Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy												Date: February 2018
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 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
Total Program Element	200.574	38.949	33.525	25.014	-	25.014	23.870	4.520	2.478	2.535	Continuing	Continuing
0725: *Communication Automation*	200.574	38.949	33.525	25.014	-	25.014	23.870	4.520	2.478	2.535	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 Communications 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 to create a secure gateway that inter-connects all users into a common Radio Frequency (RF) Tactical Network. This network directly supports the Assured Command and Control (C2) posture of US-Only and NATO Allied/Coalition users' tactical data information exchanges on each platform between and/or across separately dispersed RF Networks even if Satellite Communications (SATCOM) channels to shore are lost in an Anti-Access/Area Denial (A2/AD) environment.

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. Flight test demonstration completed in FY18.

High Frequency Over-the-horizon Robust Communications Enterprise (HFORCE) and JALN-M are very different approaches to solving the same problem: achieving Assured C2 communications in a satellite-denied environment. The current national focus on highly contested environments has highlighted the growing need for protected, anti-jam and low-probability of detection (LPD), communications. Projects such as JALN-M and 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 half-scale hub-based high frequency (HF) communication architecture. 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 LPD. HFORCE will address the need for protected BLOS C4I in SATCOM denied environments where opportunities exist to leverage shore infrastructure to support all Navy platforms with reach back to shore/terrestrial networks that is affordable, reliable and secure.

FY19 HFORCE efforts will focus on the development of half-scale hub, continued Protected High Frequency Waveform (PHFW) and Military Standard Waveform (MSW) development, interoperability and compatibility testing, demonstrations, and system performance simulations.

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, to include emerging Assured Command and Control (C2) capabilities and pier connectivity.

FY19 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. Will continue Network-Based Cyber Security technology and virtualization to increase performance of the Navy's ADNS routing and transport architecture.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	48.225	33.525	22.541	-	22.541
Current President's Budget	38.949	33.525	25.014	-	25.014
Total Adjustments	-9.276	0.000	2.473	-	2.473
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-7.500	0.000			
• SBIR/STTR Transfer	-1.342	0.000			
• Program Adjustments	0.000	0.000	2.817	-	2.817
• Rate/Misc Adjustments	0.000	0.000	-0.344	-	-0.344
• Congressional General Reductions Adjustments	-0.434	-	-	-	-

Change Summary Explanation

The FY 2019 funding request was reduced by $5.3 million to account for the availability of prior year execution balances.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy	Date: February 2018
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*

Joint Aerial Layer Network-Maritime (JALN-M): Due to the Navy's $7.5M reprogramming in FY 2017, shipboard testing and associated ancillary equipment installations in support of the JALN-N architecture flight testing were eliminated.

High Frequency Over-the-horizon Robust Communications Enterprise (HFORCE): The funding increase in FY 2019 is to initiate development of military Transmission Security/Communications Security (TRANSEC/COMSEC) waveform architecture.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 7					R-1 Program Element (Number/Name) PE 0204163N / *Fleet Tactical Development*				Project (Number/Name) 0725 / *Communication Automation*			
COST ($ in Millions)	**Prior Years**	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
0725: *Communication Automation*	200.574	38.949	33.525	25.014	-	25.014	23.870	4.520	2.478	2.535	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.

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. Flight test demonstration completed in FY18.

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 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.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

FY19 HFORCE efforts will focus on the development of half-scale hub, continued Protected High Frequency Waveform (PHFW) and Military Standard Waveform (MSW) development, waveform interoperability and compatibility testing, demonstrations, and system performance simulations.

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 megabytes 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, and Aegis Ashore sites 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 not only the JALN-M system but also the key Assured Command and Control (C2) capabilities. 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.

