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 0204163N *I Fleet Tactical Development*							
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	161.026	39.548	48.225	33.525	-	33.525	22.541	19.579	2.664	2.721	Continuing	Continuing
0725: *Communication Automation*	161.026	39.548	48.225	33.525	-	33.525	22.541	19.579	2.664	2.721	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Communication Automation Program is a continuing program that provides for automation and communications upgrades for fleet tactical users. It includes Battle Force Tactical Network (BFTN), Joint Aerial Layer Network-Maritime (JALN-M), High Frequency Over-the-horizon Robust Enterprise (HFORCE)and Automated Digital Network System (ADNS).

The Battle Force Tactical Network (BFTN) on each surface, subsurface, air, or fixed US Navy platform utilizes previously installed/existing Line of Sight (LOS)/Extended Line of Sight (ELOS) radios (a.k.a. Radio Frequency (RF)) to create a secure gateway that inter-connects all users into a common RF Tactical Network (a.k.a. wireless). This network separately supports US-Only and NATO Allied/Coalition users' tactical data information exchanges on each platform (node) between and/or across separately dispersed RF Networks even if Satellite Communications (SATCOM) channels to shore are lost during an Assured Command and Control (C2) and Anti-Access/Area Denial (A2/AD) event.

Joint Aerial Layer Network-Maritime (JALN-M), a system of systems (SoS) capability, is the Navy implementation of the JALN architecture which provides assured communications in any environment, especially Anti-Access/Area Denial (A2/AD). With disruption or loss of space tier communications, JALN-M establishes and/or restores connectivity with the High Capacity Backbone (HCB) tier, the Distribution Access Range Extension (DARE) tier, and the Transition tier in accordance with the JALN-M Initial Capabilities Document (ICD) and the JALN-M Analysis of Alternatives (AoA) Final Report. JALN-M is a robust, assured communications capability providing joint connectivity via the HCB and Navy platform connectivity via a pseudo satellite DARE capability. JALN-M will use the Extended Data Rate (XDR) waveform (Navy Multiband Terminal (NMT)) for intra-battle group DARE communications, a Common Data Link (CDL) waveform for the HCB cross-link capability, and will leverage enhanced Ultra High Frequency/High Frequency (UHF/HF) waveforms for coalition connectivity. Furthermore, a Positioning, Navigation, and Timing (PNT) capability will be developed and integrated into the JALN-M Pod, and will provide position and timing data to other Pod subsystems, both with and without Global Positioning System (GPS) connectivity. Because the Pod is being designed to operate in an A2/AD environment, the Pod HCB and XDR (NMT) subsystems need to be provided with PNT data in the absence of GPS, and the assured PNT subsystem will provide that data. The objective is to provide an alternative communication path in a denied environment, to support key information exchange requirement via ADNS.

The current national focus on highly contested environments has highlighted the growing need for protected (anti-jam and low-probability of detection) communications. Projects such as JALN-M and High Frequency Over-the-horizon Robust Communications Enterprise (HFORCE) address capability gaps (network connectivity, network capacity, information and data sharing, network management) to enable assured communications in a satellite-denied environment. Although these projects will supplement and backup current capabilities, they may become the only communications paths available if satellite communications are completely denied. Navy is currently prototyping and demonstrating an aerial relay surrogate SATCOM communications capability under the JALN-M Project. The HFORCE Project will demonstrate resiliency and throughput enhancements via a hub-based HF communication architecture. HFORCE and JALN-M are very different approaches to

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
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solving the same problem: achieving assured communications in a satellite-denied environment. HFORCE will demonstrate a robust communications infrastructure in a SATCOM denied/restricted environment, particularly where beyond-line-of-sight (BLOS) connectivity is required with seemingly opposing requirements for long range, high data rates, and low probability of detection (LPD). HFORCE will address the need for protected and reliable BLOS C4I in SATCOM denied environments where opportunities exist to leverage shore infrastructure to address the SATCOM-denied gap. HFORCE prototype has the potential to augment current space-based BLOS systems, providing an alternative capability in satellite-denied environments that is affordable, reliable and secure. The HFORCE project will address this gap by leveraging large gain hub arrays to enhance performance of HF links. Large gain hubs in concert with multi-carrier waveforms and adaptive scheduling provide Mbps-class data rates to large platforms and orders of magnitude improvement in LPD performance over traditional methods. Small scale demonstrations have focused on performance of system at the physical layer. HFORCE will focus on a larger scale prototype hub to be used with legacy waveforms and legacy radios.

Automated Digital Network System (ADNS) is the method by which Tactical Navy units transfer Internet Protocol (IP) data to Navy and Department of Defense communities on the Global Information Grid (GIG). ADNS is the gateway to tactical Wide Area Network (WAN) afloat for Internet Protocol network operations, supporting information dissemination and external connectivity. ADNS enables services and applications to interconnect to the Defense Information Systems Network (DISN) ashore via multiple Radio Frequency (RF) resources and pier connectivity.

FY18 BFTN efforts will focus on the completion and documentation of Initial Operational Test & Evaluation (IOT&E).

FY18 JALN-M efforts will focus on execution of the JALN-M demonstration flight tests which demonstrate Navy ship-to-ship/sub and ship/afloat-to-GIG communications via Airborne JALN-M Pod hosting Aerial Extended Data Rate (AXDR), High Capacity Backbone (HCB), and Assured PNT (Positioning, Navigation, and Timing) payloads. Results of the demonstration seeks to inform DoD and Navy leadership on the JALN way ahead (technical and programmatic risks) and of the viability of JALN-M as a future capability.

FY18 HFORCE efforts will use results from JALN-M resiliency studies to inform development of HFORCE demonstration plan and cost analysis, procurement of commercial off the shelf (COTS) hardware for installation of prototype half-scale hub, and initiate HF protected waveform (HFPW) development including interoperability with legacy waveforms. Additional FY18 efforts include programmatic documentation development (e.g. cost estimate, Project Definition Document (PDD)).

