Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604280N *I JT TACTICAL RADIO SYSTEM (JTRS)*							
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
Total Program Element	49.373	180.878	232.930	234.434	-	234.434	-	-	-	-	-	-
0725: *Communication Automation*	0.000	2.993	8.378	8.774	-	8.774	-	-	-	-	-	-
0728: *Navy Multiband Terminal (NMT)*	0.000	0.000	0.000	26.337	-	26.337	-	-	-	-	-	-
0729: *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*	0.000	0.000	0.000	27.810	-	27.810	-	-	-	-	-	-
0742: *Sub Integrated Ant System*	0.000	17.845	13.660	15.929	-	15.929	-	-	-	-	-	-
0921: *NAVSTAR GPS Equipment*	0.000	50.971	51.590	28.903	-	28.903	-	-	-	-	-	-
1411: *Sub Tact Comm System*	0.000	13.038	14.245	13.575	-	13.575	-	-	-	-	-	-
2126: *ATDLS Integration*	0.000	21.000	18.565	22.922	-	22.922	-	-	-	-	-	-
3020: *MIDS/JTRS*	0.000	39.703	82.227	66.417	-	66.417	-	-	-	-	-	-
3078: *Digital Modular Radio*	49.373	1.854	2.770	2.530	-	2.530	-	-	-	-	-	-
3341: *Network Tactical Common Data Link*	0.000	30.775	34.520	19.096	-	19.096	-	-	-	-	-	-
4011: *Naval Coastal Warfare Surv and C4I Sys*	0.000	2.699	2.975	2.141	-	2.141	-	-	-	-	-	-
9999: *Congressional Adds*	0.000	0.000	4.000	0.000	-	0.000	-	-	-	-	-	-

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): 290, 554

A. Mission Description and Budget Item Justification

Programs will implement digital system-of-systems engineering by using tools such as Model Based System Engineering (MBSE) and Digital Twins to create adaptable digital models to optimize system engineering from design, development and testing to operations and sustainment. Programs will use Development, Security and Operations (DevSecOps) processes for continuous development, integration, testing and deployment, along with common platform services such as Agile Core Services (ACS), for faster fielding of capability.

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Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604280N *I JT TACTICAL RADIO SYSTEM (JTRS)*

(0725)BFTN RC3 System Enhancements (BRSE) is a system enhancement to BFTN, which is a continuing program that utilizes previously installed/existing LOS/ELOS radios to create a secure gateway that interconnects all users into a common RF tactical network. BRSE is Navy's response to the High Frequency (HF) Modernization study conducted in 2018 by OPNAV N81 and NAVIFOR N82. The system will close identified Resilient Command, Control, and Communications (RC3) gaps required to support Distributed Maritime Operations (DMO) and the RC3 posture.

The BRSE pillar of RC3 brings unique communications capabilities to warfighters. BRSE will not require relay satellites for beyond line of sight (BLOS) shore-to-ship and ship-to-shore communications. Incorporation of automated technology will overcome historical challenges attributable to HF propagation effects to ensure links are always on-always connected (AOAC) by adjusting to dynamic environmental conditions. BRSE will complete the HF command and control loop between strike groups at sea and commanders ashore. BRSE will provide these improvements through the development of advanced waveforms with Low Probability of Exploitation (LPE) features, the replacement of 2-channels current radios with software defined radios and modems on surface platforms, automation of operations such as frequency selection, frequency tuning, and waveform parameters selection, and bringing increased performance in a contested and congested environment. The BRSE system is formally specified by both Fleet Commanders as a threshold capability for global maritime command, control, and communications in a Distributed Maritime Environment to execute current warfighting plans.

FY22 BRSE will continue prototype development for two (2) variants (a surface variant (plus integration kits to account for configuration differences in existing HF Legacy communications architecture among ship classes) and a fixed shore variant). In FY22, BRSE will test and evaluate initial prototypes in a shore-based operationally representative environment. Following the results of the operational test, BRSE will initiate advanced prototype development, maturing initial prototypes and developing an advanced subsurface variant and two (2) additional advanced surface variants in preparation for an Operational Demonstration in FY23.

(0728) The Navy Multiband Terminal (NMT) Program is the required Navy component to the Advanced Extremely High Frequency (AEHF) program for enhancing protected and survivable satellite communications to Naval forces. The NMT system provides an increase in single service capability from 1.5 Megabits per second (Mbps) to 8 Mbps, increases the number of coverage areas and retains Anti-Jam/Low Probability of Intercept (AJ/LPI) protection characteristics. It is compatible with legacy Navy Low Data Rate/Medium Data Rate (LDR/MDR) terminals and will sustain the Military Satellite Communications (MILSATCOM) architecture by providing connectivity across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic nuclear operations, strategic defense, theater missile defense, and space operations and intelligence in support of Resilient Command, Control, and Communications (RC3) initiatives. The NMT system replenishes and improves on Navy terminal capabilities of the Military Strategic, Tactical & Relay System (MILSTAR), Defense Satellite Communications System (DSCS), Wideband Global Satellite (WGS) and Global Broadcast Service (GBS). The new system equips warfighters with the assured, jam resistant, secure communications as described in the joint AEHF satellite communications system and WGS Operational Requirements Documents (ORD).

(0728) The Wideband Anti-Jam Modem System (WAMS) is a Navy technology upgrade that enhances communication capability of shipboard and submarine NMTs by providing wideband Anti-Jam (AJ) Satellite Communication throughput over Wideband Global SATCOM (WGS). WAMS is a major contributor in supporting the National Defense Strategy by investing in resilience to provide assured communications capabilities. WAMS enables space segment Anti Jam (AJ) diversity (EHF/AEHF and WGS), thus enabling NMT ships and submarines equipped with the modem to operate in wideband links closer to threat jammers. The United States Air Force (USAF) Protected Tactical Enterprise Service (PTES) program will provide the ground hub component of the WAMS communication system. This PTES joint hub will serve as

a DoD enterprise service ground solution for the use of the Protected Tactical Waveform (PTW) of SATCOM communications and introduces a Network Operations Without Shore (NOWS) capability. The NOWS capability will use the Direct Sequence Spread Spectrum (DSSS) waveform that provides uninterrupted communication in case of loss of shore hub connectivity. PTW is a Frequency Hopped Spread Spectrum (FHSS) waveform that provides high data rates in a benign environment and anti-jam protection to meet contested data rate requirements. High data rate anti-jam capability is enabled via the Protected Tactical Waveform (PTW) and low data rate anti-jam capability is provided via the Direct Sequence Spread Spectrum (DSSS) waveform. These two waveforms are designed to operate over the Wideband Global SATCOM system as well as other transponded satellites, and are also forward compatible with the on-board processing capabilities of the future Protected Tactical Satellites (PTS). WAMS enables the use of WGS X and Ka-band resources to assure access to mission critical communications to provide Resilient Command, Control, and Communications (RC3) capabilities in contested/degraded environments, formerly known as Anti-Access/Area Denial (A2AD). The use of WAMS PTW on WGS will augment AEHF Extended Data Rate (XDR) services to provide the information throughput capacity necessary to support critical Command and Control capability.

(0728) Navy Global Broadcast System (GBS) is a member of the larger Joint C4I program, providing high speed (up to 45 Mbps per transponder)/large volume information/data delivery to forces afloat, ashore, and Naval Special Warfare Command. Leveraging the NMT antenna, GBS provides a one-way broadcast to Naval maritime forces across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic nuclear operations, strategic defense, theater missile defense, and space operations and intelligence in support of RC3. GBS Transmission Security (TRANSEC) is an operational requirement from the Joint GBS ORD and provides robust datalink protection of both uplink and downlink for the GBS broadcast. GBS is evaluating Protected Tactical Waveform (PTW) solutions to meet the TRANSEC mandate. The Air Force & Army Anti-Jam Modem (A3M) and the WAMS are PTW solutions that are under consideration. Navy GBS will require extensive development activities for the new PTW modem solution and must conduct a FOT&E with Joint Services. Overall program efforts include technology insertion studies required to support satellite communications.

(0728)The FY22 request will provide for continued development of Wideband Anti Jam Modem System (WAMS) to include integration of anti-jam capabilities and RC3 over WGS. In addition, GBS will continue GBS Transmission Security (TRANSEC) development to provide robust datalink protection of both uplink and downlink for the GBS broadcast.

(0729) Satellite Communications: The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

(0742)Submarine Integrated Antenna System: The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

(0921)Navigation Satellite Timing & Ranging (NAVSTAR) Global Positioning System (GPS) project (0921) encompasses the Navy's efforts to pace the growing threat to GPS Navigation through the fielding of new GPS receivers, Anti-Jam (AJ) Antennas, and Assured-Positioning Navigation and Timing (A-PNT) technologies across all Navy platform types. NAVSTAR GPS is a group of A-PNT systems that provides authorized users with secure, worldwide, all weather, three dimensional position, velocity, and precise time data. NAVSTAR GPS provides A-PNT capability to Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) and combat systems in standalone and networked architectures throughout air and maritime domains. This project is comprised of four distinct efforts: Sea Navigation Warfare (NAVWAR), GPS-based Positioning, Navigation, and Timing (PNT) Service (GPNTS), Air Navigation Warfare (NAVWAR) and GPS

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Modernization. Sea NAVWAR provides AJ antennas and GPNTS provides GPS receivers and A-PNT technology to surface platforms, and Air NAVWAR provides AJ antennas and GPS Modernization provides GPS receivers to air platforms. Research, Development, Testing and Evaluation (RDT&E) funds are used to perform all the non-recurring GPS Surface Ship, Submarine and Aircraft Development, Integration, and Testing efforts in support of NAVSTAR GPS.

(1411)Submarine Tactical Communications System: The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

(2126) Tactical Data Link (TDL) systems includes the Advanced Tactical Data Link Systems (ATDLS) integration programs, specifically Link 16 Network, Command and Control Processor (C2P) and Link Monitoring and Management Tool (LMMT).

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under operational systems development because it encompasses engineering and manufacturing development for upgrade of existing operational systems.

Link 16 Network Program provides high power shipboard and shore integrated Link 16 capability through the fielding of Joint Tactical Information Distribution System (JTIDS), Multifunctional Information Distribution System (MIDS) on Ships (MOS) and MOS Modernization (MOS Mod) including transmit and receive antennas and High Power Amplifiers (HPA). JTIDS, MOS and MOS Mod utilizes the JTIDS, MIDS Low Volume Terminal (LVT), and MIDS Joint Tactical Radio System (JTRS) terminals respectively, integrates the HPA and interfaces to the shipboard antenna and Command and Control Processor (C2P). MIDS-LVT and MIDS JTRS terminals are developed by the MIDS Program Office. JTIDS terminal is no longer in production, but is undergoing product improvement to maintain interoperability and security with MIDS-LVT and MIDS JTRS. As part of the product improvement all shipboard Link 16 terminals are required to have dynamic network management (DNM), crypto modernization (CM) and frequency remapping (FR). MIDS Program Office is developing additional improvements to the MIDS-LVT and MIDS JTRS terminals. The MIDS-LVT will have Link 16 Enhanced Throughput (ET) and the MIDS JTRS will have the added capability of four net concurrent multi-netting (CMN) with current contention receive (CCR) and tactical targeting networking technology (TTNT).

(3020)The Multifunctional Information Distribution System (MIDS) program office is the Performing Activity for the Navy (Lead Service for Department of Defense (DOD)), Link 16 capability and consists of two (2) product lines, MIDS Low Volume Terminal (LVT) (legacy hardware defined radio) and MIDS Joint Tactical Radio System (JTRS) (software defined radio). MIDS-LVT effort is a cooperative development program between France, Germany, Italy, Spain, and the United States with United States joint service participation (Navy, Army, Air Force), and has provided over 11,000 terminals to 48 Nations providing interoperability with North Atlantic Treaty Organization (NATO) and coalition partners. The Department of Defense (DoD) established the program to design, develop, and deliver low volume, lightweight tactical information system terminals for U.S. and allied fighter aircraft, bombers, helicopters, ships, and ground sites. MIDS-LVT significantly increases force effectiveness and minimizes hostile actions and friend-on-friend engagements. MIDS-LVT Block Upgrade 2 was executed as an ECP and provides the critical upgrades to the MIDS-LVT Terminal to enable U.S., Coalition and International partners' ability to meet the National Security Agency (NSA) mandated timelines for Cryptographic Modernization (CM) and the National Telecommunications and Information Agency (NTIA) and Federal Aviation Agency (FAA) mandated timelines for Frequency Remapping (FR).

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MIDS JTRS, designed as a Pre-Planned Product Improvement (P3I) and executed as an Engineering Change Proposal (ECP) to the production MIDS-LVT configuration, and is fully compatible with MIDS-LVT. The MIDS JTRS Core Terminal achieved Full Production and Fielding (FP&F) in March 2012. It facilitated the JTRS incremental approach for fielding advanced JTRS transformational networking capability and transformed the MIDS-LVT into a 4-channel, Software Communications Architecture (SCA) compliant, Joint Tactical Radio. A form-fit-function replacement to MIDS-LVT, MIDS JTRS also adds three programmable 2 Megahertz (MHz) to 2 Gigahertz (GHz) channels capable of hosting the JTRS legacy and networking waveforms. In addition to Link 16, Tactical Air Navigation (TACAN), and voice functionality found in MIDS-LVT, MIDS JTRS has four channels and adds capabilities such as Link 16 Enhanced Throughput (ET), Link 16 FR, software programmability, CM, and Four Net Concurrent Multi-Netting with Concurrent Contention Receive (CMN-4).

MIDS JTRS Tactical Targeting Network Technology (TTNT), is a block upgrade to the MIDS JTRS CMN-4 Terminal providing an Internet Protocol-based networking capability on tactical aircraft. TTNT is a low latency, high throughput waveform that has the capability to support data exchange between fast-moving tactical aircraft, weapons, and unmanned aircraft, in addition to air, land, and sea-based command and control nodes, in a variety of air-to-air and air-to-ground missions including time sensitive targeting, air warfare, close air support, non-traditional ISR, and anti-surface warfare. TTNT and MIDS JTRS CMN-4 are critical Tactical Data Link capabilities and directly supports Naval Integrated Fire Control (NIFC) capability requirements. These capabilities provide Joint Airborne Network-Tactical Edge functionality to run advanced mission applications in a cross-platform/cross-domain tactical network enterprise.

The FY 2022 Budget completes the Link 16 Hardware Upgrade and continues to fund the MIDS Modernization Software and Firmware development and the Field Loadable capability development effort for the MIDS JTRS terminal. The FY 2022 budget also supports the lead service core waveform development requirements for developing a reference implementation platform for prototyping and conducting frequency testing for the Link 16 and TTNT waveforms.
The FY 2022 Budget continues to fund critical warfighter improvements to the TTNT Terminal Software and Waveform in order to out pace the threat. It also continues the development of the TTNT Consolidated Automated Support System (CASS) Test Program Sets (TPS). The CASS TPS will enable I-level testing of the terminal in the field allowing field level replacement of SRUs instead of returning the entire terminal to the manufacturer.

(3078)Digital Modular Radio (DMR) with Integrated Waveform (IW) and Mobile User Objective System (MUOS) capable hardware is the Navy's technical solution for the IW/MUOS requirement. The DMR AN/USC-61(C), is the first software defined radio to become a communications system standard for the U.S. Military. The compact, multi-channel DMR provides 3G, Wideband Code Division Multiple Access (WCDMA) technology, for high speed/capacity voice and data satellite communications. DMR radios currently operate aboard U.S. Navy surface and subsurface vessels, fixed-sites and other Department of Defense (DoD) communication platforms using frequencies ranging from 2 MHz to 2 GHz. Certified to pass secure voice and data at Multiple Independent Levels of Security (MILS) over High Frequency (HF), Very High Frequency (VHF), Ultra High Frequency (UHF), and Satellite Communications (SATCOM) channels, the DMR system was developed to the U.S. Navy's specifications and meets all the stringent environmental, Electromagnetic Interference (EMI) and performance requirements for use in the U.S. Fleet. This system is formally specified by both Fleet Commanders as a threshold capability, for global maritime command control and communications in a Distributed Maritime Environment, to execute current warfighting plans and is required for National Command and Control capability. This program is for continued development/integration of the IW and MUOS waveforms into the DMR in accordance with Military Standards 188-181,2,3. Additionally, the enhancements of High Frequency Distribution Amplifier Group (HFDAG) and HF Automated Link Establishment (ALE) will also be developed/integrated into the DMR. HFDAG is a follow-on HF solution to fulfill transmit and receive HF communication capability with various modes of operation, such as ALE, for Navy platforms. HFDAG will utilize the existing DMR as the exciter/receiver. Generation 3 (GEN 3) HF ALE/HF wideband provides Navy users with improved HF communications, increased transmission rates from radio to radio, and serves as a supplement

to SATCOM when SATCOM networks are overloaded or unavailable. IW uses a Time Division Multiple Access (TDMA) communication system in an attempt to improve satellite bandwidth utilization over legacy SATCOM waveforms. This enables demand assigned services on UHF SATCOM networks to support new applications that require better performance and higher channel throughput. The MUOS waveform will enable MUOS satellites to provide worldwide communication satellite coverage for DoD requirements. MUOS will provide functionality comparable to commercial mobile phone systems.

FY 2022 will fund DMR to complete 6.5.3 HF ALE, begin integration and porting of the latest MUOS waveform.

(3341)Network Tactical Common Data Link (NTCDL) provides the ability to transmit/receive real-time intelligence, surveillance, and reconnaissance (ISR) data simultaneously from multiple sources (air, surface, sub-surface, and man-portable) and exchange command and control information (voice, data, imagery, and full-motion video) across dissimilar joint, service, coalition, and civil networks. NTCDL provides warfighters the capability to support multiple, simultaneous, networked operations with in-service Common Data Link (CDL) equipped aircraft (e.g., F/A-35, P-3, and MH- 60R) in addition to next-generation manned and unmanned platforms (e.g., P-8 Poseidon, Triton, MQ-25 (Stingray), small tactical unmanned aircraft systems (STUAS), and Fire Scout). NTCDL benefits the Fleet by providing a horizon extension for line-of-sight systems for use in time-critical strike missions.

FY 2022 request is for NTCDL to continue Full Capability development.

(4011)The Navy Expeditionary C4I project supports the Navy Expeditionary Combat Command (NECC) mission to detect, deter or interdict potential threats to DoN assets using agile, modular and scalable technology. NECC units have a number of current and future Command, Control, Communications, Computers & Intelligence (C4I) technological requirements for Tactical/Command Operations Center, tactical vehicles, combatant craft, and dismounted personnel. NECC operations require units to maintain effective command and control, develop and display a common tactical picture, and share intelligence and current operational information with higher headquarters, subordinate units, joint forces and coalition allies. Small, Medium, and Large Scale Communication Systems (LSCS) are the C4I hub for the NECC; Navy Enterprise Tactical Command and Control (NETC2) is the converged LSCS baseline. Future C4I research and development include enhanced information transport, network cyber security posture, assured communications in denied environments along with agility and mobility. Funding is required for testing and evaluation of cyber security issues associated with obsolescence of network items and if not addressed will impact the ability of the Program Office to maintain system accreditation under Risk Management Framework (RMF) revoking multiple LSCS assets authority to connectivity on the Department of Defense Information Network (DoDIN). Efforts are in alignment with NECC's strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities and maintain alignment with greater DoD initiatives, such as Joint Information Environment (JIE), Mission Partner Environment (MPE) in order to maintain interoperability and drive down DoN enterprise costs.

FY 2022 funding supports investigation of cloud and containerization technologies, and utilization of Development, Security, and Operations (DevSecOps) in order to rapidly deliver mission tailored applications and cloud based services.

Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Navy	Date: May 2021
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B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	190.689	232.818	168.366	-	168.366
Current President's Budget	180.878	232.930	234.434	-	234.434
Total Adjustments	-9.811	0.112	66.068	-	66.068
• Congressional General Reductions	-	-1.250			
• Congressional Directed Reductions	-	-2.638			
• Congressional Rescissions	-	-			
• Congressional Adds	-	4.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-3.653	0.000			
• SBIR/STTR Transfer	-6.157	0.000			
• Program Adjustments	0.000	0.000	6.850	-	6.850
• Rate/Misc Adjustments	-0.001	0.000	59.218	-	59.218

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: 9999: *Congressional Adds*		
Congressional Add: *Multifunciontal Information Distribution System Acceleration*	0.000	4.000
Congressional Add Subtotals for Project: 9999	0.000	4.000
Congressional Add Totals for all Projects	0.000	4.000

Change Summary Explanation

The overall FY2022 funding request for PE 0604280N was increased by $1.504 million, program adjustments are as follows:

- (0728) The FY2022 funding request was increased by $6.045M to support Wideband Anti-Jam Modem System (WAMS) development and testing and GBS TRANSEC development and testing. Funding has been realigned into PE 0604280N from PE 0303109N Project 0728 as part of RDTEN PE Consolidation starting FY22.