FY19 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. Will 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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Battle Force Tactical Network (BFTN)	5.190	0.499	0.000	0.000	0.000
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 Ultra High Frequency (UHF) Line of Sight (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 (A2AD) environment and serves as a primary backup for SIPRNET (Secret Internet Protocol Router Network) in the absence of satellite communications.					
FY 2018 Plans: Complete and finalize the Initial Operational Test & Evaluation (IOT&E) event, resulting reports and documentation in support of a full rate production decision. Adjudicate any developmental issues identified during IOT&E. Continue to develop engineering solutions for end of life issues, obsolescence, and increase system ease of use for operators.					
FY 2019 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decrease from FY 2018 to FY 2019 is due to the completion of BFTN's RDT&E,N funding.					
Title: Joint Aerial Layer Network -Maritime (JALN-M) ***Articles:*** ***Description:*** Current threats being pursued by US adversaries include the 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 2018 Plans:*** FY18 efforts include final planning and execution activities to conduct the JALN-M demonstration test flights. Complete installation of Mobile Ground Entry Point (MGEP) Deployable Joint Command and Control (DJC2) at Naval Support Activity (NSA) Northwest Annex (NWA). Submit Interim Authority to Test (IATT) request and obtain Navy Authorizing Official (NAO) approval to continue lab based testing. Demonstration flight test will be executed in two phases. Phase 1 will include localized testing of Pod capabilities against emulated platforms at Naval Undersea Warfare Center (NUWC). Phase 2 will include extended Pod testing at NUWC with connection to live shore networks. Following completion of flight tests, additional efforts include submittal of post demonstration analysis report to OSD. ***FY 2019 Base Plans:*** FY19 efforts include the completion of the post demonstration analysis report to OSD. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decrease from FY 2018 to FY 2019 is due to the JALN-M project nearing completion.	31.050 -	7.097 -	0.500 -	0.000 -	0.500 -
Title: High Frequency Over-the-horizon Robust Communications Enterprise (HFORCE) ***Articles:***	0.000 -	25.000 -	23.670 -	0.000 -	23.670 -

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
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 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 2018 Plans:*** FY18 HFORCE efforts will use results from JALN-M resiliency studies to inform development of the HFORCE demonstration plan, cost analysis, procurement of commercial off the shelf (COTS) hardware for installation of prototype half-scale hub, and initiate Protected High Frequency Waveform (PHFW) 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 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 existing High Frequency Global Communications System (HFGCS) and alternative shore systems to transmit and receive communications with topside HF antenna systems such as Automated Digital Network System (ADNS), 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 2019 Base Plans:*** FY19 efforts will be focused on continued Protected High Frequency Waveform (PHFW) development including interoperability with legacy waveforms, system development of half-scale hub prototype, and analysis of application performance and shipboard architecture. Continue independent anti-jam and Low Probability of Detection (LPD) analysis of new PHFW, Military Standard Waveform (MSW), ancillary equipment needed for					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
HFORCE prototype implementation, and conduct legacy radio assessment for integration. Initiate development of military Transmission Security/Communications Security (TRANSEC/COMSEC) waveform architecture. Develop models to perform hardware, waveforms and system performance simulations. Demonstration of PHFW two-way communication and MSW compatibility using the prototype system will be conducted along with component and sub-component level testing and system performance simulations. Initiate PHFW and MSW integration, testing and development with half-scale hub. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decrease from FY 2018 to FY 2019 is due to the completion of the HFORCE studies and completion of the three Preliminary Design Reviews (Hub and Terminal, Military Standard Waveform, and Protected High Frequency Waveform).					
Title: Automated Digital Network System (ADNS)	2.709	0.929	0.844	0.000	0.844
Articles:	-	-	-	-	-
FY 2018 Plans: Continue testing and interfacing 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. Continue network-based Cyber Security technology and virtualization of ADNS. ***FY 2019 Base Plans:*** Continue testing and interfacing 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. Continue network-based Cyber Security technology and virtualization of ADNS. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
The ADNS program decrease from FY18 to FY19 reflects less system engineering effort in support of Quality of Service (QoS) development.					
Accomplishments/Planned Programs Subtotals	38.949	33.525	25.014	0.000	25.014

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/3057: *Battle Force Tactical Network (BFTN).*	3.380	1.078	11.765	-	11.765	16.272	3.960	3.983	14.890	Continuing	Continuing
• OPN/3050: *Automated Digital Network System (ADNS)*	44.191	52.336	66.309	-	66.309	66.726	64.095	60.746	62.447	Continuing	Continuing

Remarks

D. Acquisition Strategy

Battle Force Tactical Network (BFTN) - Completion of Initial Operational Test & Evaluation (IOT&E) in support of 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 protected HF waveform (PHFW).