FY18 ADNS RDT&E investment will continue to support Interface Design Development (IDD) and integration with network applications, development of Line-Of-Sight (LOS) link, DISN integration, and development of Cipher-Text (CT) piers. ADNS development/integration will include addressing network management, intra and inter domain routing, Quality of Service (QoS), and Concept of Operations discussions. Continue Network-Based Cyber Security technology and virtualization to increase performance of the Navy's ADNS routing and transport architecture.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy					Date: May 2017
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B. Program Change Summary ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**
Previous President's Budget	41.538	48.225	8.437	-	8.437
Current President's Budget	39.548	48.225	33.525	-	33.525
Total Adjustments	-1.990	0.000	25.088	-	25.088
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.000	0.000			
• SBIR/STTR Transfer	-0.990	0.000			
• Program Adjustments	0.000	0.000	24.937	-	24.937
• Rate/Misc Adjustments	0.000	0.000	0.151	-	0.151

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
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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
0725: *Communication Automation*	161.026	39.548	48.225	33.525	-	33.525	22.541	19.579	2.664	2.721	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Battle Force Tactical Network (BFTN) on each surface, subsurface, air, or fixed US Navy platform uses previously installed/existing Line of Sight (LOS)/ Extended Line of Sight (ELOS) radios (a.k.a. Radio Frequency (RF)) to create a secure gateway that inter-connects all users into a common RF Tactical Network (a.k.a. wireless). BFTN enables war-fighters to digitally communicate NATO Allied/Coalition and US-Only information necessary to execute and plan in a real-time operational environment without relying on ashore application server interaction. This RF Network separately supports US-Only Carrier and Expeditionary Strike Group Commanders and maintains the digital communication ability to execute and plan with other U.S. ships, submarines or aircraft, as well as with NATO Allied/Coalition networks; even if Satellite Communication (SATCOM) channels to shore are lost. In a satellite-denied event, adversaries covertly jam or disable communications necessary to Fleet protection and tactical operation.

FY18 BFTN efforts will focus on the completion and documentation of Initial Operational Test & Evaluation (IOT&E).

Joint Aerial Layer Network-Maritime (JALN-M), a system of systems (SoS) capability, is the Navy implementation of the JALN architecture which provides assured communications in any environment, especially Anti-Access/Area Denial (A2/AD). With disruption or loss of space tier communications, JALN-M establishes and/or restores connectivity with the High Capacity Backbone (HCB) tier, the Distribution Access Range Extension (DARE) tier, and the Transition tier in accordance with the JALN-M Initial Capabilities Document (ICD) and the JALN-M Analysis of Alternatives (AoA) Final Report. JALN-M is a robust, assured communications capability providing joint connectivity via the HCB and Navy platform connectivity via a pseudo satellite DARE capability. JALN-M will use the Extended Data Rate (XDR) waveform (Navy Multiband Terminal (NMT)) for intra-battle group DARE communications, a Common Data Link (CDL) waveform for the HCB cross-link capability, and will leverage enhanced Ultra High Frequency/High Frequency (UHF/HF) waveforms for coalition connectivity. Furthermore, a Positioning, Navigation, and Timing (PNT) capability will be developed and integrated into the JALN-M Pod, and will provide position and timing data to other Pod subsystems, both with and without Global Positioning System (GPS) connectivity. Because the Pod is being designed to operate in an A2/AD environment, the Pod HCB and XDR (NMT) subsystems need to be provided with PNT data in the absence of GPS, and the assured PNT subsystem will provide that data. The objective is to provide an alternative communication path in a denied environment, to support key information exchange requirement via ADNS.

FY18 JALN-M efforts will focus on execution of the JALN-M demonstration flight tests which demonstrate Navy ship-to-ship/sub and ship/afloat-to-GIG communications via Airborne JALN-M Pod hosting Aerial Extended Data Rate (AXDR), High Capacity Backbone (HCB), and Assured PNT (Positioning, Navigation, and Timing) payloads. Results of the demonstration seeks to inform DoD and Navy leadership on the JALN way ahead (technical and programmatic risks) and of the viability of JALN-M as a future capability.

The High Frequency Over-the-horizon Robust Communications Enterprise (HFORCE) project will demonstrate a robust communications infrastructure in a SATCOM denied/restricted environment, particularly where beyond-line-of-sight (BLOS) connectivity is required with seemingly opposing requirements for long range, high data

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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rates, and low probability of detection (LPD). HForce will address the need for protected and reliable BLOS C4I in SATCOM denied environments where opportunities exist to leverage shore infrastructure to address the SATCOM-denied gap. Recent advances in High Frequency (HF) radio and digital signal processing technologies have increased performance, signal clarify and data transmission capabilities, rapidly making HF a viable option for terrestrial-based, long-range C4I. Digital Wideband HF has the potential to augment current space-based BLOS systems, providing an alternative capability in satellite-denied environments that is affordable, reliable and secure. The HForce project will address this gap by leveraging large gain hub arrays to enhance performance of HF links. Large gain hubs in concert with multi-carrier waveforms and adaptive scheduling provide Mbps-class data rates to large platforms and orders of magnitude improvement in LPD performance over traditional methods. Small scale demonstrations have focused on performance of system at the physical layer. HForce will focus on a larger scale prototype hub to be used with legacy waveforms and legacy radios.

FY18 HForce efforts will focus on the development of a demonstration plan and cost analysis, integration and test of 1/2 scale development hub, hardware procurement for half-scale demonstration hub, waveform development including interoperability with legacy waveforms, demonstrate waveform acquisition functionality, assessment of Program of Record (PoR) radios for integration with prototype waveform, preparation for POR transition.

Automated Digital Network System (ADNS) provides routing, switching, baseband, configuration and monitoring capabilities for interconnecting naval, coalition and joint enclaves worldwide. ADNS utilizes off the shelf equipment and network protocols as specified by the Joint Technical Architecture. ADNS INC III combines all Navy Tactical Voice, Secure Communications Interoperability Protocol (SCIP) Inter-Working Function, Video, and data requirements into a converged IP data stream. ADNS INC III supports higher bandwidth satellites, providing up to 25 mega bytes per second (Mbps) of throughput on Unit Level ships and up to 50 Mbps on Force Level ships. INC III architecture also incorporates an IPv4/IPv6 dual stack and Cipher-Text (CT) security architecture to align to the Global Information Grid (GIG) in order to mesh Navy Tactical surface, subsurface, and airborne platforms into a single IP environments with gateway functions to coalition and joint networks, in addition to greater security utilizing the High Assurance Internet Protocol Encryptor (HAIPE) devices. ADNS will serve as the Navy tactical interface for IP Networking for the JALN-M system. ADNS will investigate emerging technologies to integrate with additional Department of Defense C4I Programs to improve inter-strike group networking and extend the network to the tactical edge.