- (0729) The FY2022 funding request was increased by $6.124M in project 0729. Funding has been realigned into PE 0604280N from PE 0303109N Project 0729 as part of RDTEN PE Consolidation starting FY22. The details of program element 0604280N Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

- (0742) The FY2022 funding request was increased by $2.269M. The details of program element 0604280N Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

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- (0921) The FY2022 funding request was reduced by $22.687M due Military Global Position System (GPS) User Equipment (MGUE) development delays impacting integration efforts of Embedded GPS Inertial-Military Code (M-Code) (EGI-M) GPS Receivers and the planned completion of integration and Developmental Testing/Operational Testing (DT/OT) efforts within several NAVSTAR GPS programs.

- (1411.L39) The FY2022 funding request was increased by $0.743M. The details of program element 0604280N Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

- (1411.S15) The FY2022 funding request was decreased by $1.413M. The details of program element 0604280N Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

- (2126) The FY2022 funding request was increased by $4.357M to include an increase of $3.102M for Link 16 to fund vendor qualification of the MIDS J BU3 ship interface to meet environmental, functional, security and electromagnetic compatibility requirements and government host integration and validation testing; $1.658M increase to support increased staffing for software development and independent verification and validation efforts as part of the C2P Modernization development and -$0.403M decrease in LMMT development efforts as CD 3 nears completion in FY22.

- (3020 MIDS/JTRS) The FY2022 funding request decreases by $15.810M overall due to the MIDS JTRS Link 16 Hardware development effort entering into testing in FY 2022; the development work is complete and the effort moves into the testing phase. Risk reduction efforts for MIDS JTRS Software/Firmware development, risk reduction for Field Loadable capability, and the NSA standards update also complete in FY 2021. There is an increase in FY 2022 for Core Waveform upgrades, but overall PU 3020 decreases from FY 2021 to FY 2022.

- (9999 MIDS/JTRS) A FY2022 overall decrease of $4.0M due to one-time add in FY 2021 to accelerate the software and firmware development for MIDS Modernization efforts and qualification.

- (3341) The FY2022 funding request was decreased by $15.424M due to major EDM test events completing in FY21, and the anticipated completion of Path 1 development efforts mid-year FY22.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*				Project (Number/Name) 0725 / *Communication Automation*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
0725: *Communication Automation*	0.000	2.993	8.378	8.774	-	8.774	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

BFTN RC3 System Enhancements (BRSE) is a system enhancement to BFTN, which is a continuing program that utilizes previously installed/existing LOS/ELOS radios to create a secure gateway that interconnects all users into a common RF tactical network. BRSE is Navy's response to the High Frequency (HF) Modernization study conducted in 2018 by OPNAV N81 and NAVIFOR N82. The system will close identified Resilient Command, Control, and Communications (RC3) gaps required to support Distributed Maritime Operations (DMO) and the RC3 posture.

The BRSE pillar of RC3 brings unique communications capabilities to warfighters. BRSE will not require relay satellites for beyond line of sight (BLOS) shore-to-ship and ship-to-shore communications. Incorporation of automated technology will overcome historical challenges attributable to HF propagation effects to ensure links are always on-always connected (AOAC) by adjusting to dynamic environmental conditions. BRSE will complete the HF command and control loop between strike groups at sea and commanders ashore. BRSE will provide these improvements through the development of advanced waveforms with Low Probability of Exploitation (LPE) features, the replacement of 2-channels current radios with software defined radios and modems on surface platforms, automation of operations such as frequency selection, frequency tuning, and waveform parameters selection, and bringing increased performance in a contested and congested environment. The BRSE system is formally specified by both Fleet Commanders as a threshold capability for global maritime command, control, and communications in a Distributed Maritime Environment to execute current warfighting plans.

FY22 BRSE will continue prototype development for two (2) variants (a surface variant (plus integration kits to account for configuration differences in existing HF Legacy communications architecture among ship classes) and a fixed shore variant). In FY22, BRSE will test and evaluate initial prototypes in a shore-based operationally representative environment. Following the results of the operational test, BRSE will initiate advanced prototype development, maturing initial prototypes and developing an advanced subsurface variant and two (2) additional advanced surface variants in preparation for an Operational Demonstration in FY23.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**
Title: Battle Force Tactical Network (BFTN)	2.993	8.378	8.774	0.000	8.774
Articles:	-	-	-	-	-
Description: Overall program efforts include design, development and test of a robust, modern High Frequency (HF) capability designed to close identified Resilient Command, Control and Communications (RC3) capability gaps required to support Distributed Maritime Operations (DMO) and the RC3 posture. BRSE is the Navy's response to the HF Modernization study conducted in 2018 by OPNAV N81 and NAVIFOR N82. BRSE is					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0725 / *Communication Automation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
the only Allied/Coalition option providing an Always On/Always Connected (AOAC) alternative to SATCOM in contested and congested environments. This capability is critical to meeting near-term and future threat environments. ***FY 2021 Plans:*** Continue developing and testing strategies, tactical employment concepts, and system modifications to address capability gaps and deficiencies that are needed to enable Resilient Command, Control, and Communications (RC3). Continue developing the system modifications previously identified to address near-term and future communications threats. Efforts are focused on completing design and testing of a more robust MIL-STD-110C/D based High Frequency (HF) waveform. Develop strategies to modify and enhance existing shipboard HF and Ultra High Frequency (UHF) Line of Sight (LOS) communications architecture to meet near-term threat and future threat environments. Begin developing and testing capabilities designed to enable BFTN's message and chat capabilities in an organic shipboard-only environment (e.g., without requiring shore reach back). ***FY 2022 Base Plans:*** Complete design activities for all BRSE variants, including final global afloat-shore architecture, and shipboard integration and installation plans. Complete Phase 2 development, including initial development of one (1) ship-variant prototype (including integration kits to account for configuration differences in existing HF Legacy communications architecture among ship classes) and one (1)fixed-shore variant prototype. Test and evaluate initial prototypes in an operationally representative environment; one Contractor Development Test (CDT) and one Government Developmental Test (GDT) conducted in the laboratory and Over the Air (OTA). Generate and evaluate test reports. Begin development of existing prototypes (ship-variant and fixed-shore variant) into advanced prototypes, and develop one (1) advanced subsurface-variant prototype. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The $.396M increase from FY21 to FY22 funds a continued ramp-up of design efforts and developmental testing for BFTN RC3 System Enhancements afloat variants. Funds will be used to further develop initial prototypes into advanced prototypes ready to be tested in operationally representative threat environments. These efforts are critical to address RC3 requirements necessary to overcome near-term and future communication threats.					
Accomplishments/Planned Programs Subtotals	2.993	8.378	8.774	0.000	8.774

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/3057: *Battle Force Tactical Network (BFTN)*	12.178	25.266	27.816	-	27.816	-	-	-	-	-	-

Remarks

OPN LI 3057 is a shared line; funding identified is for BFTN efforts.

D. Acquisition Strategy

Battle Force Tactical Network (BFTN) - Develop and test Resilient Command, Control, and Communications (RC3) Beyond Line of Sight (BLOS) surface, subsurface, and shore variants with advanced, electronically protected HF waveforms. Program will conduct this effort via an Information Warfare Research Project (IWRP) Other Transaction Authority (OTA) contract strategy with a three phased approach to design and development. At the end of each phase, the Government can choose to award the next phase to incumbent vendors or recompete. Phase 1, preliminary designs, has been awarded jointly to L3 Technologies and Rohde & Schwarz. Phase 2 develops initial prototypes, and Phase 3 develops advanced prototypes in all variants and tests them in an at-sea Operational Demonstration.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development - BFTN	WR	NIWC PAC : San Diego, CA	0.000	0.380	Oct 2019	0.458	Dec 2020	0.653	Oct 2021	-		0.653	-	-	-
Product Development - BFTN	WR	NIWC LANT : Charleston, SC	0.000	0.743	Oct 2019	0.000	Dec 2020	0.000	Oct 2021	-		0.000	-	-	-
Product Development - BFTN	C/FFP	L3 Harris : Salt Lake City, UT	0.000	1.486	Mar 2020	7.570	Dec 2020	7.471	Nov 2021	-		7.471	-	-	-
		Subtotal	0.000	2.609		8.028		8.124		-		8.124	-	-	N/A

Remarks

Complete design activities for all BRSE variants, including final global afloat-shore architecture, and shipboard integration and installation plans. Complete Phase 2 development, including initial development of one (1) ship-variant prototype (including integration kits to account for configuration differences in existing HF Legacy communications architecture among ship classes) and one (1)fixed-shore variant prototype. Test and evaluate initial prototypes in an operationally representative environment; one Contractor Development Test (CDT) and one Government Developmental Test (GDT) conducted in the laboratory and Over the Air (OTA). Generate and evaluate test reports. Begin development of existing prototypes (ship-variant and fixed-shore variant) into advanced prototypes, and develop one (1) advanced subsurface-variant prototype.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype Research and Design	C/FFP	MIT/Lincoln Lab : Lexington, MA	0.000	0.384	Dec 2019	0.350	Nov 2020	0.550	Nov 2021	-		0.550	-	-	-
		Subtotal	0.000	0.384		0.350		0.550		-		0.550	-	-	N/A

Remarks

BRSE Shore leverages a Federally Funded Research Development Center (FFRDC) for Phases 0-2. Phase 0 conducts initial engineering studies.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation - BFTN	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.000		0.100	Oct 2021	-		0.100	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	0.000	0.000		0.000		0.100		-		0.100	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	2.993		8.378		8.774		-		8.774	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
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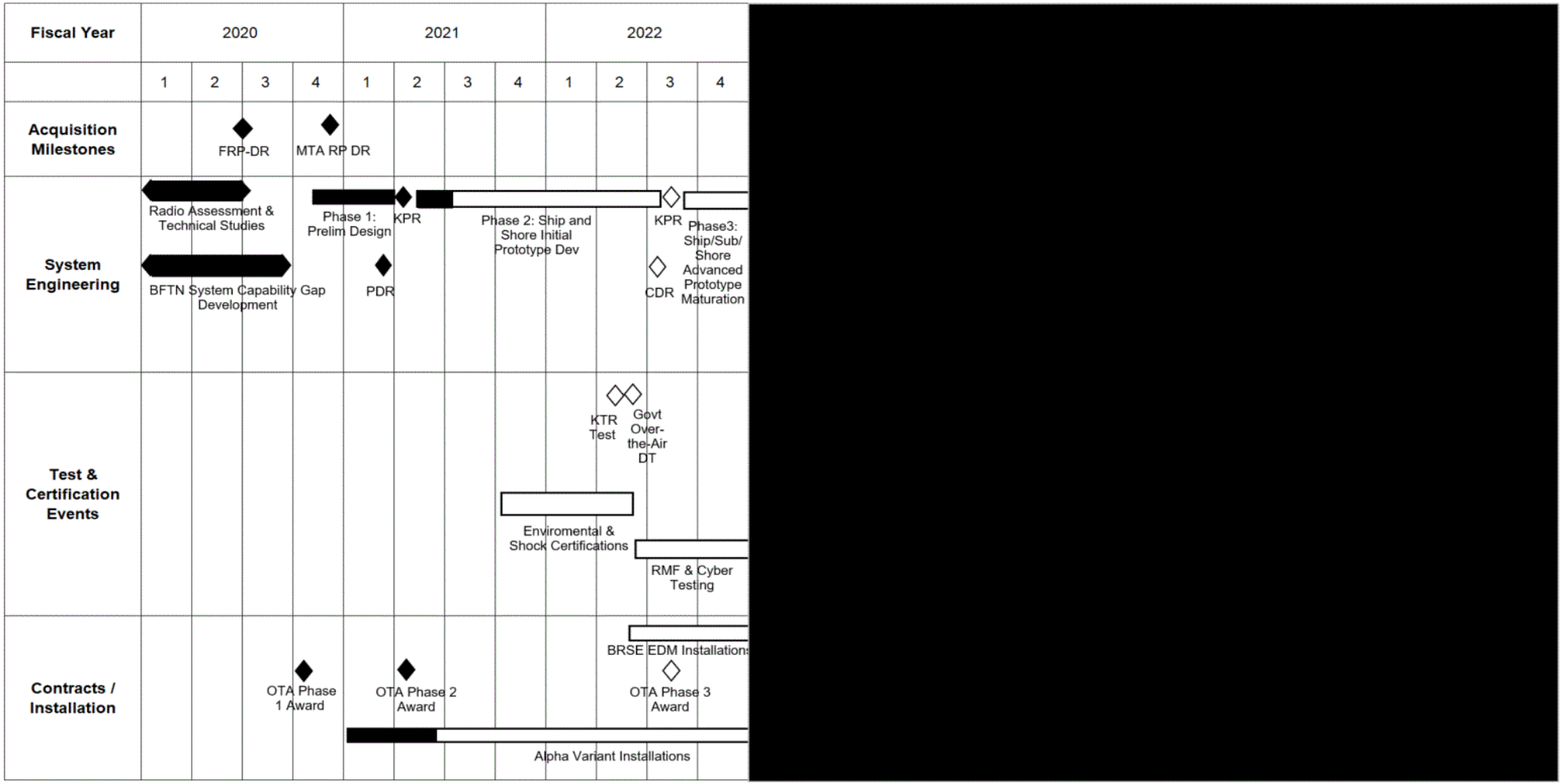

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
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Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0725				
Radio Assessment & Technical Studies	1	2020	2	2020
BFTN System Capability Gap Development	1	2020	3	2020
OTA Phase 1 Award	4	2020	4	2020
Phase 1 Prelim Design	4	2020	1	2021
PDR	1	2021	1	2021
Alpha Variant installations	1	2021	4	2022
Knowledge Point Review 1	2	2021	2	2021
OTA Phase 2 Award	2	2021	2	2021
Phase 2 Ship and Shore Initial Prototype Development	2	2021	3	2022
Environmental and Shock Certifications	4	2021	2	2022
Knowledge Point Review 2	3	2022	3	2022
KTR Test	2	2022	2	2022
Over-the-air DT	2	2022	2	2022
BRSE EDM Installation	2	2022	4	2022
RMF Cyber Testing	2	2022	4	2022
OTA Phase 3 Award	3	2022	3	2022
Phase 3 Ship/Sub/Shore Advanced Prototype Maturation	3	2022	4	2022
CDR	3	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy												Date: May 2021
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COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
0728: *Navy Multiband Terminal (NMT)*	0.000	0.000	0.000	26.337	-	26.337	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 290

Note

Funding has been realigned into PE 0604280N from PE 0303109N Project 0728 as part of RDTEN PE Consolidation starting FY22. There are no new starts with this realignment. All budgeted efforts have been previously approved.

A. Mission Description and Budget Item Justification

The Navy Multiband Terminal (NMT) Program is the required Navy component to the Advanced Extremely High Frequency (AEHF) Program for enhancing protected and survivable satellite communications to Naval forces. Although development of the NMT terminal is complete, software and hardware upgrade development is ongoing to provide enhanced capabilities to the fleet. The NMT system provides an increase in single service capability from 1.5 Megabits per second (Mbps) to 8 Mbps, increases the number of coverage areas, and retains Anti-Jam/Low Probability of Intercept (AJ/LPI) protection characteristics. It is compatible with legacy Navy Low Data Rate/Medium Data Rate (LDR/MDR) terminals and will sustain the Military Satellite Communications (MILSATCOM) architecture by providing connectivity across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic defense, theater missile defense, and space operations and intelligence. The NMT system replenishes and improves on Navy Military Strategic, Tactical & Relay System (MILSTAR), Defense Satellite Communications System (DSCS), Wideband Global Satellite (WGS), and Global Broadcast Service (GBS) terminal capabilities. The new system equips warfighters with assured, jam resistant, secure communications as described in both the joint AEHF Satellite Communications System and the WGS Operational Requirement Documents (ORD). Mission requirements specific to Navy operations, including threat levels and scenarios, are contained in the ORD. The NMT provides multiband Satellite Communications (SATCOM) capability for ship, submarine, and protected MILSATCOM for shore sites.

The Wideband Anti-Jam Modem System (WAMS) is a Navy technology upgrade that enhances communication capability of shipboard and submarine NMTs by providing wideband Anti-Jam (AJ) Satellite Communication throughput over Wideband Global SATCOM (WGS). WAMS is a major contributor in supporting the National Defense Strategy by investing in resilience to provide assured communications capabilities. WAMS enables space segment Anti Jam (AJ) diversity (EHF/AEHF and WGS), thus enabling NMT ships and submarines equipped with the modem to operate in wideband links closer to threat jammers. The United States USAF (USAF) Protected Tactical Enterprise Service (PTES) program will provide the ground hub component of the WAMS communication system. This PTES joint hub will serve as a DoD enterprise service ground solution for the use of the Protected Tactical Waveform (PTW) of SATCOM communications and introduces a Network Operations Without Shore (NOWS) capability. The NOWS capability will use the Direct Sequence Spread Spectrum (DSSS) waveform that provides uninterrupted communication in case of loss of shore hub connectivity. PTW is a Frequency Hopped Spread Spectrum (FHSS) waveform that provides high data rates in a benign environment and anti-jam protection to meet contested data rate requirements. High data rate anti-jam capability is enabled via the Protected Tactical Waveform (PTW) and low data rate anti-jam capability is provided via the Direct Sequence Spread Spectrum (DSSS) waveform. These two waveforms are designed to operate over the Wideband Global SATCOM system as well as other transponded satellites, and are also forward compatible with the on-board processing capabilities of the future Protected Tactical

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Satellites (PTS). WAMS enables the use of WGS X and Ka-band resources to assure access to mission critical communications to provide Resilient Command, Control, and Communications (RC3) capabilities in contested/degraded environments, formerly known as Anti-Access/Area Denial (A2AD). The use of WAMS PTW on WGS will augment AEHF Extended Data Rate (XDR) services to provide the information throughput capacity necessary to support critical Command and Control capability.

Navy Global Broadcast System (GBS) is a member of the larger Joint Command, Control, Communications, Computers, and Intelligence (C4I)program, providing high speed (up to 45 Mbps per transponder)/large volume information/data delivery to forces afloat, ashore, and Naval Special Warfare Command. Leveraging the NMT antenna, GBS provides a one-way broadcast to Naval maritime forces across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic nuclear operations, strategic defense, theater missile defense, and space operations and intelligence in support of RC3. GBS Transmission Security (TRANSEC) is an operational requirement from the Joint GBS ORD and provides robust datalink protection of both uplink and downlink for the GBS broadcast. GBS is evaluating Protected Tactical Waveform (PTW) solutions to meet the TRANSEC mandate. The Air Force & Army Anti-Jam Modem (A3M) and the WAMS are PTW solutions that are under consideration. Navy GBS will require extensive development activities for the new PTW modem solution and must conduct a Follow-On Test & Evaluation (FOT&E) with Joint Services. Overall program efforts include technology insertion studies required to support satellite communications.

Technology Insertion, studies and implementation is necessary for military satellite communications systems development to support emerging technologies for Commercial Broadband Satellite Program (CBSP) and Global Broadcast Service (GBS) Terminals in the out years.

The FY22 request will provide for continued development of Wideband Anti Jam Modem System (WAMS) to include integration of anti-jam capabilities and RC3 over WGS. In addition, GBS will continue GBS Transmission Security (TRANSEC) development to provide robust datalink protection of both uplink and downlink for the GBS broadcast.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: NMT Resilient C3 Development	0.000	0.000	24.409	0.000	24.409
Articles:	-	-	-	-	-
Description: Navy Multiband Terminal (NMT) software and hardware upgrade development is ongoing to provide Resilient Command, Control, and Communications (RC3) capabilities to pace the evolving threats to the warfighter in contested/degraded environments. The Wideband Anti-Jam Modem System (WAMS) will provide an anti-jamming capability that will counter various adversary threats. Adaptive Coding (AC) autonomously maximizes throughput in degraded or benign conditions over the Advanced Extremely High Frequency (AEHF) satellites, providing significantly more throughput than is available today in the baseline NMT. The Time of Day (TOD) capability promotes communications reliability and resiliency. When the channel is degraded due to inclimate weather or adversarial action, TOD enables the system to automatically transition to a more robust, lower code rate resulting in ability to maintain satellite link thereby allowing the fleet to preserve communications. Technology Insertion, studies and implementation is necessary for military satellite communications systems development to support emerging technologies.					