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: PB 2019 Navy		Date: February 2018
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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 protected High Frequency waveform (PHFW). Develop models to perform hardware, waveforms and system performance simulations.

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, increasing 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: PB 2019 Navy			Date: February 2018
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	Various	Various : Various	62.126	0.000		0.000		0.000		-		0.000	0.000	62.126	-
Systems Engineering-ADNS	WR	SSC : PAC/LANT	23.589	1.691	Dec 2016	0.558	Dec 2017	0.510	Dec 2018	-		0.510	Continuing	Continuing	Continuing
Systems Engineering-ADNS	WR	NUWC : Newport, RI	3.000	0.647	Dec 2016	0.184	Dec 2017	0.166	Dec 2018	-		0.166	Continuing	Continuing	Continuing
System Engineering-ADNS	C/CPFF	NUWC : Newport, RI	0.110	0.145	Mar 2017	0.046	Mar 2018	0.041	Mar 2019	-		0.041	0.000	0.342	-
Integration and Test-ADNS	C/CPFF	SSC : PAC	0.000	0.132	Mar 2017	0.046	Mar 2018	0.041	Mar 2019	-		0.041	0.000	0.219	-
Primary Hardware/ Software - HFORCE	C/FFP	MIT/Lincoln Lab : Lexington MA	0.000	0.000		23.350	Nov 2017	20.966	Nov 2018	-		20.966	Continuing	Continuing	Continuing
Primary Hardware/ Software - HFORCE TRANSEC	C/FFP	MIT/Lincoln Lab : Lexington MA	0.000	0.000		0.000		0.987	Nov 2018	-		0.987	Continuing	Continuing	Continuing
System Engineering JALN-M	MIPR	GTRI : Atlanta, GA	0.000	0.000		1.500	Mar 2018	0.000		-		0.000	0.000	1.500	-
Primary Hardware/ Software - JALN-M	C/FFP	MIT/Lincoln Lab : Lexington MA	48.655	26.678	Nov 2016	1.796	Feb 2018	0.100	Nov 2018	-		0.100	0.000	77.229	-
System Engineering JALN-M	C/CPFF	STF : San Diego,CA	3.330	1.064	Nov 2016	0.800	Feb 2018	0.200	Nov 2018	-		0.200	0.000	5.394	-
System Enginering JALN-M	WR	SSC : PAC	3.127	0.711	Jan 2017	1.851	Nov 2017	0.200	Nov 2018	-		0.200	0.000	5.889	-
		Subtotal	143.937	31.068		30.131		23.211		-		23.211	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support	Various	Various : Various	11.701	0.000		0.000		0.000		-		0.000	0.000	11.701	-
System Engineering BFTN	WR	SSC : LANT	0.586	0.306	Nov 2016	0.000		0.000		-		0.000	0.000	0.892	-
System Engineering BFTN	C/CPFF	STF : San Diego, CA	0.713	0.235	Jan 2017	0.000		0.000		-		0.000	0.000	0.948	-
Travel - JALN-M	WR	PMW 170 : San Diego, CA	0.000	0.000		0.050	Jan 2018	0.000		-		0.000	0.000	0.050	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204163N / *Fleet Tactical Development*	Project (Number/Name) 0725 / *Communication Automation*	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Studies and Analysis BFTN	WR	SSC : PAC	0.588	0.016	Nov 2016	0.000		0.000		-		0.000	0.000	0.604	-