FY18 ADNS RDT&E investment will continue to support Interface Design Development (IDD) and integration with network applications, development of Line-Of-Sight (LOS) link, DISN integration, and development of CT piers. ADNS development will include addressing network management, intra and inter domain routing, QoS, and Concept of Operations discussions. Continue Network-Based Cyber Security technology and virtualization to increase performance of the Navy's ADNS routing and transport architecture.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Battle Force Tactical Network (BFTN)	10.679	5.354	0.499	0.000	0.499
Articles:	-	-	-	-	-
Description: Overall program efforts include investigation of emerging technologies through study, development and associated testing for feasibility of program insertion. The BFTN is the Navy's program of record for high-frequency internet protocol (HFIP) and UHF LOS subnet relay (SNR) communications. BFTN is the only Allied/ Coalition option, providing command and control in a non-SATCOM or SATCOM-denied anti-access area-denied					

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 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
(A2AD) environment and serves as a primary backup for SIPRNET (Secret Internet Protocol Router Network) in the absence of satellite communications. ***FY 2016 Accomplishments:*** Continued to support to the Developmental Test/Integrated Test (DT/IT) event in support of a Full Rate Production (FRP) decision. Supported channel allocation/saturation studies; designed specifications for High Frequency (HF) and Ultra High Frequency (UHF) radio wideband modification kit and radio feasibility studies; planned for environmental and shock/vibe testing; and developmental and demonstration test activities. ***FY 2017 Plans:*** Finalize DT/IT test documentation/plans. Complete system installations on test platforms. Complete the Operational Test Readiness Review. Continue preparations for Initial Operational Test & Evaluation (IOT&E) event in support of a full rate production decision. Continue to develop engineering solutions for end of life issues, obsolescence, and increase system ease of use for operators. ***FY 2018 Base Plans:*** Complete and finalize the IOT&E event, resulting reports and documentation in support of a full rate production decision. Adjudicate any developmental issues identified during IOT&E. ***FY 2018 OCO Plans:*** N/A					
Title: Joint Aerial Layer Network -Maritime (JALN-M) ***Articles:*** ***Description:*** Current threats being pursued by peer adversaries have demonstrated an ability to deny US Forces satellite communications. In the absence of satellite communications, JALN-M is a system that can provide high capacity anti-jam communications to naval forces by utilizing aerial relays. The FY18 demonstration will complete the proof-of-concept. ***FY 2016 Accomplishments:*** FY16 efforts included procurement of the hardware for the two surrogate satellite prototypes. Continued design and development of JALN-M end-to-end system. Completed component and system of systems (SoS) Critical Design Review (CDR). Continued Airborne XDR development. Completed PNT subsystem and PRS development. Began pod subsystem integration and test of eight HCB air systems, and Airborne XDR. Continued Assured PNT subsystem integration and test with the pods. Continued development of the JALN-M Provider Edge Router for air and surface nodes. Completed design and integration of HCB ground systems,	25.422 -	40.084 -	7.097 -	0.000 -	7.097 -

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 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
and equipment procurement for Mobile Ground Entry Point (MGEP) and shipboard terminals. Completed component integration of Topology Manager for airborne PRS, NMT, and HCB systems. Began integration and installation of MGEP at Naval Undersea Warfare Center (NUWC) for emulated CVN and emulated SSN. Delivered production HCB systems for MGEP, and shipboard terminals. Additional efforts included planning activities and the development of systems engineering documentation in support of the JALN-M Pod flight tests. Continued coordination efforts with Navy Authorizing Official (NAO) toward obtaining Interim Authority to Test (IATT) approval for test phase. ***FY 2017 Plans:*** FY17 efforts include procurement, integration, and test of the Joint Aerial Layer Network-Maritime (JALN-M) end-to-end system in preparation for 30 flight tests. Complete component integration for Airborne XDR Deliver two pod prototypes and four HCB terminals. Begin system integration for pod prototypes, HCB, and Airborne XDR. Procure 14 radios for Position Reporting System (PRS) and continue system integration of PRS with shipboard systems and airborne payloads. Complete MGEP installation at Naval Support Activity (NSA) Northwest Annex and begin shipboard installations of Topology Manager on one aircraft carrier (CVN) and three Destroyer Guided Missiles (DDGs). Begin hardware and software installations of QNT radios on three DDGs and one CVN. Begin hardware and software installations of HCB on one CVN. Begin Electromagnetic Interference (EMI) testing to determine topside equipment installation position for underway DDG. Complete Integration and Test Readiness Review (ITRR), Installation Readiness Review (IRR), and Pre-Demo Flight Readiness Review (RR). ***FY 2018 Base Plans:*** FY18 efforts include all planning and execution activities to conduct the JALN-M demonstration test flights. Complete installation of shipboard systems (ADNS and NMT) and MGEP (DJC2) at NAVSATCOMFAC Teleport Northwest. Efforts include In-Service Engineering Activity (ISEA) (ADNS and DJC2) and Subject Matter Expert (SME) support (GCCS-M) for Information Exchange Requirements (IERs) in support of the demonstration flight test. Submit IATT request and obtain NAO approval of IATT to continue lab based testing and commencement of shipboard testing. Demonstration flight test will be executed in four phases. Phase 1 will include localized testing of Pod capabilities against emulated platforms at NUWC. Phase 2 will include extended Pod testing at NUWC with connection to live shore networks. Phase 3 will include extended testing of Pod with Fleet platforms at Norfolk, VA with ships pierside at Naval Station, Norfolk, VA. Phase 4 will include the full JALN-M architecture flight testing of two Pods, supporting two Strike Groups (Norfolk and Naval Undersea Warfare Center), connecting to Fleet Network Operations Center (FLTNOC) for representative operational demonstration.					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Following completion of flight tests, additional efforts include deinstallation of all shipboard installations and submittal of post demonstration analysis report to OSD. ***FY 2018 OCO Plans:*** N/A					
Title: High Frequency Over-the-horizon Robust Enterprise (HFORCE) ***Articles:***	0.000 -	0.000 -	25.000 -	0.000 -	25.000 -
Description: High Frequency Over-the-horizon Robust Communications Enterprise (HFORCE) will demonstrate a robust communications infrastructure in a SATCOM denied/restricted environment, particularly where beyond-line-of-sight (BLOS) connectivity is required with seemingly opposing requirements for long range, high data rates, and low probability of detection (LPD). HFORCE will address the need for protected and reliable BLOS C4I in SATCOM denied environments where opportunities exist to leverage shore infrastructure to address the SATCOM-denied gap. HFORCE prototype has the potential to augment current space-based BLOS systems, providing an alternative capability in satellite-denied environments that is affordable, reliable and secure. HFORCE project will address this gap by leveraging large gain hub arrays to enhance performance of HF links. Large gain hubs in concert with multi-carrier waveforms and adaptive scheduling provide Mbps-class data rates to large platforms and orders of magnitude improvement in LPD performance over traditional methods. Small scale demonstrations have focused on performance of system at the physical layer. HFORCE will focus on a larger scale prototype hub to be used with legacy waveforms and legacy radios. ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:*** N/A ***FY 2018 Base Plans:*** FY18 High Frequency Over-the-horizon Robust Communications Enterprise (HFORCE) efforts will use results from JALN-M resiliency studies to inform development of HFORCE demonstration plan and cost analysis, procurement of commercial off the shelf (COTS) hardware for installation of prototype half-scale hub, and initiate HF protected waveform (HFPW) development including interoperability with legacy waveforms. Additional FY18 efforts include programmatic documentation development (e.g. cost estimate, Project Definition Document (PDD)), identifying shore sites for demonstration, develop Security Classification Guide, conduct technical studies necessary to specify systems and design requirements, identify impacts to current demonstration					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
plan and identify needs for test environments for half-scale demonstration sites. Conduct quarterly In-Process Reviews (IPR). HFORCE studies will be conducted to assess and analyze use of High Frequency Global Communications System (HFGCS) and alternative shore systems in place of array for transmit and receive; topside HF antennas; Automated Digital Network System (ADNS) interface to HFORCE prototype system and shipboard HF system, including Digital Mobile Radio (DMR) and Battle Force Tactical Network (BFTN). Conduct analysis of application performance and shipboard architecture; independent anti-jam and Low Probability of Detection (LPD) analysis of new HF waveform and ancillary equipment needed for HFORCE prototype implementation. Cost analyses will be conducted to determine cost needed to improve shipboard HF systems. ***FY 2018 OCO Plans:*** N/A					
Title: Automated Digital Network System (ADNS)	3.447	2.787	0.929	0.000	0.929
Articles:	-	-	-	-	-
FY 2016 Accomplishments: Continued testing and interfaced with Enterprise Network Management System (ENMS), IPv6 transition, and integration of Super High Frequency (SHF). Continued the Interface Design Development (IDD) and integration with network applications, developed Line-Of-Sight (LOS) link, Defense Information System Network (DISN) integration and development of Cipher-Text (CT) Piers. Investigated and recommended platform network devices, network design support to include procurement, integration and testing of the Wide Area Network (WAN) and Joint Aerial Layer Network-Maritime (JALN-M) system. Commenced network-based Cyber Security technology and virtualization of ADNS. ***FY 2017 Plans:*** Continue testing and interfaces with ENMS, IPv6 transition, and integration of SHF. Continue the IDD and integration with network applications, develop LOS link, DISN integration and development of CT Piers. Investigate and recommend platform network devices, network design support to include procurement, integration and testing of the WAN and JALN-M system. Complete JALN-M development and test events. Continue network-based Cyber Security technology and virtualization of ADNS. ***FY 2018 Base Plans:*** Continue testing and interfaces with ENMS, IPv6 transition, and integration of SHF. Continue the IDD and integration with network applications, develop LOS link, DISN integration and development of CT Piers. Investigate and recommend platform network devices, network design support to include procurement,					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
integration and testing of the WAN. Continue network-based Cyber Security technology and virtualization of ADNS. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	39.548	48.225	33.525	0.000	33.525