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Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0728 / *Navy Multiband Terminal (NMT)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY 2021 Plans: FY21 plans funded under PE 0303109N, Project 0728. ***FY 2022 Base Plans:*** Continue overall WAMS development. Begin major integration, test, cyber security, and modem certification activities for WAMS. The government Testing & Evaluation team will develop the WAMS Testing and Evaluation Master Plan (TEMP) to support DT/OT. The vendor will conduct a Test Readiness Review (TRR) at the vendor's facility to review test plans, procedures, and expected results prior to Design Verification Testing (DVT). The vendor will conduct DVT which will consist of all testing necessary to determine compliance with the WAM requirements at the vendor's facility and Over-the-Air (OTA) Wideband communications with the NMT at the Government's facilities. Will work with Army Strategic Command (ARSTRAT) on certification of the WAMS modem for operation over WGS. Additionally, will continue working with NSA on certification of the ECU/crypto. The development of the Key Loading and Initialization Facility will commence in FY22 to support future test events. The vendor will deliver WAMS Engineering Design Models (EDM) in FY23. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** In FY21 funding under PE 0303109N, Project 0728 was $19.642M. The increase($4.767M) from FY21 to FY22 is due to ramp up in the WAMS development effort to also include major integration, test, cybersecurity and modem certification activities. The vendor will be completing development, procuring hardware for EDMs, and performing rigorous 6 month Design Verification Test (DVT) to validate all design changes. Government test team will be ramping up, drafting the TEMP, working with COTF, and preparing for DT/OT events the following year. Government team will also be working NSA and WGS certification efforts.					
Title: Global Broadcast System (GBS) Transmission Security (TRANSEC) ***Articles:*** ***Description:*** Navy GBS is a member of the larger Joint C4I program, providing high speed (up to 45 Mbps per transponder)/large volume information/data delivery to forces afloat, ashore, and Naval Special Warfare Command. Leveraging the NMT antenna, GBS provides a one-way broadcast to Naval maritime forces across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic nuclear	0.000 -	0.000 -	1.778 -	0.000 -	1.778 -

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
operations, strategic defense, theater missile defense, and space operations and intelligence in support of RC3. GBS Transmission Security (TRANSEC) is an operational requirement from the Joint GBS ORD and provides robust datalink protection of both uplink and downlink for the GBS broadcast. GBS is evaluating Protected Tactical Waveform (PTW) solutions to meet the TRANSEC mandate. The Air Force & Army Anti-Jam Modem (A3M) and the WAMS are PTW solutions that are under consideration. Navy GBS will require extensive development activities for the new PTW modem solution and must conduct a FOT&E with Joint Services. Overall program efforts include technology insertion studies required to support satellite communications. ***FY 2021 Plans:*** FY21 plans funded under PE 0303109N, Project 0728. ***FY 2022 Base Plans:*** In alignment with GBS Executive Agent (USSF) PTW implementation, Navy GBS will continue PTW design and development efforts. Design efforts will include product development with TRANSEC modem vendor to meet Navy GBS specific requirements. Includes procurement of preliminary prototype or engineering design models. Will begin program integration and test activities. Complete TRANSEC Modem solution assessment. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** In FY21 funding under PR 0303109N, Project 0728 was $0.500M. $1.278M Increase from FY21 to FY22 due to ramp up of activities resulting from PTW solution assessment determination in FY21. Determination of appropriate modem allows the program to significantly increase engineering design and development activities in FY22 which includes integration and test on surface, sub-surface, and shore platforms. Initial procurement of preliminary prototypes to support development is also planned in FY22.					
Title: Technology Insertion	0.000	0.000	0.150	0.000	0.150
Articles:	-	-	-	-	-
Description: Overall program efforts include technology insertion studies required to support satellite communications.					
FY 2021 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
FY21 plans funded under PE 0303109N, Project 0728. ***FY 2022 Base Plans:*** To maintain alignment with the Navy's Resilient Command, Control, and Communications (RC3) strategy and approach, Commercial Broadband Satellite Program (CBSP) transitioned from exercising an initial RC3 modem capability to utilizing the Wideband Anti-Jam Modem System (WAMS), which provides protected wideband Satellite Communication (SATCOM) capability to the Fleet. Funds required to perform studies on how to integrate WAMS into the CBSP architecture. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** In FY21 funding under PR 0303109N, Project 0728 was $0.150M. No change from FY21 to FY22.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	26.337	0.000	26.337

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/3216: *NAVY MULTIBAND TERMINAL (NMT)*	75.020	55.342	34.723	-	34.723	-	-	-	-	-	-
• RDTEN/0303109N/0728: *NAVY MULTIBAND TERMINAL (NMT)*	29.932	20.292	0.000	-	0.000	-	-	-	-	-	-

Remarks

The Other Appropriation represents remaining procurement and installation of NMT production units for Afloat and Shore requirements to reach Full Operational Capability. Funding also includes the procurement and installation of Assured Command and Control (AC2) modems as well as the installation of Advanced Time Division Multiple Access (TDMA) Interface Processors (ATIPs), X/KA Back-Fits, and Ashore Antennas.

D. Acquisition Strategy

The Navy Multiband Terminal (NMT) Follow-On Full Deployment (FOFD) contract will continue NMT production for Afloat platforms and Shore locations, in support of the Chief of Naval Operations and the Department of the Navy (DON), and will allow the NMT Program to complete Full Operational Capability (FOC). The competitive contract awarded to Comtech supports the development of Advanced Time Division Multiple Access (TDMA) Interface Processor (ATIP) and Assured Command and Control (AC2) modem enhancements such as Adaptive Coding. A new competitive contract will be awarded to support development and procurement of the Wideband Anti-Jam Modem System (WAMS).

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Development Engineering	C/CPFF	NUWC : Newport, RI	0.000	0.000		0.000		2.149	Jan 2022	-		2.149	-	-	-
Software Development Engineering	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.000		0.629	Jan 2022	-		0.629	-	-	-
WAMS Design Development	C/CPIF	L3 : San Diego, CA	0.000	0.000		0.000		14.256	Feb 2022	-		14.256	-	-	-
TRANSEC Development	SS/CPIF	TBD : TBD	0.000	0.000		0.000		0.750	Feb 2022	-		0.750	-	-	-
		Subtotal	0.000	0.000		0.000		17.784		-		17.784	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Software Integration/ Government Oversight	WR	NUWC : Newport, RI	0.000	0.000		0.000		1.378	Nov 2021	-		1.378	-	-	-
Software Integration Support	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.000		0.551	Nov 2021	-		0.551	-	-	-
Software Engineering Support	C/CPFF	SYSTECH : San Diego, CA	0.000	0.000		0.000		1.240	Nov 2021	-		1.240	-	-	-
WAMS Studies and Design	FFRDC	MIT/LL : Lexington, MA	0.000	0.000		0.000		0.348	Jan 2022	-		0.348	-	-	-
WAMS Cybersecurity Engineering	WR	NSA : Fort Meade, MD	0.000	0.000		0.000		0.385	Jan 2022	-		0.385	-	-	-
GBS TRANSEC Engineering Support	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.000		0.429	Jan 2022	-		0.429	-	-	-
GBS TRANSEC Engineering Support	WR	NIWC LANT : Charleston, SC	0.000	0.000		0.000		0.219	Jan 2022	-		0.219	-	-	-
GBS TRANSEC Engineering Support	WR	NUWC : Newport, RI	0.000	0.000		0.000		0.286	Jan 2022	-		0.286	-	-	-
		Subtotal	0.000	0.000		0.000		4.836		-		4.836	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0728 / *Navy Multiband Terminal (NMT)*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
WAMS Development Test and Evaluation	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.000		2.067	Nov 2021	-		2.067	-	-	-
TRANSEC Test & Evaluation	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.000		0.094	Jan 2022	-		0.094	-	-	-
Technology Insertion	WR	COTF : Norfolk, VA	0.000	0.000		0.000		0.150	Jan 2022	-		0.150	-	-	-
		Subtotal	0.000	0.000		0.000		2.311		-		2.311	-	-	N/A

Management Services ($ in Millions)

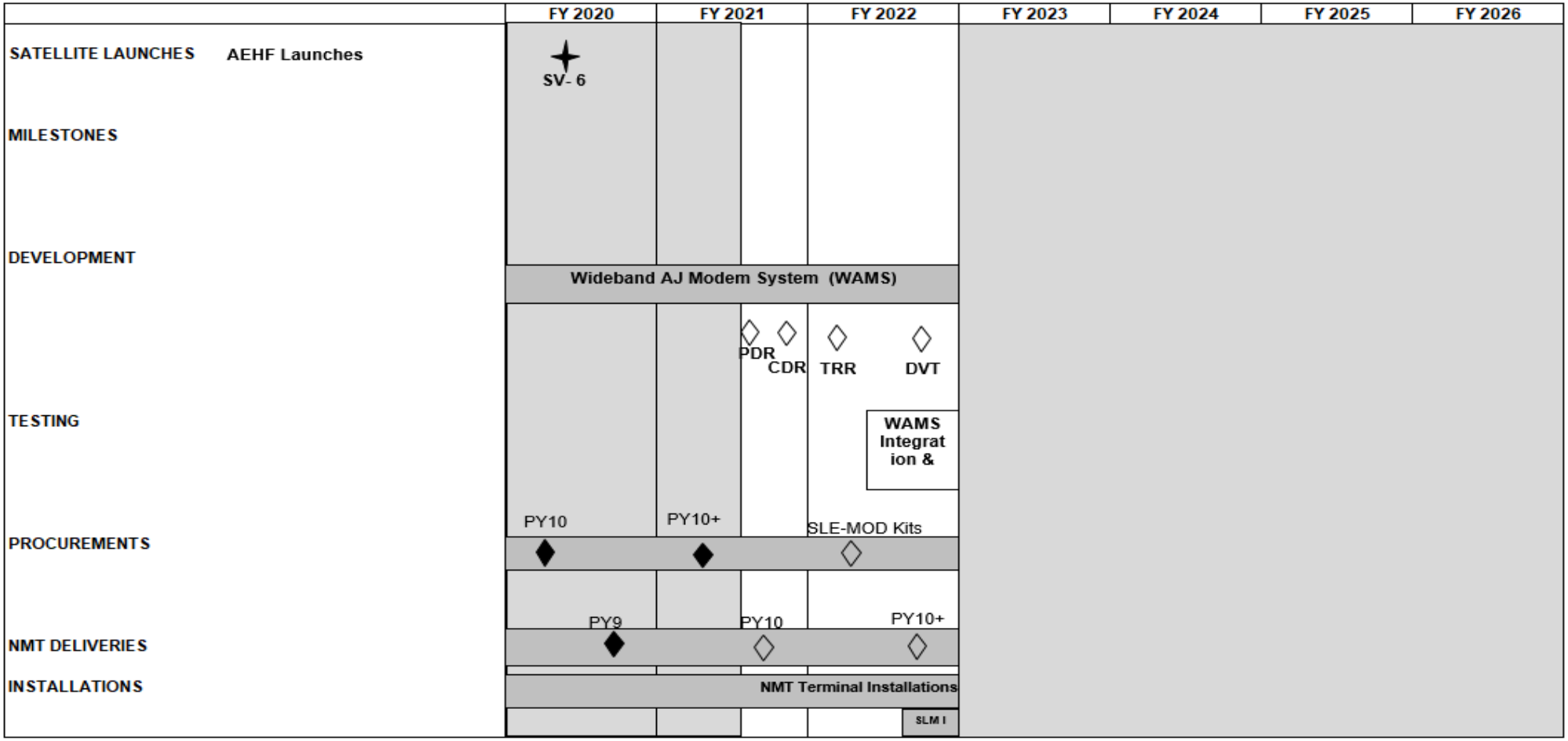
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contract Management	C/CPFF	BAH : San Diego, CA	0.000	0.000		0.000		0.254	Nov 2021	-		0.254	-	-	-
Program Management	C/CPFF	BAH : San Diego, CA	0.000	0.000		0.000		1.102	Nov 2021	-		1.102	-	-	-
Travel	Various	NAVWAR : Various	0.000	0.000		0.000		0.050	Nov 2021	-		0.050	-	-	-
		Subtotal	0.000	0.000		0.000		1.406		-		1.406	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		26.337		-		26.337	-	-	N/A

Remarks

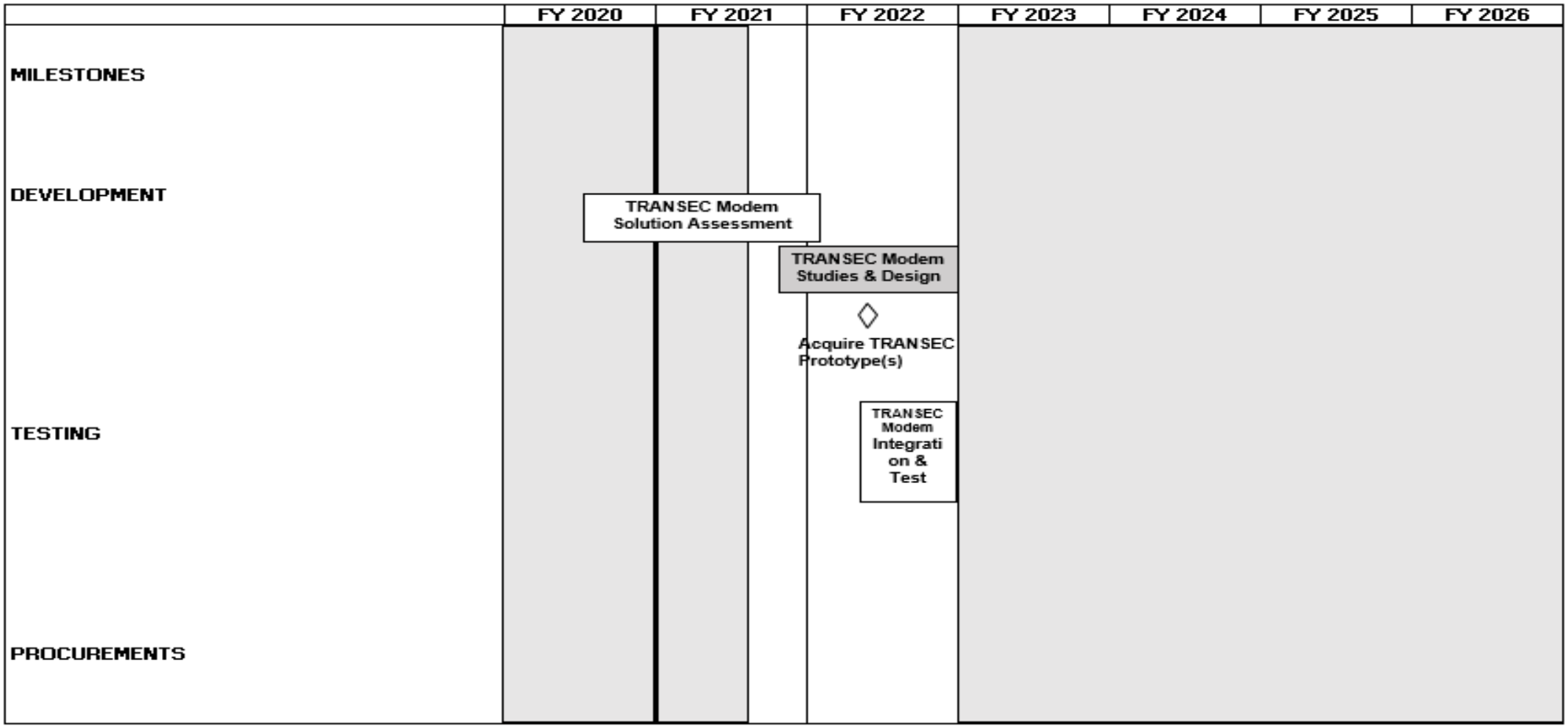
FY20 and FY21 cost data is provided under PE 0303109N, Project 0728

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0728 / *Navy Multiband Terminal (NMT)*



Notes: PU 0728 realigned from PE 0303019N to PE 0604280N in FY22
SLM I: SLE-Mod Installations starting in Q3

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0728 / *Navy Multiband Terminal (NMT)*



Notes:
PU 0728 realigned from PE0303109N to PE 0604280N in FY22
Transec Modem Integration and Test starts in Q3 FY22

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0728 / *Navy Multiband Terminal (NMT)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0728				
AEHF Launch SV-6	2	2020	2	2020
Wideband Anti-Jam Modem System (WAMS) Development	1	2020	4	2022
WAMS Preliminary Design Review (PDR)	1	2021	1	2021
WAMS Critical Design Review (CDR)	4	2021	4	2021
WAMS Technical Readiness Review (TRR)	1	2022	1	2022
WAMS Design Verification Testing (DVT)	3	2022	3	2022
WAMS Integration & Test	2	2022	4	2022
NMT Procurement Year (PY10)	2	2020	2	2020
NMT Procurement Year (PY11)	2	2021	2	2021
FY22 SLE MOD Kits	2	2022	2	2022
NMT FRP PY9 Delivery	3	2020	3	2020
NMT FRP PY10 Delivery	3	2021	3	2021
NMT Terminal Installations	1	2020	4	2022
SLE-MOD Kit Installations	3	2022	4	2022
Global Broadcast System(GBS) TRANSEC: Transec Modem Solution Assessment	3	2020	1	2022
Global Broadcast System(GBS) TRANSEC: Transec Modem Studies & Design	4	2021	4	2022
Global Broadcast System(GBS) TRANSEC: Transec Prototype	2	2022	2	2022
Global Broadcast System(GBS) TRANSEC: Transec Integration & Test	3	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*				Project (Number/Name) 0729 / *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
0729: *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*	0.000	0.000	0.000	27.810	-	27.810	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 290												

Note

Funding has been realigned into PE 0604280N from PE 0303109N Project 0729 as part of RDTEN PE Consolidation starting FY22. There are no new starts with this realignment. All budgeted efforts have been previously approved.

A. Mission Description and Budget Item Justification

The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)	0.000	0.000	27.810	0.000	27.810
Articles:	-	-	-	-	-
FY 2021 Plans: The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
FY 2022 Base Plans: The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	27.810	0.000	27.810

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0729 / *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• RDTEN/0303109N/0729: *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*	0.000	21.686	0.000	-	0.000	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0729 / *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	0.000		0.000		21.684	Apr 2022	-		21.684	-	-	-
		Subtotal	0.000	0.000		0.000		21.684		-		21.684	-	-	N/A

Remarks

FY20 (0728) and FY21 (0729) cost data is provided under PE 0303109N.

The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	0.000		0.000		4.726	Nov 2021	-		4.726	-	-	-
		Subtotal	0.000	0.000		0.000		4.726		-		4.726	-	-	N/A

Remarks

FY20 (0728) and FY21 (0729) cost data is provided under PE 0303109N.

The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	0.000		0.000		1.400	Nov 2021	-		1.400	-	-	-
		Subtotal	0.000	0.000		0.000		1.400		-		1.400	-	-	N/A

Remarks

FY20 (0728) and FY21 (0729) cost data is provided under PE 0303109N.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0729 / *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.															

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		27.810		-		27.810	-	-	N/A

Remarks

FY20 (0728) and FY21 (0729) cost data is provided under PE 0303109N.

