.000	0.000	0.060	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204228N / *Surface Support*	Project (Number/Name) 3311 / *Navigation Systems*

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
Subtotal			10.717	26.599		18.389		23.206		-		23.206	-	-	-

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
Program Management	C/CPFF	Various : Not Specified	0.894	1.611	Mar 2016	2.767	Sep 2017	1.623	Jan 2018	-		1.623	Continuing	Continuing	Continuing
Subtotal			0.894	1.611		2.767		1.623		-		1.623	-	-	-

	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	11.611	28.210		21.156		24.829		-		24.829	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204228N / *Surface Support*	**Project (Number/Name)** 3311 / *Navigation Systems*

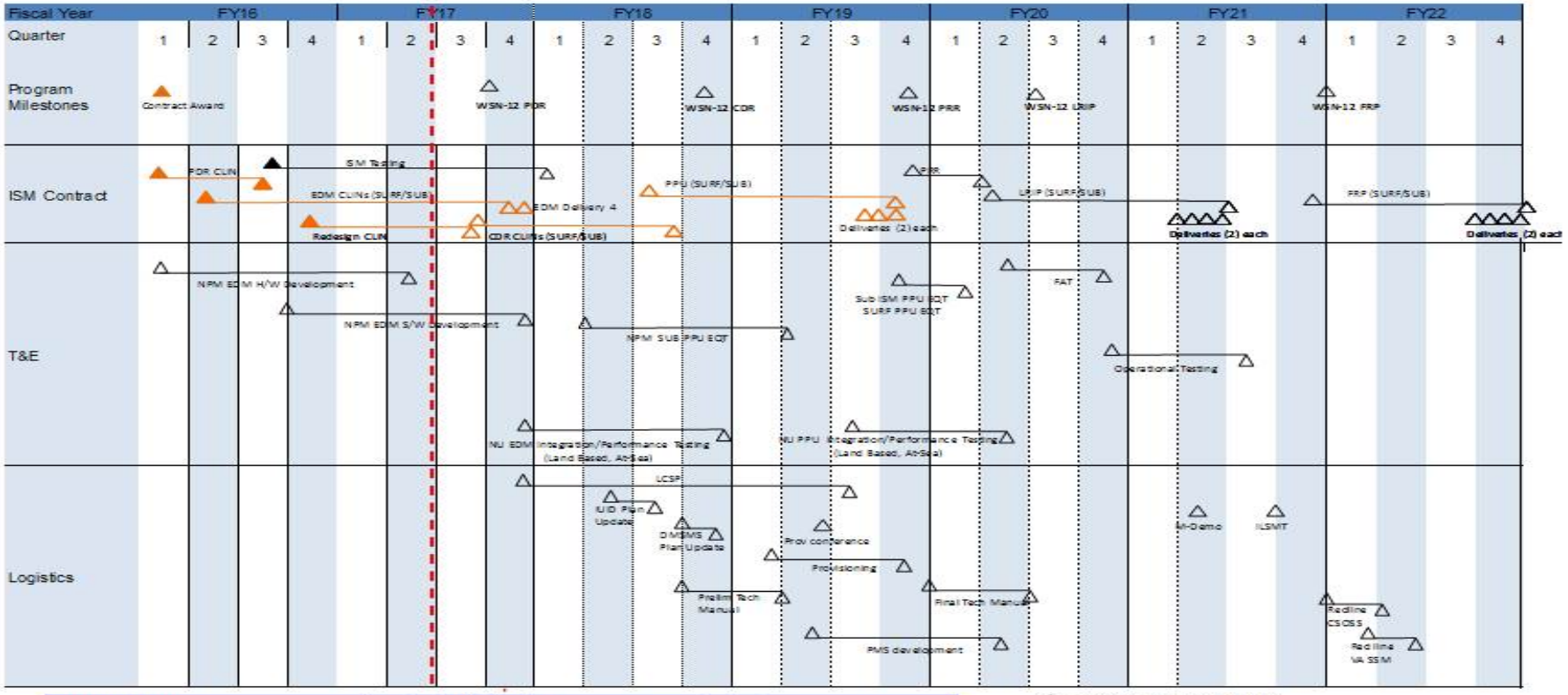

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204228N / *Surface Support*	**Project (Number/Name)** 3311 / *Navigation Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3311				
WSN-12 Contract Award	1	2016	1	2016
ISM PDR	3	2016	3	2016
WSN-12 PDR	4	2017	4	2017
ISM CDR	1	2018	1	2018
WSN-12 CDR	4	2018	4	2018
WSN-12 PRR	4	2019	4	2019
WSN-12 LRIP	3	2020	3	2020
OTRR	2	2021	2	2021
WSN-12 FRP	4	2021	4	2021
BDC Development	2	2016	4	2017
Secure Navigation Architecture Development	3	2016	1	2018
BDC Integration Testing	2	2018	4	2018
Development	1	2016	2	2016
PPU	3	2016	3	2016
At Sea Testing	3	2016	3	2016
Environmental Qualification Testing (EQT)	4	2016	4	2016
WSN-11 SSBN Installation	3	2017	4	2022
AoA	4	2016	4	2017
TFDS Develop TRD	4	2017	4	2017
Pre-Acquisition Activity	1	2018	1	2019
TFDS Contract Award	3	2019	3	2019
Acquisition Plan	2	2018	4	2018

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204228N / *Surface Support*	**Project (Number/Name)** 3311 / *Navigation Systems*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GPS Modernization Develop TRD	1	2018	3	2018
System Eng Plan	1	2018	4	2018
DHYSL Lab Testing	1	2016	1	2016
SSBN At Sea Testing	2	2016	2	2016
SSBN Installation	3	2017	4	2022