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/3057: *Battle Force Tactical Network (BFTN).*	3.675	3.706	1.078	-	1.078	1.076	2.616	4.452	4.451	Continuing	Continuing
• OPN/3050: *Automated Digital Network System (ADNS)*	50.561	43.778	50.366	-	50.366	58.057	57.420	58.651	59.824	Continuing	Continuing

Remarks

D. Acquisition Strategy

Battle Force Tactical Network (BFTN) - Completion of Initial Operational Test & Evaluation (IOT&E) will lead to a Full Rate Production (FRP) decision enabling the program to move forward with fielding additional systems.

Joint Aerial Layer Network-Maritime (JALN-M) will address capability gaps as directed by the JALN Analysis of Alternatives (AoA) by integrating a suite of technical capabilities into a single payload. Technical and acquisition support will be provided to conduct High Capacity Backbone (HCB) and Airborne Extended Data Rate (XDR) demonstrations and to develop two prototype JALN-M payloads.

High Frequency Over-the-horizon Robust Communications Enterprise (HFORCE) will address the need for protected and reliable beyond line of sight (BLOS) C4I in SATCOM-denied environments where opportunities exist to leverage shore or shipboard infrastructure to address the SATCOM-denied gap. HFORCE will address capability gaps identified during JALN-M prototype development by conducting studies to inform development of HFORCE prototype system. Technical and acquisition support will be provided to conduct BLOS HF demonstration and develop HF shore hub and HF protected waveform (HFPW).

Automated Digital Network System (ADNS): Evolutionary acquisition approach with overlapping development and implementation phases for defined INC I, II, and III baselines. INC I, II, and III will use competitively awarded contracts to implement changes consistent with acquisition initiatives. ADNS leverages Commercial-Off-The-Shelf (COTS) and Government Off-the-Shelf (GOTS) products while capitalizing on acquisition reform initiatives to achieve material savings in the logistics, installation, integration and training areas. Where feasible, differing types of advantageous contract vehicles will be used to provide flexibility, decrease contract administrative costs, and encourage acquisition streamlining through the use of COTS/GOTS products.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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E. Performance Metrics

BFTN - Complete Initial Operational Test and Evaluation (IOT&E) to determine the Operational Effectiveness and Operational Suitability of the BFTN AN/USQ-195(V)1 surface variant, when employed in its intended operational environment. This event will evaluate the capability of BFTN against its intended threats in threat-representative environments. Performance will be evaluated against defined and derived performance criteria listed in the BFTN Test and Evaluation Master Plan (TEMP). The determination of performance in specific environments, or against a specific category of threats, will provide consideration for system employment in future combat operations and contribute to the incremental improvement of future BFTN designs. The IOT&E will focus on employment of BFTN and its Command, Control and Communications (C3) capabilities in a disadvantaged communications environment (i.e., no satellite or other high-bandwidth connections available).

HFORCE - Complete technical studies, procure prototype hardware for half-scale hub, initial development stages of high frequency protected waveform (HFPW).