The details of Program Element 0604280N, Project 0729 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0729 / *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*

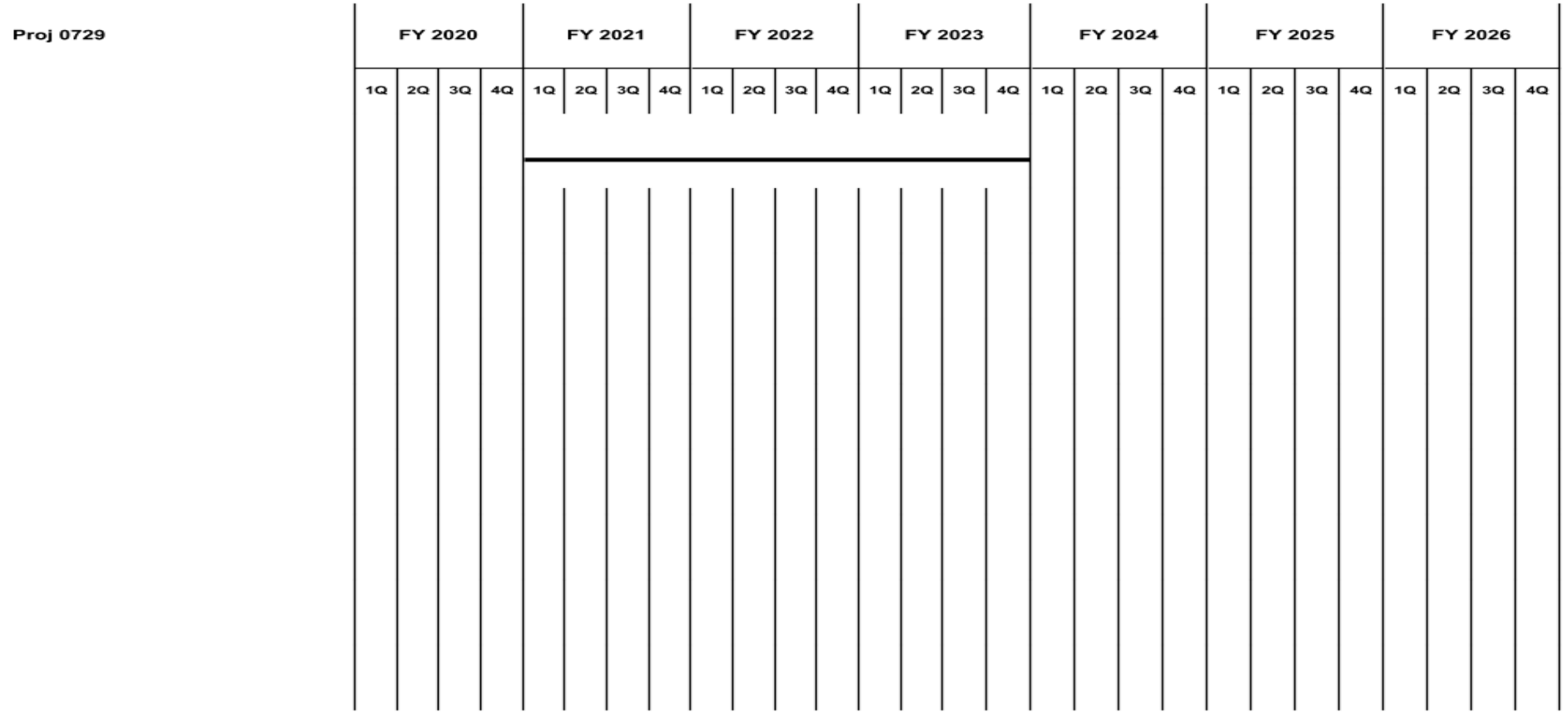


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0729 / *Mobile Advanced Extremely High Frequency (AEHF) Terminal (MAT)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0729				
Classified (Place Holder)	1	2021	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 0742 / *Sub Integrated Ant System*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
0742: *Sub Integrated Ant System*	0.000	17.845	13.660	15.929	-	15.929	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Transition Engineering	4.575	1.877	1.998	0.000	1.998
Articles:	-	-	-	-	-
FY 2021 Plans: The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
FY 2022 Base Plans: The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
Title: Submarine High Data Rate (SubHDR) Pre-Planned Product Improvement (P3I)	3.354	1.532	1.921	0.000	1.921
Articles:	-	-	-	-	-
FY 2021 Plans: The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
FY 2022 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
Title: Advanced High Data Rate (AdvHDR) ***Articles:*** ***FY 2021 Plans:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 Base Plans:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.	3.334 -	3.587 -	3.585 -	0.000 -	3.585 -
Title: Towed Buoy Antenna (AN/BRR-6/6B) ***Articles:*** ***FY 2021 Plans:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 Base Plans:***	5.131 -	3.577 -	3.530 -	0.000 -	3.530 -

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
Title: Antenna Improvements	1.451	3.087	4.399	0.000	4.399
Articles:	-	-	-	-	-
FY 2021 Plans: The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 Base Plans:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
Title: Submarine Communication Transmitter Buoy (SECT)(AN/BST-1)	0.000	0.000	0.496	0.000	0.496
Articles:	-	-	-	-	-
FY 2021 Plans: N/A ***FY 2022 Base Plans:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
Accomplishments/Planned Programs Subtotals	17.845	13.660	15.929	0.000	15.929

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/3130: *Submarine Communication Equipment*	60.055	62.214	65.950	-	65.950	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 0742 / *Sub Integrated Ant System*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	11.630	Nov 2019	9.700	Nov 2020	11.280	Oct 2021	-		11.280	-	-	-
		Subtotal	0.000	11.630		9.700		11.280		-		11.280	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	0.656	Oct 2019	0.690	Oct 2020	0.945	Oct 2021	-		0.945	-	-	-
		Subtotal	0.000	0.656		0.690		0.945		-		0.945	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	4.663	Oct 2019	2.374	Oct 2020	2.729	Oct 2021	-		2.729	-	-	-
		Subtotal	0.000	4.663		2.374		2.729		-		2.729	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	0.896	Feb 2020	0.896	Feb 2021	0.975	Feb 2022	-		0.975	-	-	-
		Subtotal	0.000	0.896		0.896		0.975		-		0.975	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 0742 / *Sub Integrated Ant System*	

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	17.845		13.660		15.929		-		15.929	-	-	N/A

Remarks

- Prior Year cost data is provided under PE 0604503N, Project 0742
- The details of Program Element 0604280N, Project 0742 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

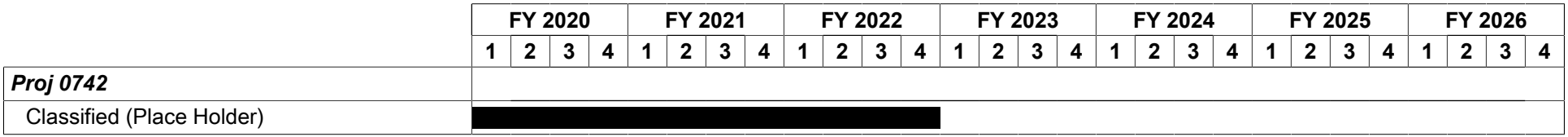


Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0742 / *Sub Integrated Ant System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0742				
Classified (Place Holder)	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 0921 / *NAVSTAR GPS Equipment*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
0921: *NAVSTAR GPS Equipment*	0.000	50.971	51.590	28.903	-	28.903	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The FY 2022 funding request was reduced by $22.687 Million due to Military Global Position System (GPS) User Equipment (MGUE) development delays impacting integration efforts of Embedded GPS Inertial-Military Code (M-Code) (EGI-M) GPS Receivers, planned completion of Multi-Function Mast (OE-538B) Developmental Testing/Operational Testing (DT/OT), planned completion of Multi-Platform Anti-Jam GPS Navigation Antenna (MAGNA) DT/OT efforts in FY 2021, the completion of development of the GPS - Based Positioning, Navigation and Timing (PNT) Service (GPNTS) hardware and software enhancements associated with the Non-GPS Aided Positioning, Navigation and Timing for Surface Ships (NoGAPSS) Future Navy Capability (FNC), and MQ-8C anti-jam efforts shifting to PMA 266 for final testing, procurements and installation.

Navigation Satellite Timing & Ranging (NAVSTAR) GPS project (0921) encompasses the Navy's efforts to pace the growing threat to GPS Navigation through the fielding of new GPS receivers, Anti-Jam (AJ) Antennas, and Assured-Positioning Navigation and Timing (A-PNT) technologies across all Navy platform types. NAVSTAR GPS is a group of A-PNT systems that provides authorized users with secure, worldwide, all weather, three dimensional position, velocity, and precise time data. NAVSTAR GPS provides A-PNT capability to Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) and combat systems in standalone and networked architectures throughout air and maritime domains. This project is comprised of four distinct efforts: Sea Navigation Warfare (NAVWAR), GPNTS, Air NAVWAR and GPS Modernization. Sea NAVWAR provides AJ antennas and GPNTS provides GPS Receivers and A-PNT technology to surface platforms, and Air NAVWAR provides AJ antennas and GPS Modernization provides GPS receivers to air platforms. Research, Development, Testing and Evaluation (RDT&E) funds are used to perform all the non-recurring GPS Surface Ship, Submarine and Aircraft Development, Integration, and Testing efforts in support of NAVSTAR GPS.

The Air and Sea NAVWAR programs provide continued access to GPS information in a denied or impeded electronic environment. Development efforts for both programs provide improvements to various platform type antennas and ensure compatibility with the new M-Code signal. The Air NAVWAR program continues integration efforts using GPS Antenna System (GAS-1), Advanced Digital Antenna Production (ADAP), and other AJ antennas on air platforms while investigating smaller AJ antennas for space constrained platforms and aircraft with unique requirements. The Sea NAVWAR program integrates AJ antennas onto surface and subsurface platforms. The Sea NAVWAR program will continue to research the viability and development of smaller AJ antennas for space-constrained platforms.

The GPNTS system is being developed to serve as the primary A-PNT system for the surface Navy to ensure reliable PNT capability and interoperability insertion into GPS receivers and associated C4ISR and Combat Systems in a denied environment. GPNTS pairs with AJ antennas and provides precise A-PNT data required for combat, weapons, command, control, communications, navigation, and other systems, as well as providing the time synchronization critical for network environments. GPNTS will back fit current PNT/GPS systems as well as serve as a forward fit for new platforms. GPNTS is an Open Architecture (OA) development, enabling rapid software and hardware based capability improvements to be inserted without a requirement for single-source contracting. GPNTS will host the Air Force GPS

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Directorate-developed MGUE card, allowing access to the new GPS M-Code signal. GPNTS will provide more robust and secure GPS/PNT capabilities than is currently in the Fleet. The system will provide the capability to migrate non-real time GPS data toward a Common Computing Environment (CCE) and provide a path for the integration of advanced navigation systems and sensors. GPNTS provides A-PNT capability to C4ISR and Combat Systems in standalone and networked architectures throughout maritime domains.

Global Position System (GPS) Modernization executes the Navy's integration of Military GPS User Equipment (MGUE) being developed by the Space Force GPS Directorate on Navy air platforms. This effort provides Navy platforms improved access to GPS signals in challenged and jammed environments. Because of the number and diversity of all of the Navy's air and weapons platforms, this project will consist of multiple parallel efforts that integrate different Military Code (M-Code) GPS receivers into different type model series aircraft across many program offices with central coordination and management of funding and priorities by GPS Modernization. Each platform will require unique prime vendor integration and testing that includes software updates to avionics and mission computers as well as modifications to the airframe based on Size, Weight and Power and Cost (SWaP-C) requirements. Modernized GPS receivers will utilize the new M-Code GPS Signal in Space, incorporate enhanced cryptology, deliver greater position and time accuracy, and provide improved protection against signal spoofing as compared to legacy receivers. Additionally, GPS Modernization delivers increased GPS Anti-Jam (AJ) protection and enables blue force GPS electronic attack. This effort supports Navy compliance with Public Law 111-383 which prohibits spending funds on non M-Code GPS user equipment after FY 2017.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Sea Navigation Warfare (NAVWAR)	2.543	2.609	1.124	0.000	1.124
Articles:	-	-	-	-	-
Description: Sea NAVWAR provides the Warfighter continued access to GPS through the use of AJ Antenna Systems designed to counter GPS Electronic Warfare threats due to intentional and unintentional interference on surface and subsurface platforms through the continued development of Anti-Jam (AJ) antennas. Program currently supports two (2) efforts: Increment 2 Advanced Digital Antenna Production (ADAP) antenna for surface platforms, and the Submarine Anti-Jam GPS Enhancement (SAGE) antenna for subsurface platforms. Increment 2 ADAP continues to research the viability and development of smaller AJ antennas for surface platforms with SWaP-C restrictions and will ensure compatibility with the M-Code signal. Increment 2 ADAP received acquisition authority (November 2018) to add a small antenna variant to the program baseline. Program is continuing the SAGE antenna development, which integrates AJ capability into the submarine Multi-Function Mast (OE-538B).					
FY 2021 Plans: SAGE antenna: Continue government oversight, system engineering, logistics, contracts, and programmatic management efforts for the SAGE, and integration into the OE-538B antenna system development.					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Commence planning final Developmental Testing/Operational Testing (DT/OT) efforts to support OE-538B fielding decision. Increment 2 ADAP antenna: Continue government oversight, system engineering, logistics, contracts, and programmatic management efforts for Increment 2 ADAP to include smaller AJ antenna variants for surface platforms with SWaP-C restrictions. Conduct Size, Weight and Power and Cost (SWaP-C) antenna integration efforts for the development of Global Positioning System (GPS) - Based Positioning, Navigation and Timing (PNT) Service (GPNTS) SWaP-C receiver solution to ensure compatibility. Complete at-sea Development Test/Operational Test (DT/OT) for the Multi-Platform Anti-Jam GPS Navigation Antenna (MAGNA) smaller Military Code (M-code) capable AJ antenna to support Full Fielding Decision. ***FY 2022 Base Plans:*** SAGE antenna: Complete government oversight, system engineering, logistics, contracts, and programmatic management efforts for the SAGE, and integration into the OE-538B antenna system development. Complete Developmental Testing/Operational Testing (DT/OT) efforts to support fielding decision for OE-538B on operational submarines. Increment 2 ADAP antenna: Begin investigation of enhanced AJ capabilities for integration into existing Sea NAVWAR antenna systems. Begin technology developmental efforts with industry to mature technical base for a next-generation AJ antenna. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding decreases by $1.485M in FY22 due to planned completion of MAGNA DT/OT efforts in FY21.					
Title: Global Positioning System (GPS) - Based Positioning, Navigation and Timing (PNT) Service (GPNTS)	15.319	17.743	1.909	0.000	1.909