Development Support - HFORCE	WR	SSC : San Diego,CA	0.000	0.000		0.850	Nov 2017	1.362	Nov 2018	-		1.362	Continuing	Continuing	Continuing
System Engineering BFTN	WR	SSC : PAC	0.842	0.470	Nov 2016	0.000		0.000		-		0.000	0.000	1.312	-
Logistics Support BFTN	C/CPFF	CSA : San Diego, CA	0.436	0.363	Nov 2016	0.000		0.000		-		0.000	0.000	0.799	-
Development Support - JALN-M	C/CPFF	BAH : San Diego	4.012	0.775	Dec 2016	0.850	Dec 2017	0.000		-		0.000	0.000	5.637	-
Development Support - JALN-M	WR	SSC : PAC	2.971	1.033	Nov 2016	0.000		0.000		-		0.000	0.000	4.004	-
Financial Management Support - JALN-M	C/CPFF	Artemis : San Diego, CA	0.711	0.422	Oct 2016	0.000		0.000		-		0.000	0.000	1.133	-
Certification Authority-ADNS	C/CPFF	BAH : San Diego,CA	0.138	0.094	Jan 2017	0.095	Jan 2018	0.086	Jan 2019	-		0.086	Continuing	Continuing	Continuing
		Subtotal	22.698	3.714		1.845		1.448		-		1.448	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	Various	Various : Various	22.977	0.000		0.000		0.000		-		0.000	0.000	22.977	-
Integration and Test BFTN	C/FFP	COMOPTEVOR : Norfolk, VA	1.699	0.520	Dec 2017	0.050	Mar 2018	0.000		-		0.000	0.000	2.269	-
Test and Evaluation Support BFTN	WR	SSC : PAC	6.721	2.380	Dec 2016	0.449	Dec 2017	0.000		-		0.000	0.000	9.550	-
		Subtotal	31.397	2.900		0.499		0.000		-		0.000	0.000	34.796	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy			Date: February 2018
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0204163N / *Fleet Tactical Development*	Project (Number/Name) 0725 / *Communication Automation*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support - HFORCE	C/CPFF	BAH : San Diego, CA	0.000	0.000		0.600	Nov 2017	0.185	Nov 2018	-		0.185	Continuing	Continuing	Continuing
Program Management Support - JALN	C/CPFF	BAH : San Diego, CA	0.000	0.000		0.250	Jan 2018	0.000		-		0.000	0.000	0.250	-
Program Management Support - BFTN	C/CPFF	BAH : San Diego, CA	1.922	0.900	Nov 2016	0.000		0.000		-		0.000	0.000	2.822	-
Program Management Support JALN-M	C/CPFF	BAH : San Diego, CA	0.620	0.367	Nov 2016	0.000		0.000		-		0.000	0.000	0.987	-
Financial Management Support - HFORCE	C/CPFF	Artemis : San Diego, CA	0.000	0.000		0.200	Nov 2017	0.170	Nov 2018	-		0.170	Continuing	Continuing	Continuing
		Subtotal	2.542	1.267		1.050		0.355		-		0.355	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	200.574	38.949		33.525		25.014		-		25.014	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