ADNS - Included in the ADNS program goals are the improvements to bandwidth throughput, connectivity to multiple Radio Frequency (RF) paths, greater security, and system capability delivered within a smaller form factor. The ADNS program will, at a minimum, provide bandwidth throughput enhancements resulting in an increase from 2 megabytes per
second (Mbps) to 25/50 Mbps. ADNS will also provide the ability to transport data across multiple paths simultaneously vice the current limitations of single or secondary paths. ADNS will provide greater security posture by encrypting each enclave, increase performance of the routing and transport architecture while reducing physical footprint and cost, and securing the core via Cipher-Text.

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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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
Product Development	Various	Various : Various	50.479	0.000		0.000		0.000		-		0.000	0.000	50.479	-
Systems Engineering-ADNS	WR	SSC : PAC/LANT	22.389	1.200	Dec 2015	1.769	Dec 2016	0.558	Dec 2017	-		0.558	Continuing	Continuing	Continuing
Systems Engineering-ADNS	WR	NUWC : Newport, RI	1.864	1.136	Dec 2015	0.647	Dec 2016	0.184	Dec 2017	-		0.184	Continuing	Continuing	Continuing
System Engineering-ADNS	C/CPFF	NUWC : Newport, RI	0.000	0.110	Jul 2016	0.145	Mar 2017	0.046	Mar 2018	-		0.046	0.000	0.301	-
Intergration and Test-ADNS	C/CPFF	SSC : PAC	0.000	0.000		0.132	Mar 2017	0.046	Mar 2018	-		0.046	0.000	0.178	-
Primary Hardware/ Software - HFORCE	C/FFP	MIT/Lincoln Lab : Lexington MA	0.000	0.000		0.000		23.000	Nov 2017	-		23.000	0.000	23.000	-
Primary Hardware Dev.-JALN-M	WR	NSWC : Panama City, FL	0.695	0.000		0.000		0.000		-		0.000	0.000	0.695	-
System Engineering JALN-M	MIPR	DTIC : Ft. Belvoir, VA	0.000	0.000		0.000		1.500	Nov 2017	-		1.500	0.000	1.500	-
Primary Hardware/ Software - JALN-M	C/FFP	MIT/Lincoln Lab : Lexington MA	27.404	21.251	Nov 2015	32.179	Nov 2016	1.796	Nov 2017	-		1.796	0.000	82.630	-
System Engineering JALN-M	C/CPFF	STF : San Diego,CA	2.027	1.303	Nov 2015	2.064	Nov 2016	0.800	Nov 2017	-		0.800	0.000	6.194	-
System Enginering JALN-M	WR	SSC : PAC	1.927	1.200	Jan 2016	1.111	Jan 2017	1.851	Nov 2017	-		1.851	0.000	6.089	-
System Enginering JALN-M	WR	NAWCAD : Patuxent River, MD	1.200	0.000		0.000		0.000		-		0.000	0.000	1.200	-
System Engineering BFTN	WR	SSC : PAC	1.784	0.000		0.000		0.000		-		0.000	0.000	1.784	-
Primary HW/SW Dev BFTN	WR	SSC : PAC	0.326	0.000		0.000		0.000		-		0.000	0.000	0.326	-
System Engineering BFTN	WR	SSC : LANT JICF	0.129	0.000		0.000		0.000		-		0.000	0.000	0.129	-
System Engineering BFTN	C/CPFF	STF : San Diego,CA	0.441	0.000		0.000		0.000		-		0.000	0.000	0.441	-
Primary Hardware BFTN	SS/CPIF	Metasoft : San Diego, CA	3.460	0.000		0.000		0.000		-		0.000	0.000	3.460	-
Primary Software Dev BFTN	SS/BA	SSC : PAC	2.182	0.000		0.000		0.000		-		0.000	0.000	2.182	-
System Engineering BFTN	WR	SSC : LANT	0.512	0.000		0.000		0.000		-		0.000	0.000	0.512	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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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
Intergration and Test-ADNS	WR	SSC : LANT	0.000	0.553	Dec 2015	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
System Engineering BFTN	WR	SSC : PAC JICF	0.055	0.000		0.000		0.000		-		0.000	0.000	0.055	-
System Engineering-ADNS	C/CPFF	BAH : San Diego, CA	0.000	0.310	Jan 2016	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	116.874	27.063		38.047		29.781		-		29.781	-	-	-

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
Support	Various	Various : Various	10.358	0.000		0.000		0.000		-		0.000	0.000	10.358	-
System Engineering BFTN	WR	SSC : LANT	0.000	0.586	Feb 2016	0.306	Nov 2016	0.000		-		0.000	0.000	0.892	-
System Engineering BFTN	C/CPFF	STF : San Diego, CA	0.000	0.713	Jun 2016	0.235	Jan 2017	0.000		-		0.000	0.000	0.948	-
Travel - JALN-M	WR	PMW 170 : San Diego, CA	0.000	0.000		0.000		0.050	Dec 2017	-		0.050	0.000	0.050	-
Studies and Analysis BFTN	WR	SSC : PAC	0.468	0.120	Apr 2016	0.016	Nov 2016	0.000		-		0.000	0.000	0.604	-
Development Support - HFORCE	WR	SSC : San Diego,CA	0.000	0.000		0.000		0.850	Nov 2017	-		0.850	0.000	0.850	-
System Engineering BFTN	WR	SSC : PAC	0.000	0.842	Aug 2016	0.470	Nov 2016	0.000		-		0.000	0.000	1.312	-
Logistics Support BFTN	C/CPFF	CSA : San Diego, CA	0.329	0.107	Nov 2015	0.363	Nov 2016	0.000		-		0.000	0.000	0.799	-
Development Support - JALN-M	C/CPFF	BAH : San Diego	3.462	0.550	Dec 2015	1.375	Dec 2016	0.850	Dec 2017	-		0.850	0.000	6.237	-
Development Support - JALN-M	C/CPFF	Mitre : San Diego, CA	0.841	0.000		0.000		0.000		-		0.000	0.000	0.841	-
Development Support - JALN-M	WR	SSC : PAC	2.348	0.623	Nov 2015	2.566	Nov 2016	0.000		-		0.000	0.000	5.537	-
Development Support - JALN-M	C/CPFF	Linquest : San Diego, CA	0.300	0.000		0.000		0.000		-		0.000	0.000	0.300	-
Financial Management Support - JALN-M	C/CPFF	Artemis : San Diego, CA	0.436	0.275	Oct 2015	0.422	Oct 2016	0.000		-		0.000	0.000	1.133	-
Documentation BFTN	C/CPFF	BAH : San Diego, CA	0.202	0.000		0.000		0.000		-		0.000	0.000	0.202	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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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
Certification Authority-ADNS	C/CPFF	BAH : San Diego,CA	0.000	0.138	Jan 2016	0.094	Jan 2017	0.095	Jan 2018	-		0.095	Continuing	Continuing	Continuing
		Subtotal	18.744	3.954		5.847		1.845		-		1.845	-	-	-