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Articles:	-	-	-	-	-
Description: Global Positioning System (GPS) - Based Positioning, Navigation and Timing (PNT) Service (GPNTS) is the Navy's next generation Assured Positioning Navigation and Timing (A-PNT) system. GPNTS will provide more robust and secure GPS/PNT capabilities than is currently in the Fleet. GPNTS will replace Navigation Sensor System Interface (NAVSSI) and WRN-6 systems on surface ships. GPNTS will back fit current PNT/GPS systems as well as serve as a forward fit for new platforms. The system contains Selective Availability Anti-spoofing Security Module (SAASM) GPS security architecture with a planned migration to GPS Military Code (M-code).					
FY 2021 Plans: Continue the implementation of GPNTS Pre-planned Product Improvement (P3I) technology software enhancements for A-PNT sensor suite integration to include: All Source Position Navigation (ASPN) algorithm, Celestial Navigation, Enhanced Assured Timing (EAT), M-Code, Public/Private Key Infrastructure (PKI), and Host-Based Security System (HBSS). Implementation requires complex software modifications and significant engineering updates. ASPN algorithm, Celestial Navigation and EAT address emerging threats to the GPS signal in a GPS-denied environment and make up efforts of the Non-GPS Aided Positioning, Navigation and Timing for Surface Ships (NoGAPSS) Future Navy Capability (FNC). NoGAPSS is the mechanism which brings A-PNT capabilities to GPNTS. Complete GPNTS hardware and software enhancements associated with the NoGAPSS Early Operational Capability (EOC). Other NoGAPSS efforts include to conduct Mission Readiness Assessment (MRA) and conduct test demonstration of the NoGAPSS FNC including coordination of available platforms, installation of the NoGAPSS modifications, and operating the NoGAPSS capability in a relevant environment. Initiate preparations to forward-fit and back-fit NoGAPSS capability on legacy receiver and GPNTS fielded platforms respectively. Continue hardware and software development in a Small Form Factor of GPNTS. Complete Model Based Systems Engineering (MBSE) implementation into GPNTS systems engineering documents. Continue software defect resolution with software vendor in support of Full Operational Capability (FOC) and Full Rate Production (FRP).					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Continue cybersecurity Risk Management Framework (RMF) process to certify GPNTS software version 2.x for FY22 installations. Commence platform integration and development to support GPNTS on both LCS variants, as directed by the Navy, to provide common A-PNT capabilities and Navigation Warfare (NAVWAR) compliance on LCS. Integration efforts require identifying interface requirements and analysis that utilize existing variants of GPNTS. Participate in NoGAPSS MBSE implementation, as directed by the Navy, to provide a navigation system-of-systems architecture to integrate all sources of Position, Velocity, Attitude and Timing (PVAT) data and the NoGAPSS capability. Commence environmental qualification testing (EQT) for GPNTS NoGAPSS system. ***FY 2022 Base Plans:*** Continue the implementation of GPNTS Pre-planned Product Improvement (P3I) technology software enhancements for A-PNT sensor suite integration to include Celestial Navigation and EAT. Complete non-permanent change installation of GPNTS NoGAPSS delta hardware and software enhancements associated with the NoGAPSS FNC onboard first DDG. Complete other NoGAPSS efforts including installation of GPNTS NoGAPSS system at the Aegis test lab facility and performing environmental qualification testing (EQT) for GPNTS NoGAPSS system. Commence Aegis Integration Event (AIE) for GPNTS software 2.0 to achieve Combat Systems certification. Complete platform integration and development to support GPNTS on both LCS variants as directed by the Navy to provide a common A-PNT capabilities and Navigation Warfare (NAVWAR) compliance on LCS. Integration efforts require identifying interface requirements and analysis that utilize existing variants of GPNTS.					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Continue RMF Authorization To Operate (ATO) for multiple software baselines. Expiring software (SW) version 1.x ATO in Feb 2022 requiring renewed RMF package. Commence renewal package for SW v2.x ATO due to updated baseline configurations. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding decrease of $15.834 million from FY 2021 to FY 2022 due to the completion of Model Based Systems Engineering (MBSE) implementation into GPNTS engineering documents and the completion of the GPNTS hardware and software enhancements associated with NoGAPSS Future Navy Capability (FNC).					
Title: Air Navigation Warfare (NAVWAR) ***Articles:***	6.467 -	9.334 -	5.789 -	0.000 -	5.789 -
Description: Air NAVWAR provides the Warfighter continued access to GPS through the use of Anti-Jam (AJ) Antenna Systems designed to counter GPS Electronic Warfare threats due to intentional and unintentional interference. Air NAVWAR efforts include investigation and testing of emerging technologies to improve AJ capability and technologies such as development of miniaturized very small antenna systems to allow for the capability on small variant aircraft. Efforts will also include development to ensure antennas can accept the new Military Code (M-Code) signal. ***FY 2021 Plans:*** Continue to support A-PNT efforts by working with Navy Air platforms on navigation requirements and coordinating with surface Navy platforms to leverage synergies. Complete initial market research to identify potential solutions to fill identified capability gaps in aviation mission requirements. Complete development of High-Integrity Global Positioning System (GPS) Aided Inertial Navigation System (HI-GAINS) antenna system, focusing on the integrated system: integrating the antenna and antenna electronics into one unit. Upon completion of development, two production representative assets will be delivered to the government. Continue GPS Demonstrations and laboratory testing of GPS receivers with associated antennas at Facilities for Antenna and Radar Cross Section (RCS) Measurements (FARM), to include lab testing/ antenna demonstrations of GPS antennas, specifically Multi-Platform Anti-Jam (AJ) GPS Navigation Antenna Integrated (MAGNA-I) for					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
MQ-8C and HI-GAINS for Unmanned Aerial Systems (UAS). Additional testing comparing performance between traditional nulling systems and new beam-steering antenna electronics will be conducted. The data collected will be used by platforms as they consider future antenna system updates. Upon completion of FARM lab testing and demonstrations of HI-GAINS, conduct flight testing HI-GAINS on an UAS at White Sands Missile Range (WSMR). Continue initial ground testing of HI-GAINS Integrated antenna to include thermal and environmental testing. Continue aviation A-PNT timing study, identifying potential solutions for the specific aviation capability gaps related to PNT that were identified. Continue to provide subject matter expertise to various platforms (including MQ-4C, MQ-25, RQ-21) as they consider various AJ solutions. Continue developmental effort for AJ capability on MQ-8C to include hardware and software integration of MAGNA-I and commence preparations for testing. Commence integration efforts for MAGNA-I on AH-1Z, UH-1Y helicopters to include heat sink and environmental testing, Non-Recurring Engineering (NRE) for platform interface modifications; software development, integration testing, and hardware integration.					
FY 2022 Base Plans: Continue to support A-PNT efforts by working with Navy Air platforms on navigation requirements and coordinating with surface Navy platforms to leverage synergies. Continue Global Positioning System (GPS) Demonstrations and laboratory testing of GPS receivers with associated antennas at Facilities for Antenna and Radar Cross Section (RCS) Measurements (FARM), to include completing the lab testing/ antenna demonstrations of High-Integrity GPS Aided Inertial Navigation System (HI-GAINS) on RQ-21A and Scan Eagle. Continue to compare various Anti-Jam (AJ) antenna solution performance.					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Continue to provide subject matter expertise to various platforms (including MQ-4C, MQ-25, RQ-21, F/A-18C/D) as they consider various anti-jam solutions. Complete Non-Recurring Engineering (NRE) integration efforts for Multi-Platform AJ GPS Navigation Antenna Integrated (MAGNA-I) on AH-1Z, UH-1Y helicopters to include for platform interface modifications; software development, integration testing, and hardware integration. Complete aviation Assured-Positioning, Navigation and Timing (A-PNT) timing study, identifying potential solutions for the specific aviation capability gaps related to PNT that were identified. Continue ground testing for UH-1Y/AH-1Z and commence flight testing. Procure 4 MAGNA-I antennas to support FY 2023 Validation and Verification on UH-1Y/AH-1Z. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding decrease of $3.545 million from FY21 to FY22 due to MQ-8C anti-jam efforts shifting to PMA 266 for final testing, procurements and installation.					
Title: Global Positioning System (GPS) Modernization	26.642	21.904	20.081	0.000	20.081
Articles:	-	26	-	-	-
Description: Global Positioning System (GPS) Modernization delivers increased GPS AJ protection through modernized GPS receivers that will utilize the new Military Code (M-Code) GPS Signal in Space, incorporate enhanced cryptology, enable blue force GPS electronic attack, deliver greater position and time accuracy, and provide improved protection against signal spoofing as compared to legacy receivers. This project funds the Navy's integration of M-Code capable GPS receivers being developed by the United States Space Force (USSF) GPS Directorate into various receivers on Navy air platforms. This effort supports Navy's compliance with Public Law 111-383, which requires that all GPS user equipment be capable of receiving the new GPS M-Code signal after FY 2017.					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
To meet the Navy's mandate, system engineering and requirement development efforts must begin before actual delivery of Military GPS User Equipment (MGUE). The integration timeline of modernized GPS receivers is 5+ years from planning to test and is dependent on platform type. Each platform uses a unique GPS receiver, and has a unique GPS system configuration, which requires separate parallel efforts to include software updates to avionics and mission computers as well as modifications to the airframe based on Size, Weight and Power and Cost (SWaP-C) requirements; coordination with each Program Management Air (PMA) organization; management, oversight and support of the effort; and contracting and working with the identified Prime Vendor Integrator for the platform. Project currently consists of six (6) parallel efforts that integrate two (2) different M-Code GPS receivers into six (6) different type model series aircraft. ***FY 2021 Plans:*** Continue to support Prime Vendor Integration (PVI) and testing of Miniaturized Airborne GPS receiver 2000-Modernization (MAGR2K-M) GPS Receivers on three (3) air platforms: MV-22B, CMV-22B, and E-6B. MAGR2K-M GPS Receivers required minimal enhanced functionality and kept the same aviation form factor as the legacy MAGR2K-S receivers. Due to the developmental complexity of EGI-M GPS Receivers, PVI and testing of EGI-M GPS Receivers will be delayed in order to incorporate enhanced capabilities as required by the Embedded GPS Inertial-Military Code (M-Code) (EGI-M) System Requirements Document (SRD). FY 2021 will continue integration efforts of EGI-M GPS Receivers for six (6) air platforms: F/A-18E, F/A-18F, EA-18G, E-2D, MH-60 R/S, and CH-53K. Continue teaming with the USSF to determine the feasibility of using a Janus Software Defined Radio (SDR) as a GPS Receiver Card and continue to study opportunities to incorporate improvements into GPS receivers. Continue GPS Modernization efforts on the following three (3) air platforms, MV-22B, CMV-22B, and E-6B, which require MAGR2K-M receivers: - Begin PVI for MV-22B, CMV-22B, and E-6B. - Support USSF box level M-Code GPS receiver performance and certification testing. - Continue development of aircraft software modifications required for integrating M-Code GPS receivers into aircraft. - Continue laboratory testing of M-Code receivers in government and vendor aircraft systems integration labs. - Provide overarching management, central coordination, government oversight and guidance, shared expertise, and engineering support to ensure aircraft performance and integration requirements are supported during M-Code receiver platform integration.					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Continue GPS Modernization efforts on the following six (6) air platforms: F/A-18E, F/A-18F, EA-18G, E-2D, MH-60 R/S, and CH-53K, which require Embedded GPS/Inertial Navigation System (INS) (EGI) type of GPS receivers. - Support USSF box level M-Code GPS receiver performance and certification testing. - Continue supporting Systems Engineering and Technical Reviews (SETR) to include Integrated Baseline Review and Critical Design Review (CDR) for aircraft software development efforts for all air platforms. - Continue hardware and software M-Code integration efforts to include Systems Requirement Review (SRR), structural analysis, electrical power load analysis, human engineering, product support analysis, and product support review of Engineering & Manufacturing Development (EMD) Contract Data Requirements List (CDRL) deliverables. - Continue laboratory testing of M-Code receivers in E-2D aircraft systems integration labs. - Continue E-2D integration efforts to include: electromagnetic interference (EMI) impact testing, integrated master schedule (IMS) planning, and technical information meetings (TIM). - Procure test article receivers to provide production representative M-Code receivers for laboratory testing for E-2D, CH-53K, AH-1Y, and UH-1Z. - Continue F/A-18E, F/A-18F, EA-18G, and E-2D integration efforts to include: review of requirements and design documentation, risk management, systems engineering integration, and system integration laboratory (SIL) standup. - Continue CH-53K missionization that will leverage Positioning, Navigation, and Timing (PNT) Program Office (PO) contracts to develop missionize CH-53K specific requirements for EGI-M integration. - Provide overarching management, central coordination, government oversight and guidance, shared expertise, and engineering support to ensure aircraft performance and integration requirements are supported during M-Code receiver development. - Continue to study the feasibility to use Janus Software Design Receiver (SDR) for GPS receiver cards. - Begin studies for the MH-60R/S SRD (System Requirements Document) to support M-Code integration. ***FY 2022 Base Plans:*** Continue to support PVI and testing of Miniaturized Airborne GPS receiver 2000-Modernization (MAGR2K-M) GPS Receivers on three (3) air platforms: MV-22B, CMV-22B, and E-6B. MAGR2K-M GPS Receivers required minimal enhanced functionality and kept the same aviation form factor as the legacy MAGR2K-S receivers. Due to the developmental complexity of EGI-M GPS Receivers, PVI and testing of EGI-M GPS Receivers will be delayed in order to incorporate enhanced capabilities as required by the EGI-M System Requirements Document					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
(SRD). FY 2022 will continue integration efforts of EGI-M GPS Receivers for six (6) air platforms: F/A-18E, F/A-18F, EA-18G, E-2D, MH-60 R/S, and CH-53K. Continue teaming with the United States Space Force (USSF) to determine the feasibility of using a Janus SDR as a GPS Receiver Card and continue to study opportunities to incorporate improvements into GPS receivers. Continue GPS Modernization efforts on the following three (3) air platforms, MV-22B, CMV-22B, and E-6B, which require Miniaturized Airborne GPS receiver 2000-Modernization (MAGR2K-M) receivers: - Continue PVI for MV-22B, CMV-22B and E-6B. - Support USSF box level M-Code GPS receiver performance and certification testing. - Continue development of aircraft software modifications required for integrating M-Code GPS receivers into aircraft. - Continue laboratory testing of M-Code receivers in government and vendor aircraft systems integration labs. - Provide overarching management, central coordination, government oversight and guidance, shared expertise, and engineering support to ensure aircraft performance and integration requirements are supported during M-Code receiver platform integration. Continue GPS Modernization efforts on the following six (6) air platforms: F/A-18E, F/A-18F, EA-18G, E-2D, MH-60 R/S, and CH-53K. These platforms require Embedded GPS/Inertial Navigation System (INS) (EGI) type of GPS receivers. - Begin PVI for F/A-18E/F, EA-18G. - Support USSF box level M-Code GPS receiver performance and certification testing. - Continue supporting Systems Engineering and Technical Reviews (SETR) to include Integrated Baseline Review and Critical Design Review (CDR) for aircraft software development efforts for all air platforms. - Continue hardware and software M-Code integration efforts to include Systems Requirement Review (SRR), structural analysis, electrical power load analysis, human engineering, product support analysis, and product support review of Engineering & Manufacturing Development (EMD) Contract Data Requirements List (CDRL) deliverables. - Continue laboratory testing of M-Code receivers in E-2D aircraft systems integration labs. - Continue E-2D integration efforts to include: EMI impact testing, IMS planning, and TIM. - Continue F/A-18E, F/A-18F, EA-18G, and E-2D integration efforts to include: review of requirements and design documentation, risk management, systems engineering integration, and system integration laboratory (SIL) standup.					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
- Continue CH-53K missionization that will leverage Positioning, Navigation, and Timing (PNT) Program Office (PO) contracts to develop missionize CH-53K specific requirements for EGI-M integration. - Provide overarching management, central coordination, government oversight and guidance, shared expertise, and engineering support to ensure aircraft performance and integration requirements are supported during M-Code receiver development. - Continue to study the feasibility to use Janus SDR for GPS receiver cards. - Procure test article receivers to provide production representative M-Code receivers for laboratory testing for F/A-18E/F and EA-18G. - Complete studies for the MH-60 R/S System Requirements Document (SRD) to support M-Code integration. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Funding decrease of $1.823 million from FY 2021 to FY 2022 due to the completion of the procurement of test asset receivers for E-2D and helicopters.					
Accomplishments/Planned Programs Subtotals	50.971	51.590	28.903	0.000	28.903

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/2657: *NAVSTAR GPS Receivers (Space)*	23.294	38.043	33.097	-	33.097	-	-	-	-	-	-
• APN/0577: *Common Avionics Changes*	82.924	123.416	118.839	-	118.839	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

Both the Navigation Warfare (NAVWAR) Air and Sea programs will continue to integrate improved Anti-Jam (AJ) capability onto air and sea platforms and ensure compatibility with new M-Code signal.

GPS - based Positioning, Navigation, and Timing (PNT) Service (GPNTS) program will develop, acquire, and field GPNTS, a scalable Selective Availability/Anti-Spoofing Module (SAASM) GPS-based service-oriented architecture PNT system that will provide an open, extensible, modernized replacement for the current fleet

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PNT systems. GPNTS will also integrate Military GPS User Equipment (MGUE) and the Office of Naval Research (ONR) developed Non-GPS Aided Positioning for Surface Ships (NoGAPSS) capabilities. A firm fixed price contract was awarded March 2018 to procure Low Rate Initial Production (LRIP) and Full Rate Production (FRP) systems.

Global Position System (GPS) Modernization will manage the non-recurring engineering required to conduct systems engineering, integration and test of modernized GPS receivers and utilize United States Space Force (USSF) hardware contracts, and Navy air platform integration contracts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 0921 / *NAVSTAR GPS Equipment*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air NAVWAR Development	MIPR	Mayflower : Bedford, MA	0.000	2.319	Feb 2020	0.600	Feb 2021	1.690	Feb 2022	-		1.690	-	-	-
Air NAVWAR Development Support	WR	NAWC : Pax River, MD	0.000	1.795	Nov 2019	2.071	Nov 2020	0.000		-		0.000	-	-	-
Air NAVWAR Govt Eng Support	WR	NAWC : Pax River, MD	0.000	0.652	Dec 2019	2.292	Dec 2020	1.189	Dec 2021	-		1.189	-	-	-
Air NAVWAR Systems Engineering	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.250	Nov 2020	0.000		-		0.000	-	-	-
Air NAVWAR Product Development	WR	GPS Directorate : Los Angeles, CA	0.000	0.248	Dec 2019	0.247	Dec 2020	0.194	Dec 2021	-		0.194	-	-	-
Sea NAVWAR Development Support	WR	SSC PAC, NUWC : San Diego, Newport	0.000	0.362	Dec 2019	0.420	Dec 2020	0.347	Dec 2021	-		0.347	-	-	-
GPNTS SW / NoGAPSS Development	C/CPFF	Raytheon : San Diego, CA	0.000	6.427	Jan 2020	6.173	Jan 2021	0.000		-		0.000	-	-	-
GPNTS Development Support	WR	NIWC PAC : San Diego, CA	0.000	1.365	Dec 2019	1.065	Dec 2020	0.000		-		0.000	-	-	-
GPNTS Govt Eng Support	WR	NIWC PAC : San Diego, CA	0.000	1.800	Dec 2019	1.378	Dec 2020	1.558	Dec 2021	-		1.558	-	-	-
GPS Mod Development F/A-18E, F/A-18F, EA-18G ANAV-M	C/CPIF	Boeing : St Louis, MO	0.000	0.000		0.137	Dec 2020	1.725	Dec 2021	-		1.725	-	-	-
GPS Mod Development E-2D	C/CPIF	Northup Gruman : Pax River, MD	0.000	0.000		1.167	Nov 2020	0.300	Nov 2021	-		0.300	-	-	-
GPS Mod Development MV-22B,CMV-22B	C/CPIF	Bell Boeing : Amarillo, TX	0.000	0.000		5.747	Feb 2021	1.790	Feb 2022	-		1.790	-	-	-
GPS Mod Development CH-53K	C/CPIF	Sikorsky : Stratford, CT	0.000	0.884	Nov 2019	2.783	Nov 2020	3.000	Nov 2021	-		3.000	-	-	-
GPS Mod Development MH-60	C/CPIF	Lockheed Martin : Owego, NY	0.000	0.000		1.466	Apr 2021	0.500	Nov 2021	-		0.500	-	-	-
GPS Mod Development Support	WR	NIWC PAC, NAWC : San Diego, Pax River	0.000	1.244	Nov 2019	3.088	Nov 2020	0.000		-		0.000	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 0921 / *NAVSTAR GPS Equipment*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS Mod Govt Eng Support	WR	NIWC PAC, NAWC : San Diego, Pax River	0.000	18.934	Nov 2019	0.858	Nov 2020	0.519	Nov 2021	-		0.519	-	-	-
GPS Mod Product Development	WR	GPS Directorate : Los Angeles, CA	0.000	0.478	Dec 2019	0.965	Dec 2020	0.797	Dec 2021	-		0.797	-	-	-
GPS Mod Product Development	C/CPIF	Honeywell : Clearwater, FL	0.000	0.000		0.000		3.776	Jan 2022	-		3.776	-	-	-
		Subtotal	0.000	36.508		30.707		17.385		-		17.385	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contract Engineering Services	C/CPAF	BAH : San Diego, Pax River, China Lake	0.000	1.425	Nov 2019	1.350	Nov 2020	1.191	Nov 2021	-		1.191	-	-	-
Enginering Services	WR	NIWC PAC, NAWC : San Diego, Pax River	0.000	1.253	Nov 2019	1.839	Nov 2020	3.674	Nov 2021	-		3.674	-	-	-
Integrated Logistics Support	WR	NIWC PAC, NAWC : San Diego, Pax River	0.000	1.788	Dec 2019	1.500	Dec 2020	2.078	Dec 2021	-		2.078	-	-	-
Software Contract Support	C/CPFF	Raytheon : San Diego	0.000	2.553	Nov 2019	6.300	Nov 2020	0.000		-		0.000	-	-	-
		Subtotal	0.000	7.019		10.989		6.943		-		6.943	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air NAVWAR Test & Evaluation	WR	NAWC : Pax River	0.000	0.718	Nov 2019	2.704	Nov 2020	1.400	Nov 2021	-		1.400	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Sea NAVWAR Test & Evaluation	WR	NIWC PAC, NUWC : San Diego, Newport	0.000	2.000	Nov 2019	1.935	Nov 2020	0.000		-		0.000	-	-	-
GPNTS Test & Evaluation	WR	NIWC PAC : San Diego	0.000	1.100	Nov 2019	1.100	Nov 2020	0.351	Nov 2021	-		0.351	-	-	-
GPS Mod Test & Evaluation	WR	NIWC PAC, NAWC : San Diego, Pax River	0.000	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	0.000	3.818		5.739		1.751		-		1.751	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPAF	BAH : San Diego, Pax River, China Lake	0.000	3.626	Nov 2019	4.155	Nov 2020	2.824	Nov 2021	-		2.824	-	-	-
		Subtotal	0.000	3.626		4.155		2.824		-		2.824	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	50.971		51.590		28.903		-		28.903	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