BFTN

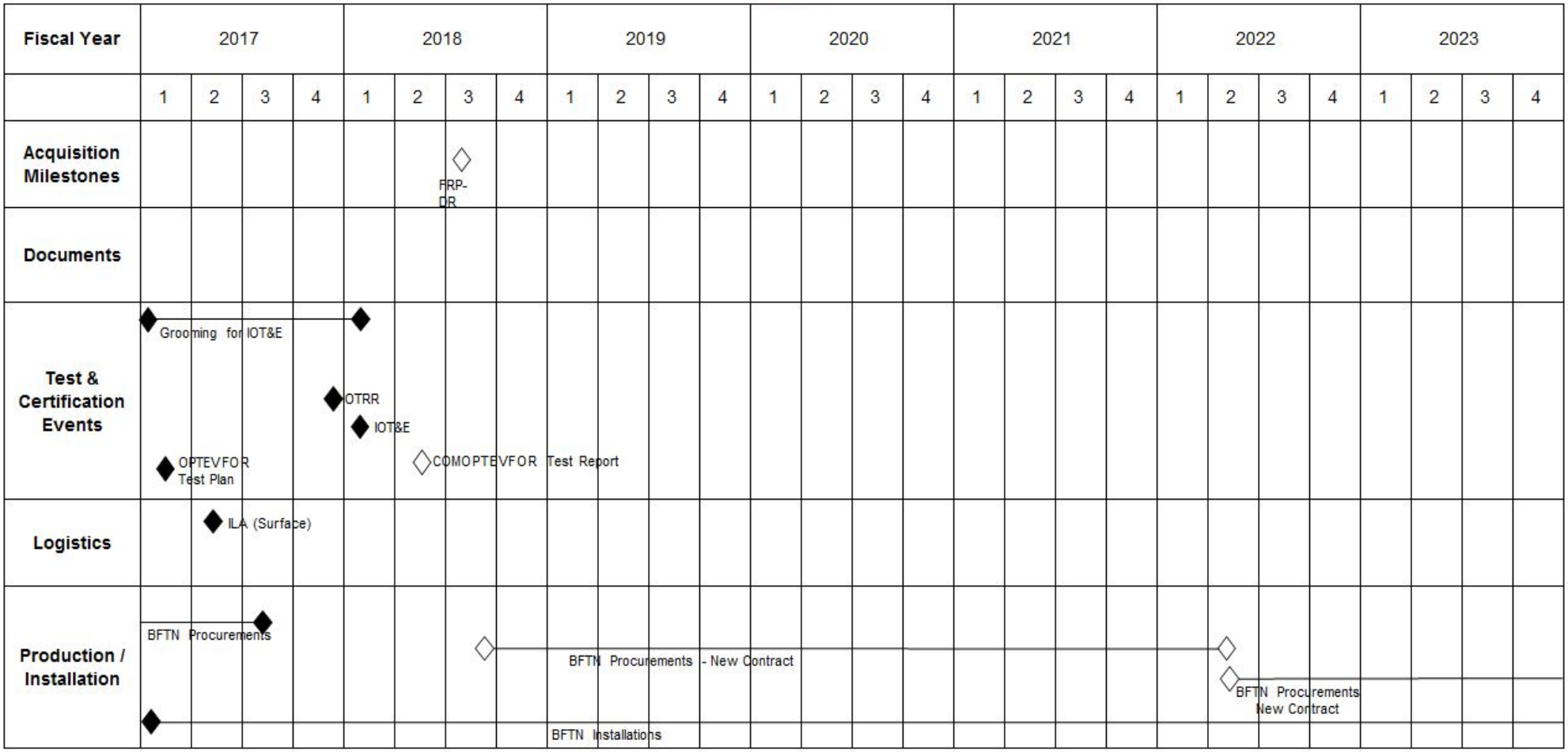

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

JALN-M Demonstration

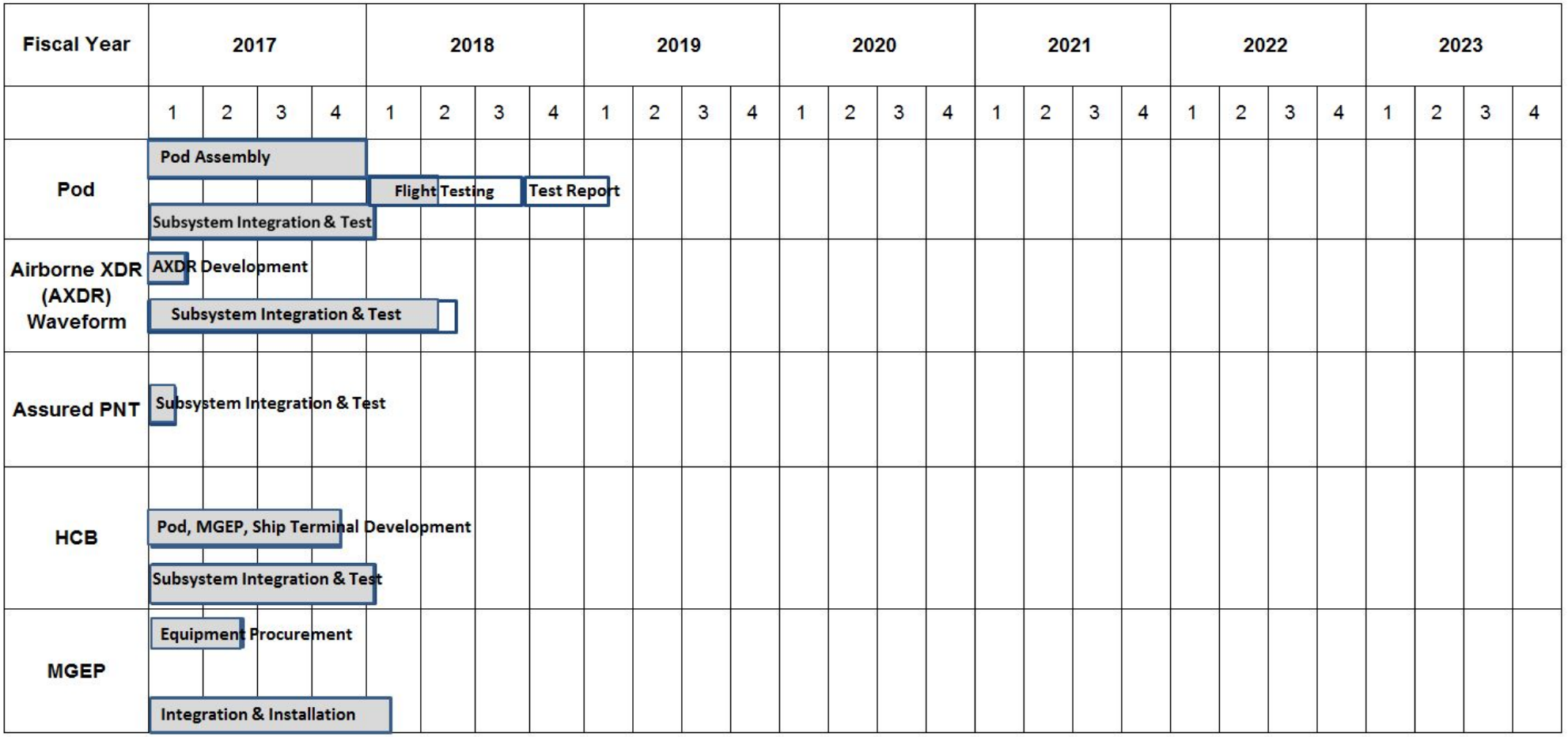

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

HFORCE

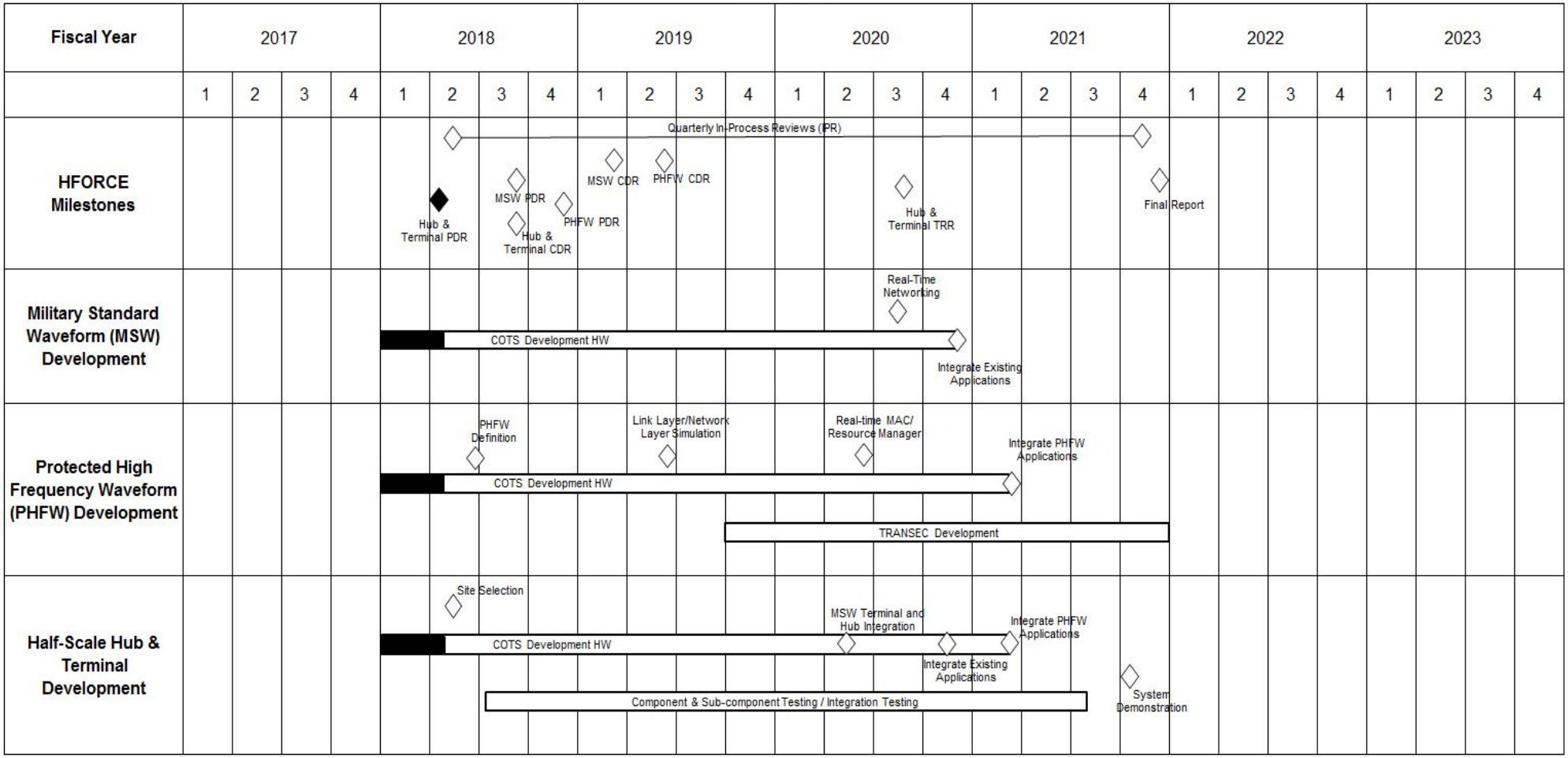

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

ADNS

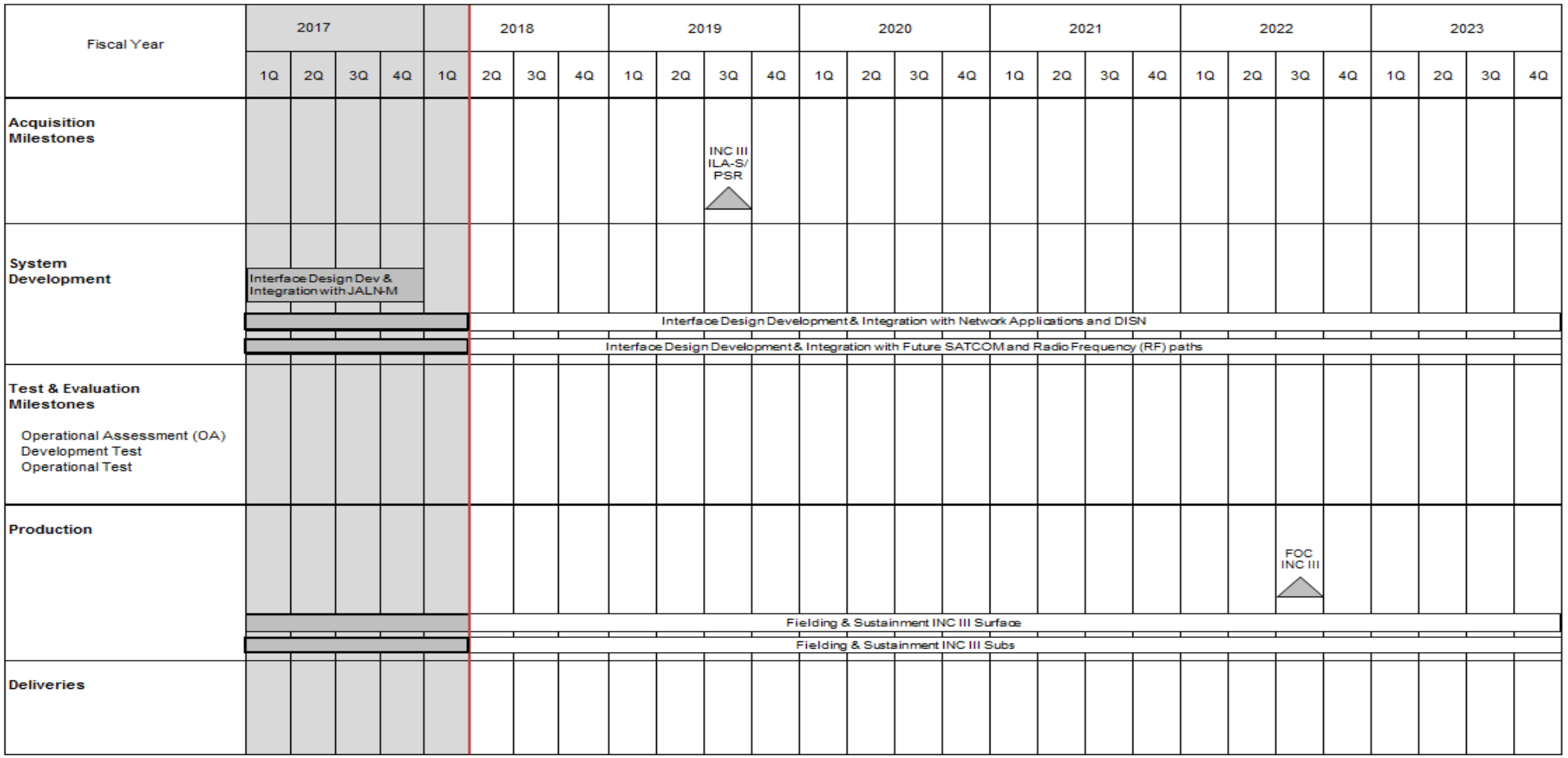

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

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 Initial Operational Test & Evaluation	1	2017	1	2018
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	1	2017	4	2017
Pod Assembly	1	2017	4	2017
Pod Flight Testing	1	2018	3	2018
A-XDR Development	1	2017	1	2017
A-XDR Integration & Test	1	2017	2	2018
PNT Subsystem Integration & Test	1	2017	1	2017