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
Test and Evaluation	Various	Various : Various	14.512	0.000		0.000		0.000		-		0.000	0.000	14.512	-
Integration and Test BFTN	C/FFP	COMOPTEVOR : Norfolk, VA	0.745	0.954	Aug 2016	0.520	Dec 2017	0.050	Mar 2018	-		0.050	0.000	2.269	-
Test and Evaluation Support BFTN	WR	SSC : PAC	1.047	5.674	Sep 2016	2.544	Dec 2016	0.449	Dec 2017	-		0.449	0.000	9.714	-
Developmental Test and Evaluation-JALN-M	C/CPFF	JHU/APL : Laurel, MD	1.400	0.000		0.000		0.000		-		0.000	0.000	1.400	-
Developmental Test and Evaluation-JALN-M	C/CPFF	MIT/Lincoln Lab : Lexington, MA	5.812	0.000		0.000		0.000		-		0.000	0.000	5.812	-
Test and Evaluation Support BFTN	WR	SSC : LANT	0.362	0.891	Sep 2016	0.000		0.000		-		0.000	0.000	1.253	-
		Subtotal	23.878	7.519		3.064		0.499		-		0.499	0.000	34.960	-

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 - HFORCE	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.600	Nov 2017	-		0.600	0.000	0.600	-
Program Management Support - JALN	C/CPFF	TBD : TBD	0.000	0.000		0.000		0.250	Nov 2017	-		0.250	0.000	0.250	-
Program Management Support - BFTN	C/CPFF	BAH : San Diego, CA	1.130	0.792	Nov 2015	0.900	Nov 2016	0.000		-		0.000	0.000	2.822	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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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 JALN-M	C/CPFF	BAH : San Diego, CA	0.400	0.220	Nov 2015	0.367	Nov 2016	0.000		-		0.000	0.000	0.987	-
Systems Eng Support - HFORCE	C/CPFF	Systech : San Diego, CA	0.000	0.000		0.000		0.350	Nov 2017	-		0.350	0.000	0.350	-
Financial Management Support - HFORCE	C/CPFF	Artemis : San Diego, CA	0.000	0.000		0.000		0.200	Nov 2017	-		0.200	0.000	0.200	-
		Subtotal	1.530	1.012		1.267		1.400		-		1.400	0.000	5.209	-

	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	161.026	39.548		48.225		33.525		-		33.525	-	-	-

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 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