SEA NAVWAR

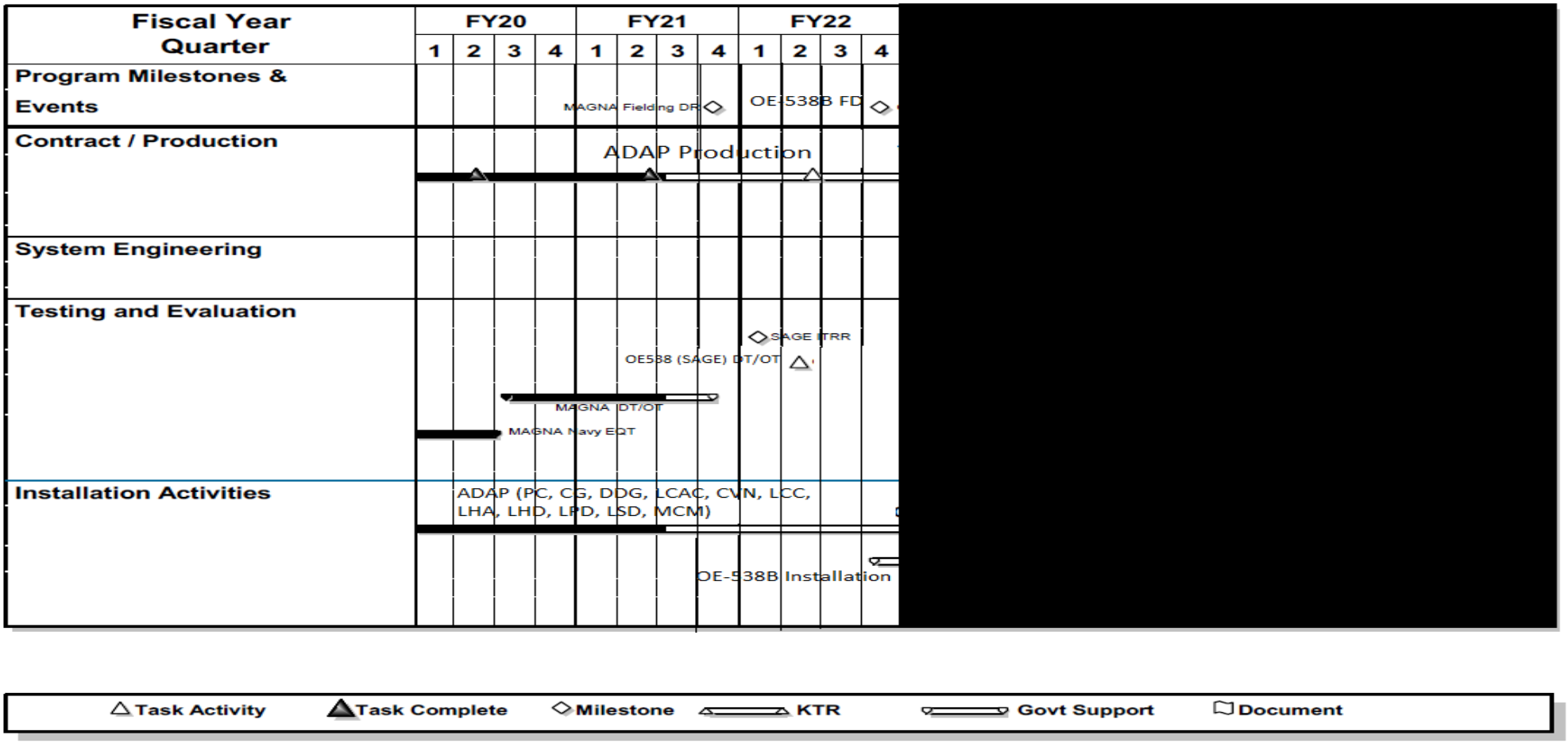


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

GPNTS Program

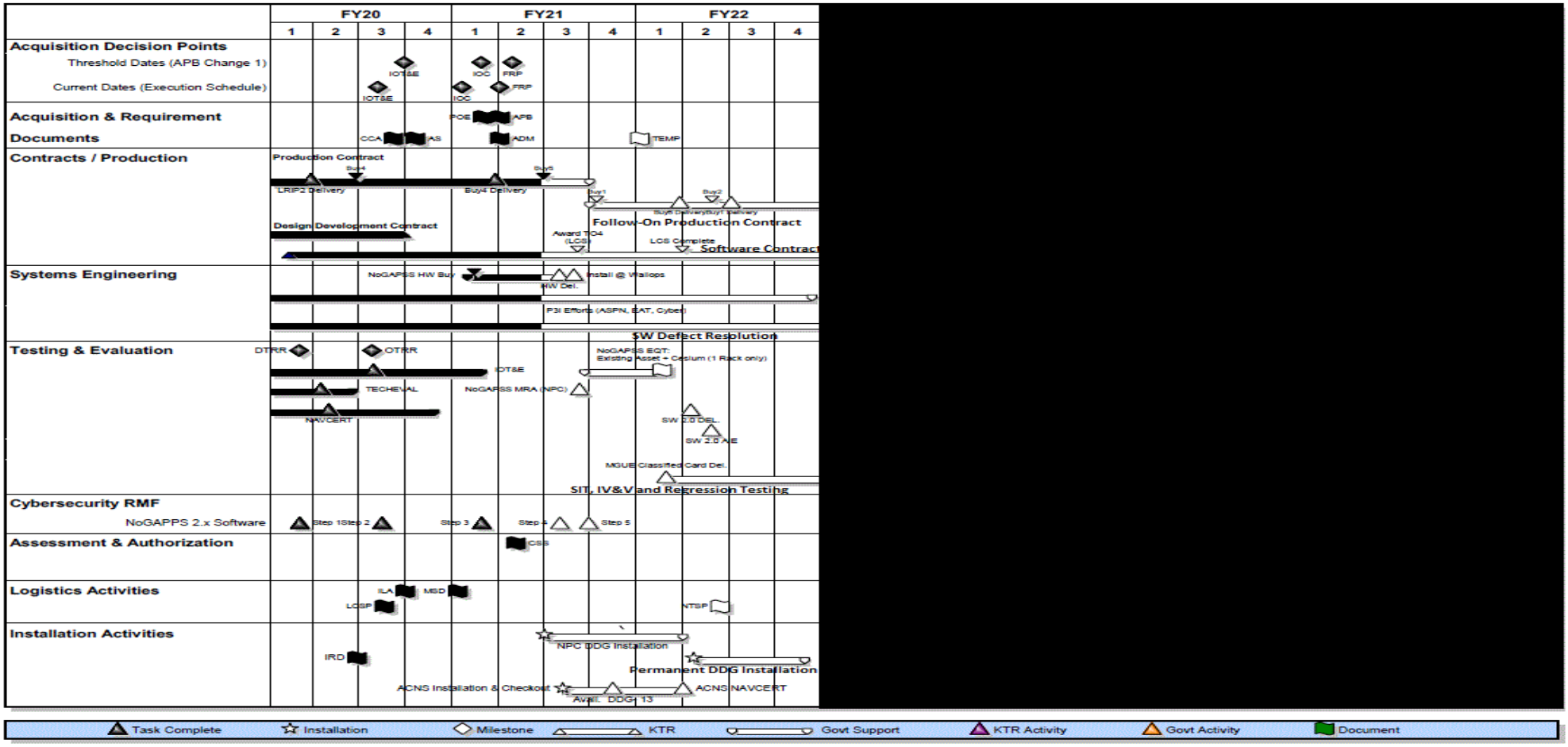


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

Air Navigation Program Schedule

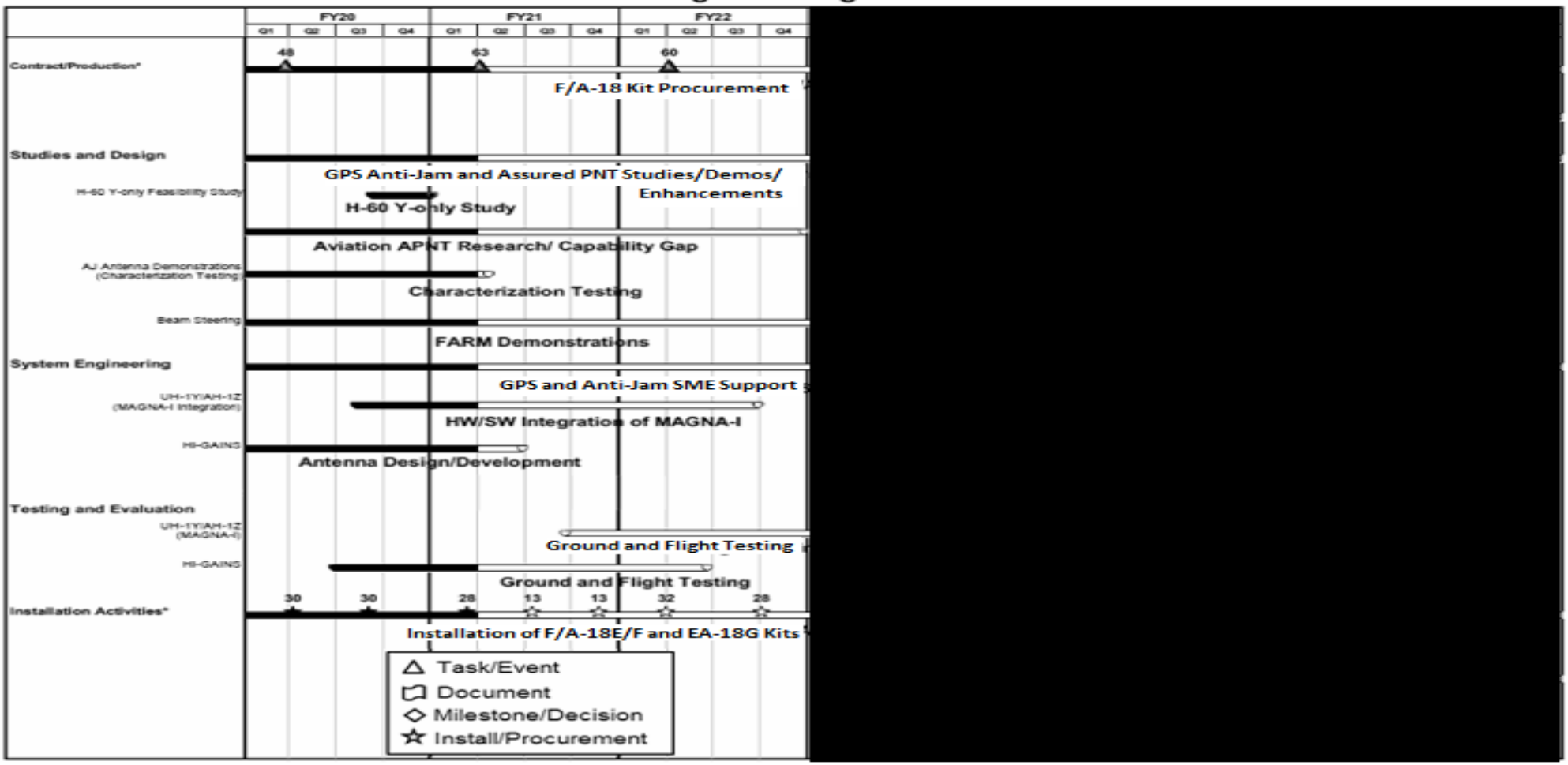
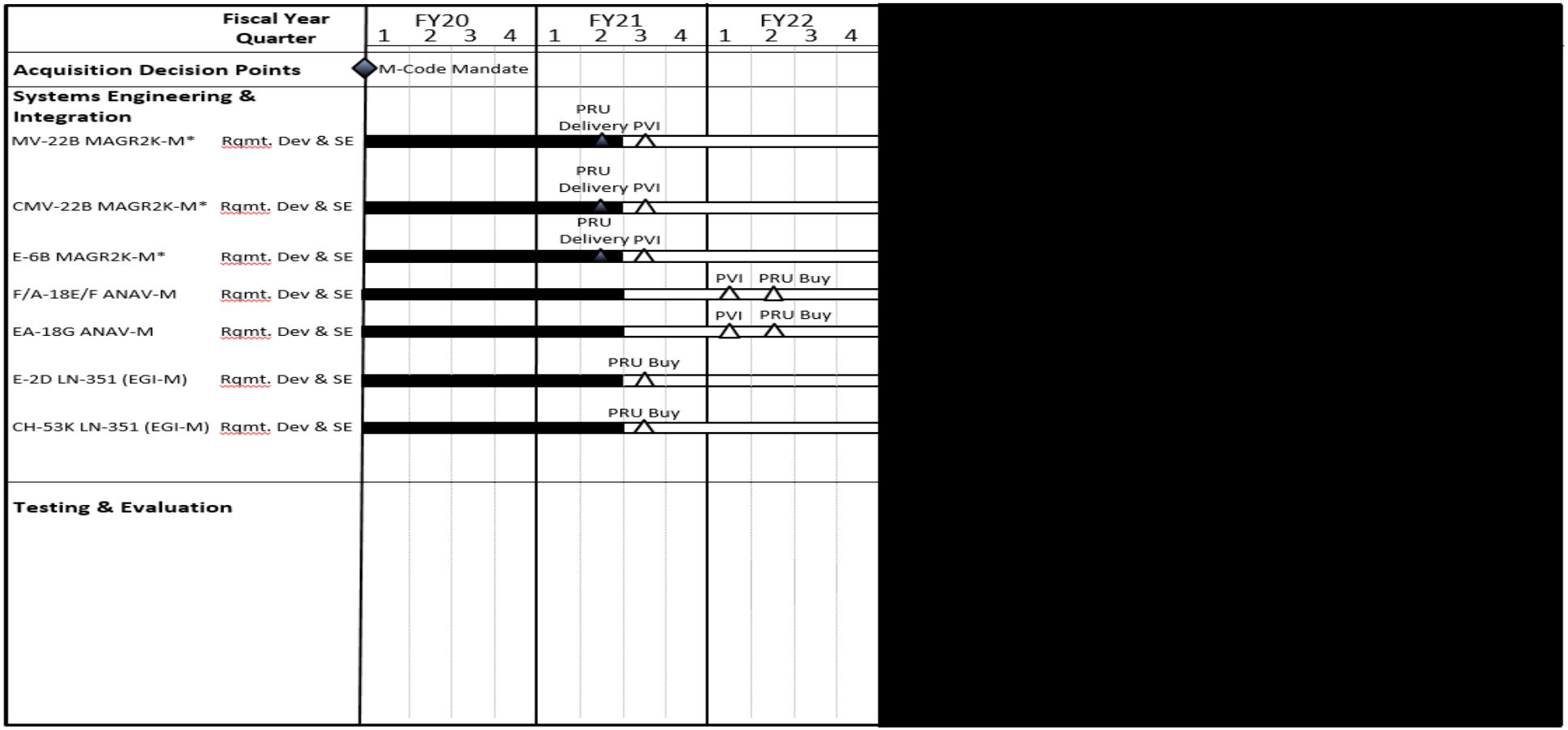


Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

GPS Modernization



- * MAGR-2K-M PRUs were bought in FY17

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 0921				
Sea NAVWAR: Sea Navigation MAGNA Fielding Decision	4	2021	4	2021
Sea NAVWAR: Sea Navigation OE-538B Fielding Decision	4	2022	4	2022
Sea NAVWAR: Sea Navigation ADAP Production	1	2020	4	2022
Sea NAVWAR: Sea Navigation ADAP Production Contract Award (FY20)	2	2020	2	2020
Sea NAVWAR: Sea Navigation ADAP Production Contract Award (FY21)	2	2021	2	2021
Sea NAVWAR: Sea Navigation ADAP Production Contract Award (FY22)	2	2022	2	2022
Sea NAVWAR: Sea Navigation OE-538B (SAGE) Internal Test Readiness Review (ITRR)	1	2022	1	2022
Sea NAVWAR: Sea Navigation OE-538B (SAGE) Development & Operational Test (DT/OT)	2	2022	2	2022
Sea NAVWAR: Sea Navigation MAGNA DT/OT	3	2020	4	2021
Sea NAVWAR: Sea Navigation MAGNA Navy EQT	1	2020	3	2020
Sea NAVWAR: Sea Navigation ADAP Installations	1	2020	4	2022
Sea NAVWAR: Sea Navigation OE-538B (SAGE) Installations	4	2022	4	2022
GPS-based PNT Service (GPNTS): GPNTS IOT&E Threshold Date (APB Change 1)	3	2020	3	2020
GPS-based PNT Service (GPNTS): GPNTS Initial Operational Capability (IOC) Threshold Date (APB Change 1)	1	2021	1	2021
GPS-based PNT Service (GPNTS): GPNTS Full Rate Production (FRP) Threshold Date (APB Change 1)	2	2021	2	2021
GPS-based PNT Service (GPNTS): GPNTS IOT&E Current Date (Execution Schedule)	3	2020	3	2020
GPS-based PNT Service (GPNTS): GPNTS Initial Operational Capability (IOC) Current Date (Execution Schedule)	1	2021	1	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GPS-based PNT Service (GPNTS): GPNTS Full Rate Production (FRP) Current Date (Execution Schedule)	1	2021	1	2021
GPS-based PNT Service (GPNTS): GPNTS POE	1	2021	1	2021
GPS-based PNT Service (GPNTS): GPNTS APB	1	2021	1	2021
GPS-based PNT Service (GPNTS): GPNTS CCA	3	2020	3	2020
GPS-based PNT Service (GPNTS): GPNTS AS	4	2020	4	2020
GPS-based PNT Service (GPNTS): GPNTS ADM	1	2021	1	2021
GPS-based PNT Service (GPNTS): GPNTS TEMP	1	2022	1	2022
GPS-based PNT Service (GPNTS): GPNTS Production Contract (LRIP)	1	2020	3	2021
GPS-based PNT Service (GPNTS): GPNTS Follow On Production Contract (FRP)	4	2021	4	2022
GPS-based PNT Service (GPNTS): GPNTS Buy 4 (LRIP)	2	2020	2	2020
GPS-based PNT Service (GPNTS): GPNTS Buy 5 (LRIP)	2	2021	2	2021
GPS-based PNT Service (GPNTS): GPNTS Buy 1 (FRP)	4	2021	4	2021
GPS-based PNT Service (GPNTS): GPNTS Buy 2 (FRP)	2	2022	2	2022
GPS-based PNT Service (GPNTS): GPNTS Design Development Contract	1	2020	3	2020
GPS-based PNT Service (GPNTS): GPNTS Software Contract	1	2020	4	2022
GPS-based PNT Service (GPNTS): TO4 (LCS) Award	3	2021	3	2021
GPS-based PNT Service (GPNTS): LCS Complete	1	2022	1	2022
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS Production Contract	1	2021	3	2021
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS HW Buy	1	2021	1	2021
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS HW Delivery	3	2021	3	2021
GPS-based PNT Service (GPNTS): GPNTS Install at Wallops	3	2021	3	2021
GPS-based PNT Service (GPNTS): GPNTS P3I Efforts	1	2020	4	2022
GPS-based PNT Service (GPNTS): GPNTS SW Defect Resolution	1	2020	4	2022
GPS-based PNT Service (GPNTS): GPNTS DTRR	1	2020	1	2020
GPS-based PNT Service (GPNTS): GPNTS OTRR	3	2020	3	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GPS-based PNT Service (GPNTS): GPNTS Initial Operational Test and Evaluation (IOT&E)	1	2020	1	2021
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS EQT	4	2021	1	2022
GPS-based PNT Service (GPNTS): GPNTS TECH EVAL	1	2020	2	2020
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS MRA (NPC)	3	2021	3	2021
GPS-based PNT Service (GPNTS): GPNTS NAVCERT	1	2020	4	2020
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS SW 2.0 DEL	2	2022	2	2022
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS AIE	2	2022	2	2022
GPS-based PNT Service (GPNTS): GPNTS MGUE SIT, IV&V and Regression Testing	1	2022	4	2022
GPS-based PNT Service (GPNTS): GPNTS MGUE Classified Card Delivery	1	2022	1	2022
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS 2.x Software Step 1	1	2020	1	2020
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS 2.x Software Step 2	3	2020	3	2020
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS 2.x Software Step 3	1	2021	1	2021
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS 2.x Software Step 4	3	2021	3	2021
GPS-based PNT Service (GPNTS): GPNTS NoGAPSS 2.x Software Step 5	4	2021	4	2021
GPS-based PNT Service (GPNTS): GPNTS CSS	2	2021	2	2021
GPS-based PNT Service (GPNTS): GPNTS ILA	4	2020	4	2020
GPS-based PNT Service (GPNTS): GPNTS MSD	1	2021	1	2021
GPS-based PNT Service (GPNTS): GPNTS LCSP	3	2020	3	2020
GPS-based PNT Service (GPNTS): GPNTS NTSP	2	2022	2	2022
GPS-based PNT Service (GPNTS): GPNTS NPC DDG Installation	3	2021	1	2022
GPS-based PNT Service (GPNTS): GPNTS IRD	3	2020	3	2020
GPS-based PNT Service (GPNTS): GPNTS Permanent DDG Installation	2	2022	4	2022
GPS-based PNT Service (GPNTS): GPNTS ACNS Installation & Checkout	3	2021	1	2022
GPS-based PNT Service (GPNTS): GPNTS Avail DDG-113	4	2021	4	2021
GPS-based PNT Service (GPNTS): GPNTS ACNS NAVCERT	1	2022	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Air NAVWAR: Air Navigation F/A-18 Kit Procurement Contract	1	2020	4	2022
Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2020	2	2020	2	2020
Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2021	2	2021	2	2021
Air NAVWAR: Air Navigation F/A-18 Kit Procurement 2022	2	2022	2	2022
Air NAVWAR: Air Navigation GPS Anti-Jam and Assured PNT Studies/Demos/ Enhancements	1	2020	4	2022
Air NAVWAR: Air Navigation H-6U Y-only Study	3	2020	4	2020
Air NAVWAR: Air Navigation Aviation A-PNT Market Research/Capability Gap	1	2020	4	2022
Air NAVWAR: Air Navigation Characterization Testing	1	2020	2	2021
Air NAVWAR: Air Navigation FARM Demonstrations	1	2020	4	2022
Air NAVWAR: Air Navigation GPS and Anti-Jam SME Support	1	2020	4	2022
Air NAVWAR: Air Navigation HW/SW Integration of MAGNA-I on UH-1Y/AH-1Z	3	2020	3	2022
Air NAVWAR: Air Navigation HI-GAINS Antenna Design/Development	1	2020	2	2021
Air NAVWAR: Air Navigation UH-1Y/AH-1Z MAGNA-I Ground and Flight Testing	4	2021	4	2022
Air NAVWAR: Air Navigation HI-GAINS Ground and Flight Testing	3	2020	2	2022
Air NAVWAR: Air Navigation Installation of F/A-18E/F & EA-18G Kits	1	2020	4	2022
Air NAVWAR: GPS Modernization: GPS Modernization M-Code Mandate	1	2020	1	2020
Air NAVWAR: GPS Modernization: GPS Modernization MV-22B MAGR2K-M Rqmt. Dev & SE	1	2020	4	2022
Air NAVWAR: GPS Modernization: GPS Modernization MV-22B MAGR2K-M Prime Vendor Integration (PVI)	3	2021	3	2021
Air NAVWAR: GPS Modernization: GPS Modernization MV-22B MAGR2K-M PRU Delivery 1	2	2021	2	2021
Air NAVWAR: GPS Modernization: GPS Modernization CMV-22B MAGR2K-M Rqmt. Dev & SE	1	2020	4	2022
Air NAVWAR: GPS Modernization: GPS Modernization CMV-22B MAGR2K-M PVI	3	2021	3	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 0921 / *NAVSTAR GPS Equipment*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Air NAVWAR: GPS Modernization: GPS Modernization CMV-22B MAGR2K-M PRU Delivery 1	2	2021	2	2021
Air NAVWAR: GPS Modernization: GPS Modernization E-6B MAGR2K-M Rqmt. Dev & SE	1	2020	4	2022
Air NAVWAR: GPS Modernization: GPS Modernization E-6B MAGR2K-M PRU Delivery	2	2021	2	2021
Air NAVWAR: GPS Modernization: GPS Modernization E-6B MAGR2K-M PVI	3	2021	3	2021
Air NAVWAR: GPS Modernization: GPS Modernization F/A-18E/F ANAV-M Rqmt. Dev & SE	1	2020	4	2022
Air NAVWAR: GPS Modernization: GPS Modernization F/A-18E/F ANAV-M PVI	1	2022	1	2022
Air NAVWAR: GPS Modernization: GPS Modernization F/A-18E/F ANAV-M PRU Buy	2	2022	2	2022
Air NAVWAR: GPS Modernization: GPS Modernization E-18G ANAV-M Rqmt. Dev & SE	1	2020	4	2022
Air NAVWAR: GPS Modernization: GPS Modernization E-18G ANAV-M PVI	1	2022	1	2022
Air NAVWAR: GPS Modernization: GPS Modernization E-18G ANAV-M PRU Buy	2	2022	2	2022
Air NAVWAR: GPS Modernization: GPS Modernization E-2D LN-351 Rqmt. Dev & SE	1	2020	4	2022
Air NAVWAR: GPS Modernization: GPS Modernization E-2D LN-351 PRU Buy	3	2021	3	2021
Air NAVWAR: GPS Modernization: GPS Modernization CH-53K LN-351 Rqmt. Dev & SE	1	2020	4	2022
Air NAVWAR: GPS Modernization: GPS Modernization CH-53K LN-351 PRU Buy	3	2021	3	2021