HCB Pod, MGEP, Ship Terminal Development	1	2017	4	2017
HCB Integration & Test	1	2017	4	2017
MGEP Equipment Procurement	1	2017	2	2017
MGEP Integration & Installation	1	2017	1	2018
HFORCE				
Quarterly In-Process Reviews	2	2018	4	2021
Military Standard Waveform COTS HW Development	1	2018	4	2020
Protected High Frequency Waveform COTS HW Development	1	2018	1	2021
Half-Scale Hub COTS HW Development	1	2018	1	2021
Hub & Terminal PDR	2	2018	2	2018

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Hub Site Selection	2	2018	2	2018
Protected High Frequency Waveform Definition	2	2018	2	2018
Military Standard Waveform PDR	3	2018	3	2018
Hub and Terminal CDR	3	2018	3	2018
Component & Sub-component Testing/Integration Testing	3	2018	3	2021
Protected High Frequency Waveform PDR	4	2018	4	2018
TRANSEC Development	4	2019	4	2021
Military Standard Waveform CDR	1	2019	1	2019
Protected High Frequency Waveform CDR	2	2019	2	2019
Link Layer/Network Simulation	2	2019	2	2019
Real-time MAC Demonstration	2	2020	2	2020
MSW Terminal and Hub Integration	2	2020	2	2020
Hub and Terminal TRR	3	2020	3	2020
Real-time Networking	3	2020	3	2020
Existing Applications Integration	4	2020	4	2020
Protected High Frequency Waveform Integration	1	2021	1	2021
System Demonstration	4	2021	4	2021
Final Report	4	2021	4	2021
ADNS				
System Development: ADNS: Increment III_Interface Design Development and Integration with JALN-M	1	2017	4	2017
System Development: ADNS: Increment III_Interface Design Development and Integration with Network Applications and Defense Information Systems Network (DISN)	1	2017	4	2023
System Development: ADNS: Increment III_Interface Design Development and Integration with SATCOM and Radio Frequency (RF) paths	1	2017	4	2023
Production: ADNS: Increment III_Fielding and Sustainment INC III Surface	1	2017	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0204163N / *Fleet Tactical Development*	**Project (Number/Name)** 0725 / *Communication Automation*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Production: ADNS: Increment III_Fielding and Sustainment INC III Submarines	1	2017	4	2023
Production: ADNS: Increment III_Full Operational Capability	3	2022	3	2022
Acquisition Milestones: ADNS: Increment III Product Support Review	3	2019	3	2019