BFTN

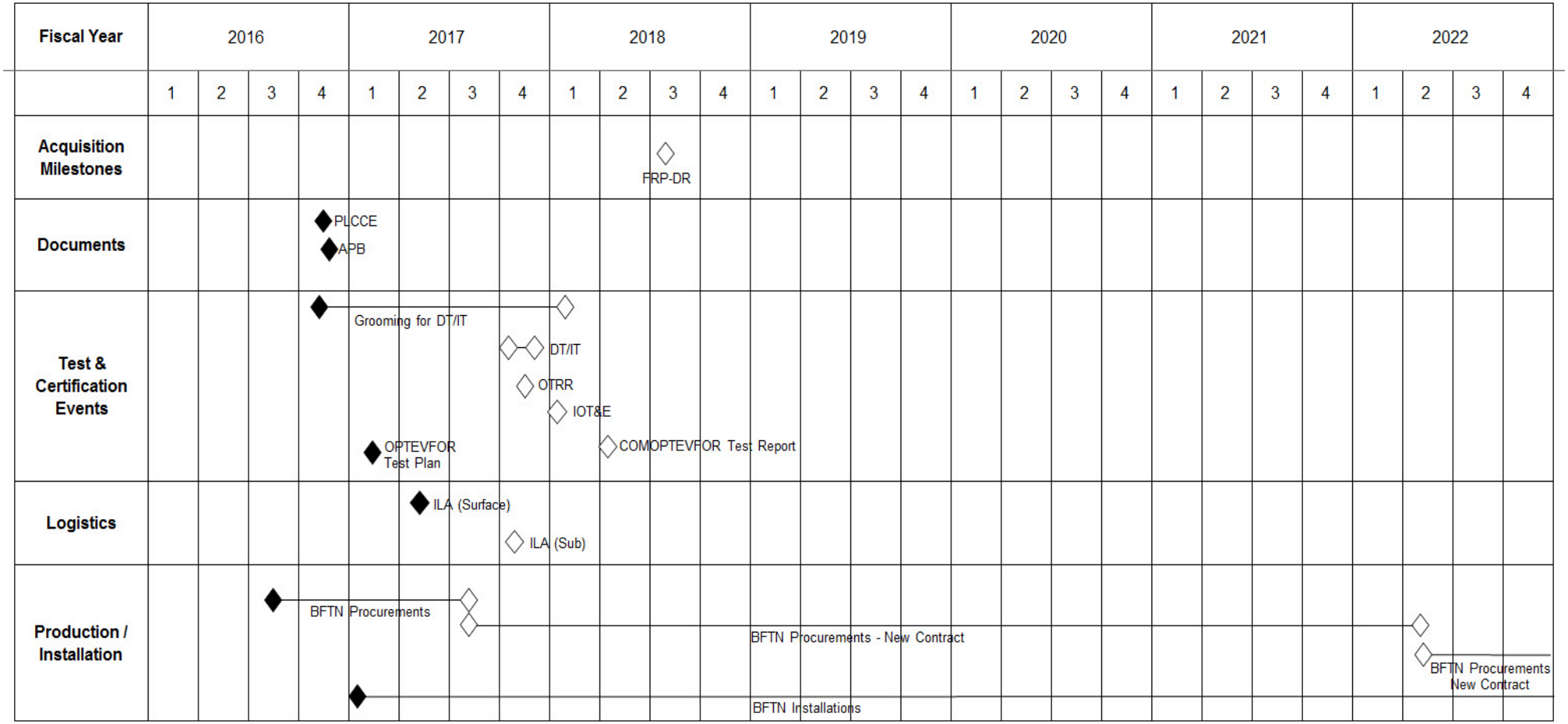

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

JALN-M Demonstration

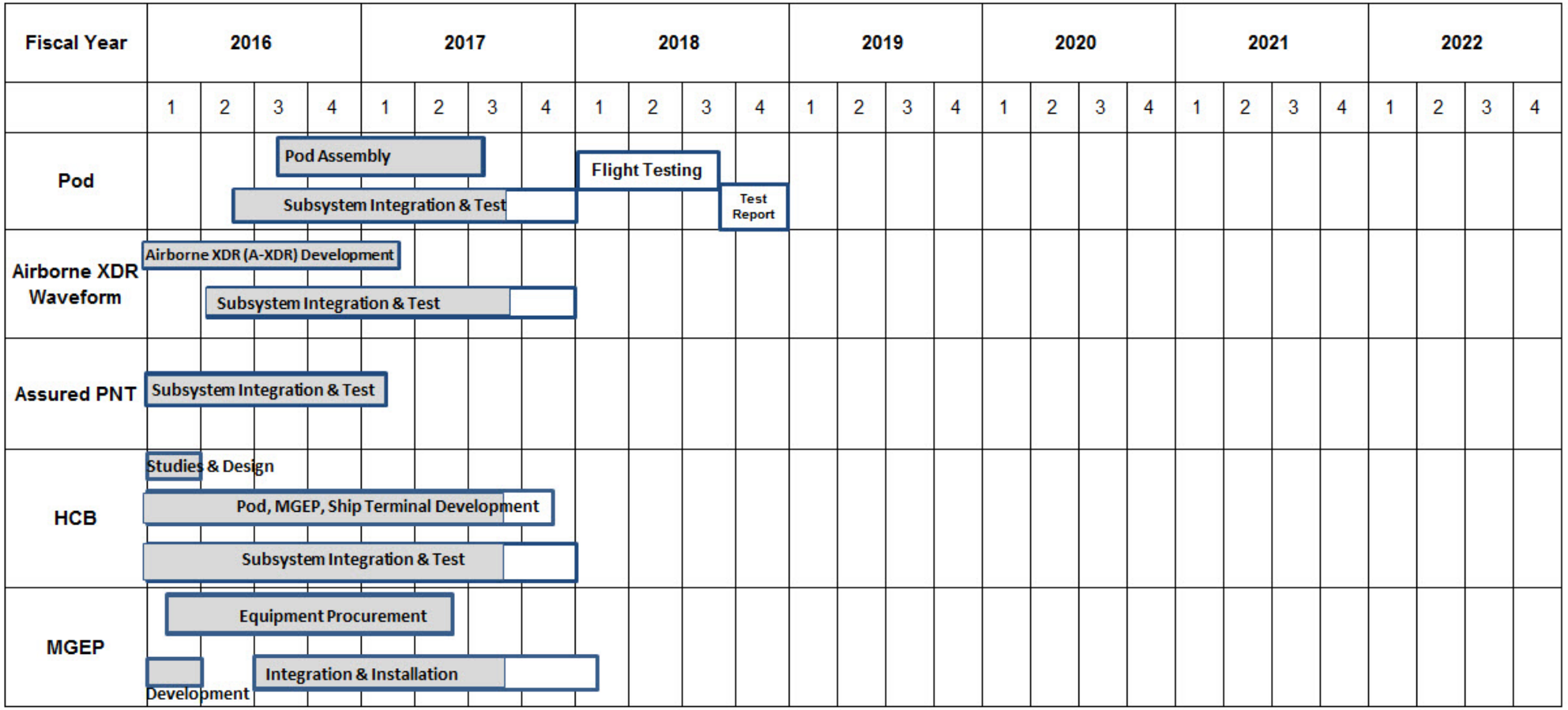

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

HFORCE Schedule

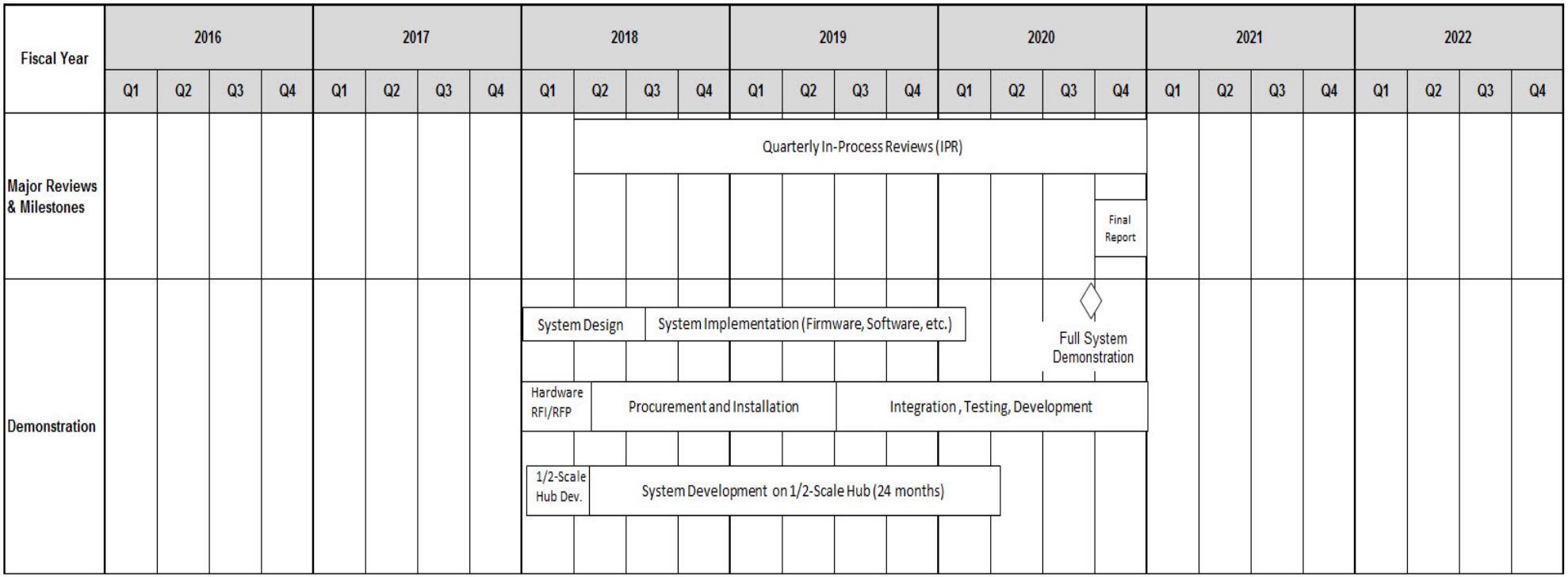

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

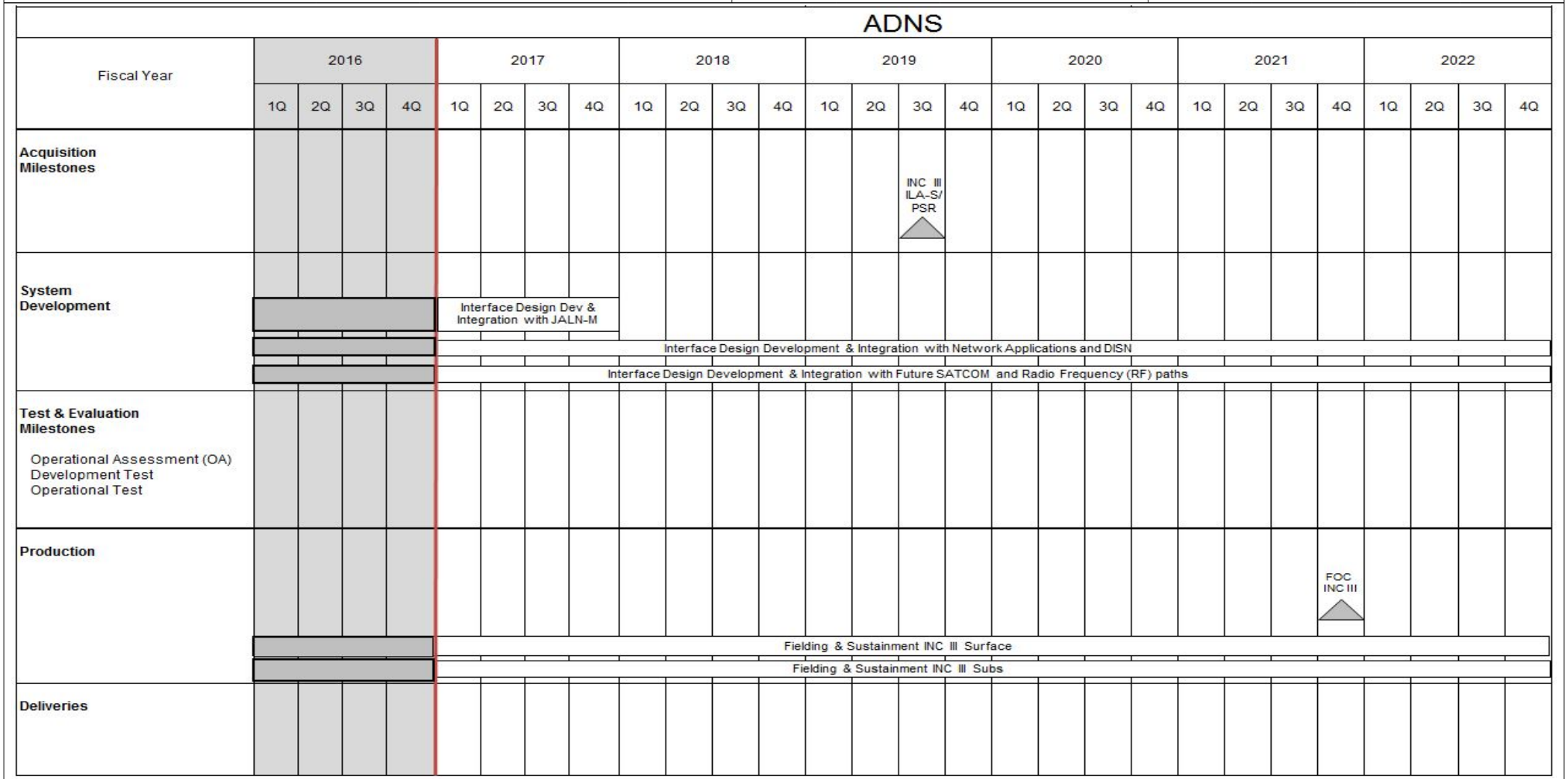

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
BFTN				
Full Rate Production Decision Review (FRP DR) Baseline System	3	2018	3	2018
Grooming for Developmental Test/Integrated Test	4	2016	1	2018
Developmental Test/Integrated Test	4	2017	4	2017
Operational Test Readiness Review	4	2017	4	2017
Initial Operational Test & Evaluation	1	2018	1	2018
COMOPTEVFOR Test Report	2	2018	2	2018
JALN-M				
Pod Subsystem Integration & Test	2	2016	4	2017
Pod Assembly	3	2016	3	2017
Pod Flight Testing	1	2018	3	2018
A-XDR Development	1	2016	1	2017
A-XDR Integration & Test	2	2016	4	2017
PNT Subsystem Integration & Test	1	2016	1	2017
HCB Studies & Design	1	2016	1	2016
HCB Pod, MGEP, Ship Terminal Development	1	2016	4	2017
HCB Integration & Test	1	2016	4	2017
MGEP Development	1	2016	1	2016
MGEP Equipment Procurement	1	2016	2	2017
MGEP Integration & Installation	3	2016	1	2018
HFORCE				
Quarterly In-Porcess Reviews	2	2018	4	2020
System Design and Implementation	1	2018	1	2020

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Hardware RFI/RFP	1	2018	2	2018
System Integration and Test	3	2019	4	2020
System Development	1	2018	2	2020
Full System Demonstration	3	2020	3	2020
Final Reports	4	2020	4	2020
ADNS				
System Development: ADNS: Increment III_Interface Design Development and Integration with JALN-M	1	2016	4	2017
System Development: ADNS: Increment III_Interface Design Development and Integration with Network Applications and Defense Information Systems Network (DISN)	1	2016	4	2022
System Development: ADNS: Increment III_Interface Design Development and Integration with SATCOM and Radio Frequency (RF) paths	1	2016	4	2022
Production: ADNS: Increment III_Fielding and Sustainment INC III Surface	1	2016	4	2022
Production: ADNS: Increment III_Fielding and Sustainment INC III Submarines	1	2016	4	2022
Production: ADNS: Increment III_Full Operational Capability	4	2021	4	2021
Acquisition Milestones: ADNS: Increment III Product Support Review	3	2019	3	2019
Production: ADNS: Increment III_Follow-On Contract	3	2017	3	2017