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*				Project (Number/Name) 1411 / *Sub Tact Comm System*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
1411: *Sub Tact Comm System*	0.000	13.038	14.245	13.575	-	13.575	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. The details of S3S within project 1411 are classified.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Common Submarine Radio Room (CSRR)	9.154	10.410	10.412	0.000	10.412
Articles:	-	-	-	-	-
FY 2021 Plans: The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
FY 2022 Base Plans: N/A					
FY 2022 OCO Plans: N/A					
FY 2021 to FY 2022 Increase/Decrease Statement: The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
Title: Undersea Assured Command & Control (UAC2)	0.318	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
FY 2021 Plans: N/A					
FY 2022 Base Plans: N/A					
FY 2022 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
Title: Link 16	3.266	2.422	3.163	0.000	3.163
Articles:	-	-	-	-	-
FY 2021 Plans: The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 Base Plans:*** N/A ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.					
Title: S3S	0.300	1.413	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: Detailed information available at a higher classification. ***FY 2021 Plans:*** The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 Base Plans:*** The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** No S3S RDTEN funds required in FY22.					
Accomplishments/Planned Programs Subtotals	13.038	14.245	13.575	0.000	13.575

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/3130: *Submarine Communication Equipment*	60.055	62.214	65.950	-	65.950	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 1411 / *Sub Tact Comm System*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	9.832	Dec 2019	9.844	Dec 2020	9.892	Dec 2021	-		9.892	-	-	-
S3S Platform Integration	MIPR	Army/TSMO : Redstone Arsenal, AL	0.000	0.300	Sep 2020	1.413	Sep 2021	0.000		-		0.000	-	-	-
		Subtotal	0.000	10.132		11.257		9.892		-		9.892	-	-	N/A

Remarks

- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	1.837	Nov 2019	1.913	Nov 2020	2.147	Nov 2021	-		2.147	-	-	-
		Subtotal	0.000	1.837		1.913		2.147		-		2.147	-	-	N/A

Remarks

- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	0.120	Nov 2019	0.199	Nov 2020	0.230	Nov 2021	-		0.230	-	-	-
		Subtotal	0.000	0.120		0.199		0.230		-		0.230	-	-	N/A

Remarks

- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified	TBD	Not Specified : Not Specified	0.000	0.949	Nov 2019	0.876	Nov 2020	1.306	Nov 2021	-		1.306	-	-	-
		Subtotal	0.000	0.949		0.876		1.306		-		1.306	-	-	N/A

Remarks

- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	13.038		14.245		13.575		-		13.575	-	-	N/A

Remarks

- The details of Program Element 0604280N, Project 1411 are classified SECRET//NOFORN and are submitted to Congress in the classified budget justification books.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 1411 / *Sub Tact Comm System*

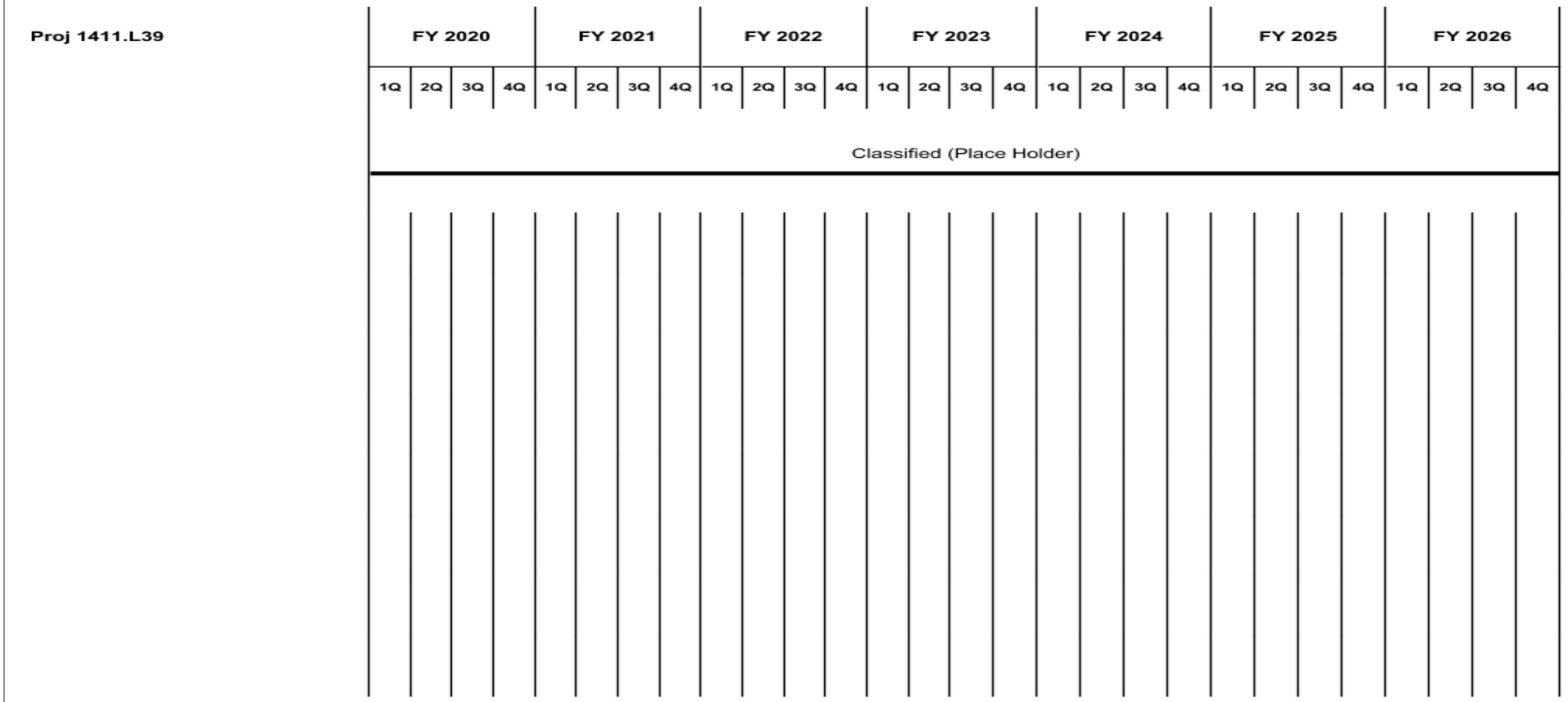

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
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Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 1411.L39				
Classified (Place Holder)	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy									Date: May 2021			
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*				Project (Number/Name) 2126 / *ATDLS Integration*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
2126: *ATDLS Integration*	0.000	21.000	18.565	22.922	-	22.922	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops and improves the Navy's Tactical Data Link (TDL) systems. It includes the Advanced Tactical Data Link Systems (ATDLS) Integration Programs, specifically Link 16 Network, Command and Control Processor (C2P) and Link Monitoring and Management Tool (LMMT).

ATDLS Integration Program develops new and improved capabilities for Navy TDL users. The ATDLS Integration Programs perform technical analyses and engineering efforts associated with implementation of new technology to enable rapid introduction of new products and technology, prevent obsolescence, and end of support issues. The programs insert new technology enhancements via incremental software & hardware upgrades and deliver as annual build release.The Navy Link 16 Network Increment II consists of Dynamic Network Management (DNM), Cryptographic Modernization (CM) and Frequency Remapping (FR). C2P is a critical component of the shipboard combat system enabling tactical data link integration with the combat systems. C2P is a critical component of the Aegis Ballistic Missile Defense (BMD) architecture. C2P Technology Refresh (TR) will modernize obsolete C2P system hardware components and improve C2P system cyber security posture. C2P Modernization (MOD) is a service life extension effort required to sustain C2P system viability and significantly improve its cyber resiliency. C2P MOD modernizes the legacy C2P system software to enable improved cyber resiliency, improved system operational availability and the ability to run in multiple hardware environments. Link 22 development and integration into the C2P allows for improved maritime tactical data link operations with coalition forces. LMMT will upgrade commercial off-the-shelf hardware and modernize software operating systems. LMMT will perform monitoring and management of all TDL and provide information in support of the Integrated Air & Missile Defense (IAMD) and Ballistic Missile Defense (BMD) missions.

Link 16 Network Increment II: (1) Develop and implement CM and FR mandates as a product improvement into existing legacy JTIDS and MOS terminals and integration into Link 16 terminals, shore sites, ship (NGC2P, Next Generation Command and Control Processor), and current Navy Joint Tactical Information Distribution System (JTIDS) airborne platforms; (2) Developmental Testing (DT) / Operational Testing (OT) of Navy platform CM/FR modifications; (3) provide product improvement for continued production capability Multifunctional Information Distribution System (MIDS) on Ship (MOS) Modernization (MOS Mod) and extensibility to new Tactical Data Link capabilities of shipboard Link 16 terminals, (4) qualification of replacement shipboard Link 16 antenna to replace end of life existing antenna. JTIDS, MOS CM/FR, and MOS Mod efforts are in support of NSA and Joint Chiefs of Staff mandates for the modernization of the cryptographic algorithm used in Link 16 terminals, and the Department of Defense and the Department of Transportation Memorandum of Agreement for the implementation of a capability to remap any 14 of the existing 51 frequencies in order to remain operable within the United States and its possessions. All Link 16 terminals are required to have this capability to support Link 16 Interoperability.

FY2022 Justification (Link 16): FY22 funds provided for contractor qualification for the MIDS J BU3 terminal with 1553 ship interface. MIDS J BU3 terminal with 1553 ship interface was developed as a replacement for MIDS J BU2 which will be obsolete

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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Command and Control Processor (C2P): The two RDT&E initiatives are 1) C2P Technology Refresh (TR) cyber security update and 2) C2P Modernization which now includes Link 22 integration. C2P TR cyber security update is a new initiative driven by recently discovered cyber security risk to the C2P system in support of the BMD mission. The C2P TR Cyber security update is planned to support acceleration on all AEGIS BMD ships. C2P Modernization funds the transition of the C2Ps legacy CMS-2Y software code (old Navy unique computer programming language from the 1980s) to a modern software language. Transition to a modern software language is required to sustain the system software, to adequately address growing cybersecurity and Ao challenges, and to enable more affordable transition to new hardware processing components as a result of commercial of the shelf processor obsolescence. Link 22, which was previously planned for fielding in the C2P TR architecture, has been delayed until the fielding of C2P Modernization. This was based on prioritizing existing resources to address the emergent cyber security risk that has resulted in the C2P TR cybersecurity update plan. Link 22 is a modernized replacement for Link 11, providing beyond line of site (BLOS) tactical data communications using HF radios.

FY2022 Justification (C2P): Implementing the development initiatives above will improve C2P cybersecurity hygiene, provide more reliable hardware (HW), and create a HW and software (SW) architecture that is more cost effective for future upgrades and corrections to latent defects.

Link Monitoring and Management Tool (LMMT) is a system delivered on commercial off-the-shelf HW providing gateway functions for multiple Tactical Data Link (TDL) interface, routing and display of TDL data to include Link 16 and Joint Range Extension (JRE). LMMT is also capable of performing TDL network monitoring and management, data forwarding between the TDLs and providing tactical data to the IAMD, BMD network, and Global Command and Control System (GCCS) for establishing the common operational picture. LMMT requirements will be incrementally developed and delivered in capability drops via the Joint Capabilities Integration Development System (JCIDS) IT Box approach.

FY2022 Justification (LMMT): Complete Capability Drop (CD) 3 software development and perform various certification and test events to include testing of Link 22 with coalition/allied countries.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Link 16 Network Increment II - Cryptographic Modernization (CM) / Frequency Remapping (FR)	4.272	0.598	3.700	0.000	3.700
Articles:	1	-	-	-	-
FY 2021 Plans:					
Complete government testing and data reduction including for operational testing of MOS Mod.					
Continue preparations and conduct for MOS Mod FDR fielding decision review.					
Complete integration and test MIDS JTRS CMN terminal into MOS Modernization terminal.					
Investigate MOS Mod and MIDS J deficiencies.					
Continue government integration and testing of CMN capability with MOS Mod and C2P.					
FY 2022 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Contract MIDS Program Office to complete qualification of MIDS J BU3 (CMN) terminal with 1553 Platform M (Ship) interface. Continue government integration and testing of CMN capability with MOS Mod and C2P. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** MIDS J BU3 terminal with 1553 ship interface will replace MIDS J BU2 which will be obsolete. The $3.102M will be used to fund vendor qualification of the MIDS J BU3 ship interface to meet environmental, functional, security and electromagnetic compatibility requirements and government host integration and validation testing in FY22.					
Title: Command and Control Proecessor (C2P)	14.572	15.770	17.428	0.000	17.428
Articles:	-	-	-	-	-
FY 2021 Plans: Complete C2P TR cybersecurity IV&V testing. Conduct C2P TR Cybersecurity Combat System Integration testing. Commence fielding of C2P TR Cybersecurity baseline. Continue C2P Modernization development ***FY 2022 Base Plans:*** Continue C2P Modernization Development, Integration and Systems Engineering. Complete SW Release A IV&V. Release C2P Mod SW drop A. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** $1.658M increase from FY21 to FY22 is needed to support increased staffing for software development and independent verification and validation efforts as part of the C2P Modernization development.					
Title: Link Monitoring and Management Tool (LMMT)	2.156	2.197	1.794	0.000	1.794
Articles:	-	-	-	-	-
FY 2021 Plans: Conduct CD 3 Independent verification and validation (IV&V).					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 2126 / *ATDLS Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Conduct Phase I Development Testing (DT) and Service level testing. ***FY 2022 Base Plans:*** Continue CD 3 development. Conduct Phase II Independent Verification and Validation (IVV) and perform certification and various test events with Coalition/Allies using Link 22. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** (-$403K) decrease from FY21 to FY22 is due to the ramping down of development efforts as CD 3 nears completion in FY22.					
Accomplishments/Planned Programs Subtotals	21.000	18.565	22.922	0.000	22.922

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/2614: *Adv Tact Data Link Sys (ATDLS)*	62.753	103.835	101.595	-	101.595	-	-	-	-	-	-

Remarks

D. Acquisition Strategy

The JTIDS Crypto Modernization (CM)/Frequency Remapping (FR) development and low rate initial production (LRIP) contract was awarded to Data Link Solutions (DLS). A sole source determination was approved for the production and integration of JPI hardware. DLS will produce and integrate JPI hardware and software into existing JTIDS terminals. Multifunctional Information Distribution System (MIDS) on Ship (MOS) CM/FR will be accomplished through integration of the MIDS LVT Block Upgrade 2 (BU) into the existing MOS cabinet. MOS CM/FR required development and integration of a High-Power Amplifier (HPA) bypass switch. HPA bypass switch development was conducted by Naval Information Warfare Center (NIWC) Pacific (PAC). Production of HPA Switch will be performed by NIWC PAC for existing MOS systems. To address the WIN 10 implementation for the MOS system, a new MOS Terminal Controller hardware and software has been developed and is being produced on the MOS Lot 4 contract. MOS MOD contract will provide three engineering manufacturing development (EMD) units for developmental and operational testing. The MOS MOD contract will also provide full rate production units. A second MOS Mod contract for production will be competitively awarded to extend the production period and increase capacity. MOS Mod integrates the MIDS JTRS terminal developed by the MIDS Program Office PMA-101. As the MIDS JTRS terminal is updated the Link 16 program will have to support qualification and integration efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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The C2P Technology Refresh (TR) configuration will be replaced by C2P Modernization (MOD). C2P Mod will leverage existing commercial-off-the-shelf (COTS) hardware and be a complete modernization of the C2P software architecture significantly improving system cybersecurity. C2P Mod capabilities are implemented in software and will be developed in capability drops (CDs). C2P Mod development and support will be managed by NIWC PAC.

The Link Monitoring and Management Tool (LMMT) capability will replace previously-fielded Air Defense Systems Integrator (ADSI) systems. LMMT will leverage existing government-off-the-shelf (GOTS) software and commercial-off-the-shelf (COTS) hardware. LMMT capabilities are implemented primarily in software and will be developed in CDs. Existing GOTS software will be updated to incorporate network performance monitoring and management capabilities by NIWC PAC.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Link 16 Network Technical Design Agents	C/CPFF	SeaPort- Various : San Diego, CA	0.000	0.784	Oct 2019	0.000		0.000		-		0.000	-	-	-
Link 16 Network Systems Engineering	WR	NIWC PAC : San Diego, CA	0.000	1.039	Oct 2019	0.000		0.000		-		0.000	-	-	-
Link 16 Network MIDS J Development and Qualification	WR	PMA 101 : San Diego, CA	0.000	1.000	Oct 2019	0.000		3.491	Oct 2021	-		3.491	-	-	-
C2P Systems Engineering	WR	NIWC PAC : San Diego, CA	0.000	5.174	Oct 2019	2.004	Oct 2020	2.441	Oct 2021	-		2.441	-	-	-
C2P IV&V	WR	NIWC PAC : San Diego, CA	0.000	0.485	Oct 2019	0.000		0.475	Oct 2021	-		0.475	-	-	-
C2P Development & Integration	WR	NIWC PAC : San Diego, CA	0.000	5.513	Oct 2019	10.992	Oct 2020	13.233	Oct 2021	-		13.233	-	-	-
LMMT Development	WR	NIWC PAC : San Diego, CA	0.000	0.916	Oct 2019	1.010	Oct 2020	0.540	Oct 2021	-		0.540	-	-	-
LMMT Systems Engineering	WR	NIWC PAC : San Diego, CA	0.000	0.570	Oct 2019	0.377	Oct 2020	0.476	Oct 2021	-		0.476	-	-	-
LMMT IV&V	WR	NIWC PAC : San Diego, CA	0.000	0.190	Oct 2019	0.252	Oct 2020	0.143	Oct 2021	-		0.143	-	-	-
		Subtotal	0.000	15.671		14.635		20.799		-		20.799	-	-	N/A

Remarks

C2P IV&V has no cost in FY21 due to the completion of v3.11 baseline in FY20. IV&V will continue though as the next IV&V cycle will be C2P MOD in FY22. $3.4M increase from FY21 to FY22 is needed to support Link 16 MIDS J BU3 terminal vendor qualification and government host integration and validation testing.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Link 16 Network T&E	WR	NIWC PAC : San Diego, CA	0.000	1.310	Oct 2019	0.488	Oct 2020	0.209	Oct 2021	-		0.209	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 2126 / *ATDLS Integration*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2P T&E	WR	NIWC PAC : San Diego, CA	0.000	1.800	Oct 2019	1.505	Oct 2020	0.000		-		0.000	-	-	-
LMMT T&E	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.272	Oct 2020	0.342	Oct 2021	-		0.342	-	-	-
		Subtotal	0.000	3.110		2.265		0.551		-		0.551	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Link 16 Network Program Management Support	C/CPFF	SeaPort- Various : San Diego, CA	0.000	0.139	Oct 2019	0.110	Oct 2020	0.000		-		0.000	-	-	-
C2P Program Management Support	C/CPFF	SeaPort- Various : San Diego, CA	0.000	0.800	Oct 2019	0.591	Oct 2020	0.581	Oct 2021	-		0.581	-	-	-
C2P Systems Engineering Support	C/CPFF	SeaPort- Various : San Diego, CA	0.000	0.800	Oct 2019	0.678	Oct 2020	0.698	Oct 2021	-		0.698	-	-	-
LMMT Program Management	C/CPFF	SeaPort- Various : San Diego, CA	0.000	0.480	Oct 2019	0.286	Oct 2020	0.293	Oct 2021	-		0.293	-	-	-
		Subtotal	0.000	2.219		1.665		1.572		-		1.572	-	-	N/A

	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	21.000		18.565		22.922		-		22.922	-	-	N/A

Remarks

All prior year cost data is provided under PE 0205604N Project 2126

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 2126 / *ATDLS Integration*

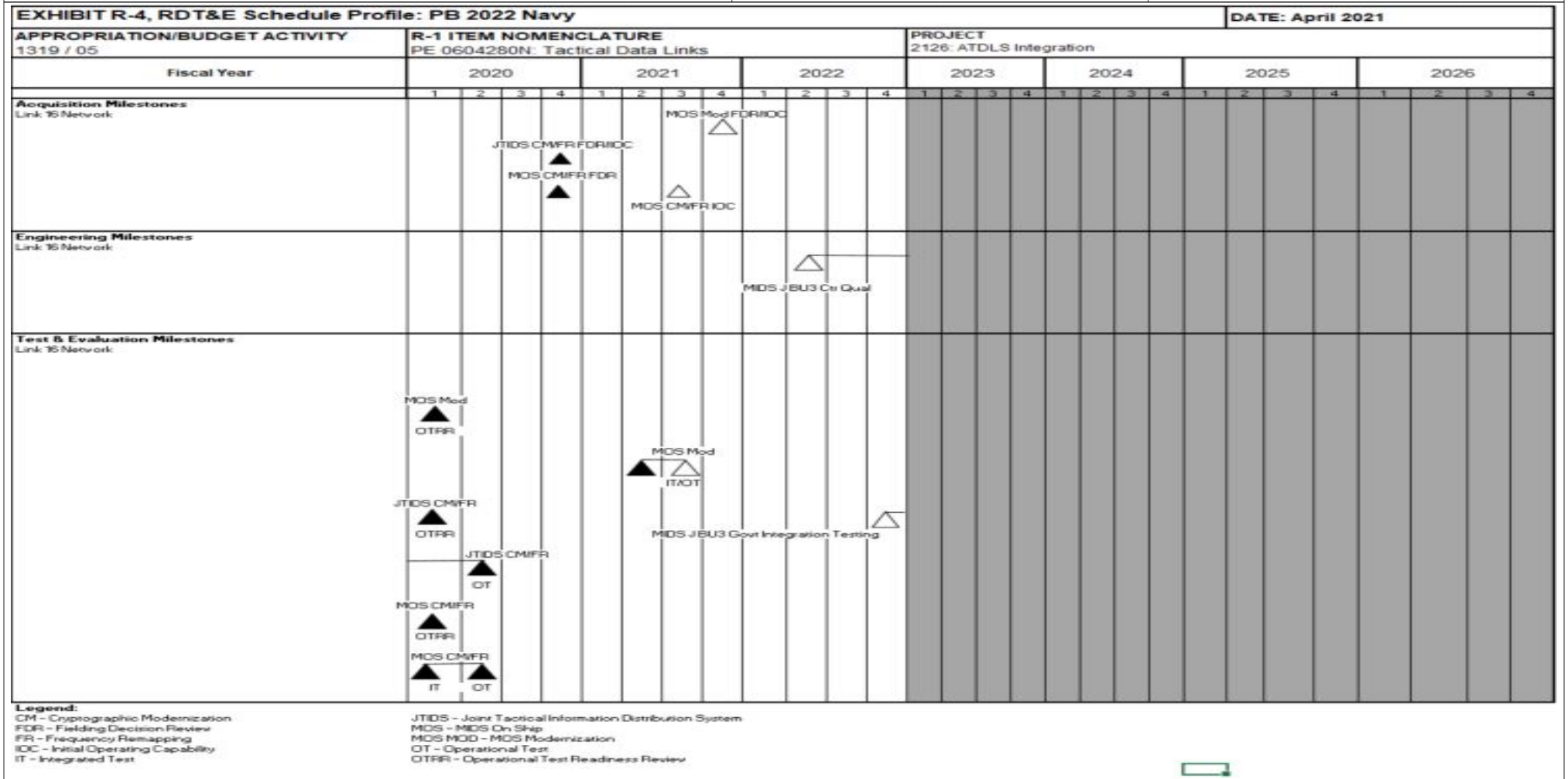

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 2126 / *ATDLS Integration*

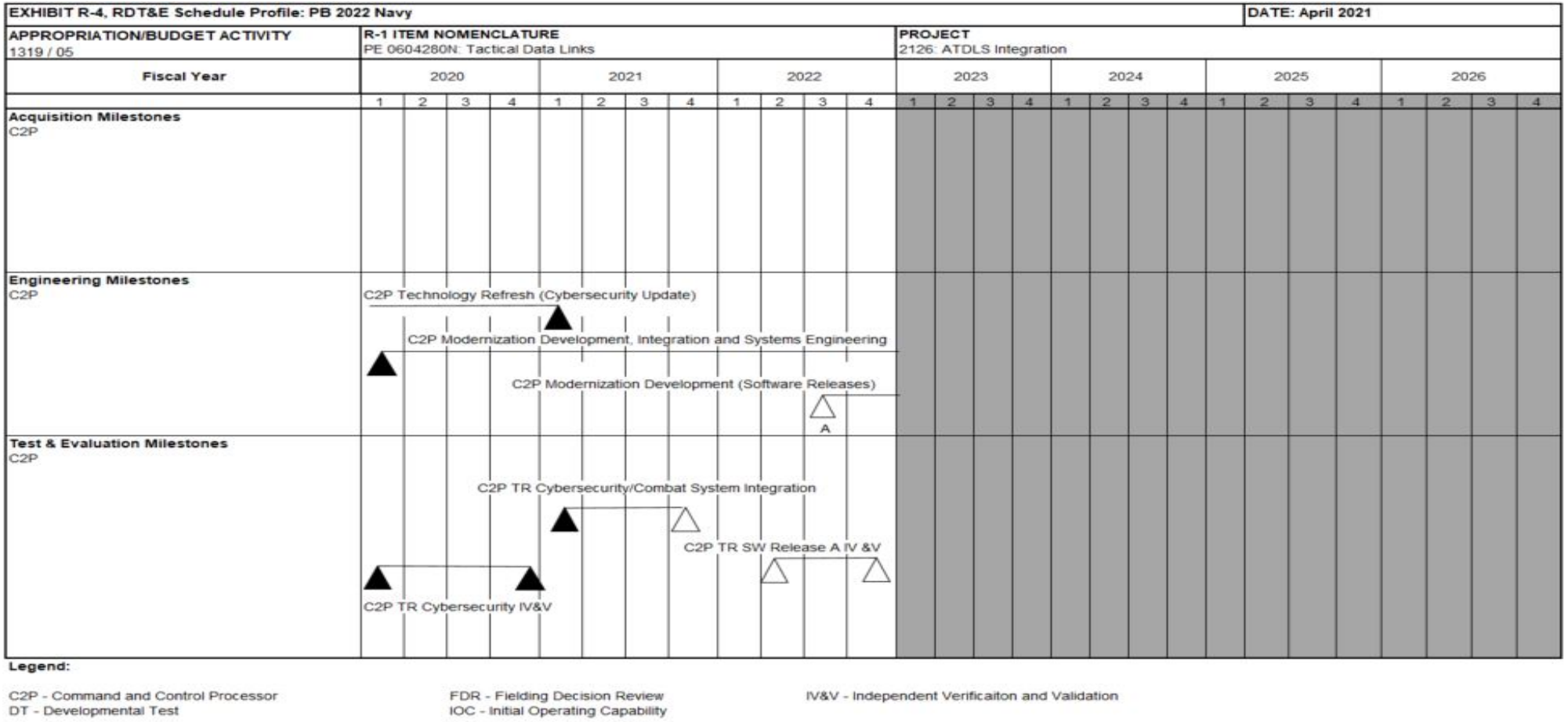

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
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EXHIBIT R-4, RDT&E Schedule Profile: PB 2022 Navy — **DATE: April 2021**

APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	PROJECT
1319 / 05	PE 0604280N: Tactical Data Links	2126: ATDLS Integration

Fiscal Year	2020				2021				2022				2023				2024				2025				2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones LMMT							CD 3																					
	▲ BD																											
Engineering Milestones LMMT							CD 3																					
	▲ BTR																											
Test & Evaluation Milestones LMMT							IVV △				CD 3 △△ DTRR	OT																

Legend:

BD - Build Decision
BTR - Build Technical Review
CD - Capability Drop
DTRR - Developmental Test Readiness Review
FDR - Fielding Decision Review
FTR - Fielding Technical Review
IVV - Independent Verifcation and Validation
OT - Operational Test

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
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Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2126				
Link 16 MOS Mod Operational Test Readiness Review	1	2020	1	2020
Link 16 MOS Mod Integrated Test / Operational Test	2	2021	3	2021
Link 16 MOS Mod Fielding Decision Review / Initial Operating Capability	4	2021	4	2021
Link 16 JTIDS CM/FR Operational Test Readiness Review	1	2020	1	2020
Link 16 JTIDS CM/FR Operational Test	2	2020	2	2020
Link 16 JTIDS CM/FR Fielding Decision Review / Initial Operating Capability	4	2020	4	2020
Link 16 MOS CM/FR Operational Test Readiness Review	1	2020	1	2020
Link 16 MOS CM/FR Integrated Test	1	2020	1	2020
Link 16 MOS CM/FR Operational Test	2	2020	2	2020
Link 16 MOS CM/FR Fielding Decision Review	4	2020	4	2020
Link 16 MOS CM/FR Initial Operating Capability	3	2021	3	2021
Link 16 MIDS J BU3 Vendor Qualification	2	2022	4	2022
Link 16 MIDS J BU3 Govt Integration Testing	4	2022	4	2022
C2P Technology Refresh (Cybersecurity Update)	1	2020	1	2021
C2P Modernization Development, Integration and Systems Engineering	1	2020	4	2022
C2P Technology Refresh Cybersecurity/Combat System Integration	1	2021	4	2021
C2P Technology Refresh IV&V	1	2020	4	2020
Complete SW Release A IV&V	2	2022	4	2022
C2P Mod Software release A	3	2022	3	2022
LMMT CD 3 Build Decision	1	2020	1	2020
LMMT CD 3 Build Technical Review	1	2020	1	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
LMMT IVV	3	2021	3	2021
LMMT CD 3 Developmental Test Readiness Review	3	2022	3	2022
LMMT CD 3 Oprational Test	3	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy											Date: May 2021	
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COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
3020: *MIDS/JTRS*	0.000	39.703	82.227	66.417	-	66.417	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 554

A. Mission Description and Budget Item Justification

The Multifunctional Information Distribution System (MIDS) program office is the Performing Activity in the Navy (Lead Service for Department of Defense (DOD)) Link 16 capability and consists of two (2) product lines, MIDS Low Volume Terminal (LVT) (legacy hardware defined radio) and MIDS Joint Tactical Radio System (JTRS) (software (SW) defined radio). MIDS-LVT effort is a cooperative development program between France, Germany, Italy, Spain, and the United States with United States joint service participation (Navy, Army, Air Force), and has provided over 11,000 terminals to 48 Nations providing interoperability with North Atlantic Treaty Organization (NATO) and coalition partners. The Department of Defense (DoD) established the program to design, develop, and deliver low volume, lightweight tactical information system terminals for U.S. and allied fighter aircraft, bombers, helicopters, ships, and ground sites. MIDS-LVT significantly increases force effectiveness and minimizes hostile actions and friend-on-friend engagements. MIDS-LVT Block Upgrade 2 was executed as an ECP and provides the critical upgrades to the MIDS-LVT Terminal to enable U.S., Coalition and International partners' ability to meet the National Security Agency (NSA) mandated timelines for Cryptographic Modernization (CM) and the National Telecommunications and Information Agency (NTIA) and Federal Aviation Agency (FAA) mandated timelines for Frequency Remapping (FR).

MIDS JTRS, designed as a Pre-Planned Product Improvement (P3I) and executed as an Engineering Change Proposal (ECP) to the production MIDS-LVT configuration, and is fully compatible with MIDS-LVT. The MIDS JTRS Core Terminal achieved Full Production & Fielding (FP&F) in March 2012. It facilitated the JTRS incremental approach for fielding advanced JTRS transformational networking capability and transformed the MIDS-LVT into a 4-channel, SW Communications Architecture (SCA) compliant, Joint Tactical Radio. A form-fit-function replacement to MIDS-LVT, MIDS JTRS also adds three programmable 2 Megahertz (MHz) to 2 Gigahertz (GHz) channels capable of hosting the JTRS legacy and networking waveforms. In addition to Link 16, Tactical Air Navigation (TACAN), and voice functionality found in MIDS-LVT, MIDS JTRS has four channels and adds capabilities such as Link 16 Enhanced Throughput (ET), Link 16 FR, SW programmability, CM, and Four Net Concurrent Multi-Netting with Concurrent Contention Receive (CMN-4).

MIDS JTRS Tactical Targeting Network Technology (TTNT), is a block upgrade to the MIDS JTRS CMN-4 Terminal providing an Internet Protocol-based networking capability on tactical aircraft. TTNT is a low latency, high throughput waveform that has the capability to support data exchange between fast-moving tactical aircraft, weapons, and unmanned aircraft, in addition to air, land, and sea-based command and control nodes, in a variety of air-to-air and air-to-ground missions including time sensitive targeting, air warfare, close air support, non-traditional ISR, and anti-surface warfare. TTNT and MIDS JTRS CMN-4 directly supports Naval Integrated Fire Control (NIFC) capability requirements. These capabilities provide Joint Airborne Network-Tactical Edge functionality to run advanced mission applications in a cross-platform/cross-domain tactical network enterprise.

Currently when updated software or any bug fixes are available, the warfighter must return the terminal to the vendor and pay for the labor to install the latest software push. With the new Field Loadable capability, the vendors will update the terminal's software to allow the warfighter to use the front panel of the terminal to load the

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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latest software build in the field. The Field Loadable capability entails updating and rewriting the specifications documents for the front panel, new software to enable users in the field to push updates and retrofitting government furnished equipment for use in the new testing environments.

The FY 2022 Budget continues to fund the MIDS Modernization Software and Firmware (SW/FW) development effort to maximize capabilities of the new Link 16 transceiver by finalizing baseline requirements and conducting technical reviews to complete the SW/FW development piece and move into test and integration. FY 2022 also continues the development of Field Loadable capability into the MIDS JTRS and MIDS JTRS TTNT terminals, allowing the warfighter to use the front panel of the terminal to load the latest software build in the field.

The FY 2022 budget also funds CMN-4 enhancement efforts for the MIDS JTRS terminal, the Consolidated Automated Support System for TTNT and gap improvements to the TTNT Software and Waveform. Lead Service Core Waveform updates is also funded in FY 2022 to include developing a Link 16 reference implementation platform for prototyping and frequency testing.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: MIDS	39.703	82.227	66.417	0.000	66.417
Articles:	-	-	-	-	-
FY 2021 Plans: Award MIDS Modernization Software and Firmware (SW/FW) development for the MIDS JTRS terminal to meet Joint Combatant Commanders' prioritized requirements for Integrated Fires Control and Joint Tactical Grid information exchange requirements at the Tactical Edge. MIDS JTRS industry will update the software and firmware requirements documentation with the new enhancements and conduct System Requirements Review (SRR) to establish Level 0 requirements and mature the Functional Baseline (FBL) specifications. Industry will begin implementation of the FBL into the MIDS JTRS SW/FW, including SW/FW integration of enhancements with the existing code base and regression testing. MIDS Modernization requires new developed Specialized Test Equipment (STE) to support the new SW/FW Integration and Test (I&T). Continue risk reduction efforts for the MIDS JTRS Field Loading capability. Field Loading directly enables rapid technology insertion and enhanced readiness, permitting significant capability upgrades without returns to the manufacturer. This capability enables increased operational availability, retrofit cost avoidance, and speeds fielding of SW upgrades. MIDS JTRS will conduct FBL specification updates, including joint Government/ Industry review of the FBL. Continue the MIDS JTRS Link 16 transceiver hardware upgrade development efforts by conducting Test Readiness Review. Incorporate the TTNT baseline to ensure the new Link 16 hardware will work in the TTNT terminals. Test the new Link 16 hardware with the latest Integrated Baseline Software.					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Upgrade/modernize the MIDS Special Test Equipment (STE) stations required for Link 16 and TTNT development efforts to be WIN10 compliant. System development and testing efforts cannot be executed without upgrading the STE stations. Operating systems on all the existing STE will be upgraded to allow for faster and compliant test procedures. Complete the NSA mandated transition from Unified INFOSEC Criteria (UIC) requirements and derived specifications to full detailed specification tracing to the Information Assurance Security Requirements Document (IASRD). All MIDS development efforts are required to be in the new IASRD standard to receive NSA certification. Review and update all specification documentation for functional and allocated baselines as well as development and testing procedures to adhere to the new standard. The FY 2021 Budget also funds the development and build/purchase of more MIDS test equipment for a new government depot/test lab and the support for the depot/lab. MIDS JTRS is undergoing Modernization efforts to outpace the future threats and capabilities. The new depot/testing lab has test stations specifically for the replacement of Shop Replaceable Assemblies to allow for faster upgrades to the modernized terminal. Develop a new Test Bench for MIDS JTRS terminal testing. Complete MIDS JTRS Tactical Targeting Network Technology (TTNT) Problem Report fixes from platform testing. Update the TTNT Waveform with the fixes from testing and delta test the waveform with the completed TTNT terminal and amplifiers. Begin Consolidated Automated Support System (CASS) Test Program Sets (TPS) efforts for the MIDS JTRS TTNT terminal. This entails labor for developing a prototype, the purchase of parts, and developing a new case to house the CASS TPS for use in the field. Develop new TTNT I-level support equipment. Continue MIDS systems engineering, communication security, IA and program management support. Continue with Link 16 and TTNT Waveform development fixes and updates. ***FY 2022 Base Plans:*** Continue MIDS Modernization SW/FW development for the MIDS JTRS terminal enhancements. Industry will finalize Functional Baseline (FBL) and Allocated Baseline (ABL) requirements, hold technical reviews with the Government, complete SW/FW development and execute system I&T. A Test Readiness Review will					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
be conducted to enter into formal contractor test and Industry will deliver the new capability as a Block Cycle upgrade to the Link 16 transceiver hardware program (Software drop 1). Begin working on Block Cycle 2 (second software drop) of the SW/FW enhancements after Block Cycle 1 (software drop 1) test is complete ensuring continuity and platform testing/use can begin. Begin derivation of draft ABL specification updates. Begin initial SW/FW implementation and integration. Retrofit GFE units to support industry lab testing. Begin test of the Field Loading capability in MIDS JTRS and MIDS JTRS TTNT terminals. Complete the MIDS JTRS Link 16 transceiver hardware upgrade development effort by conducting Contractor First Article Qualification Testing (CFAQT) and Electromagnetic Compatibility (EMC) Features testing and transitioning the new Link 16 hardware into Production. Begin TTNT Waveform Changes/Gap Improvements with new Integrated Builds for Software drops. Multicast and classified characteristics improvements will be developed, integrated into the terminal, and qualification testing will be conducted. Solutions from Federally Funded Research and Development Centers and Small Business will be integrated by the MIDS prime vendors to provide warfighter capability. Problem reports from EA-18G, F/A-18E/F (H-16 release) and E-2D Operational Testing (DSSC 4) will be corrected and implemented into the terminals. Complete the TTNT System of Systems (SoS) Modeling and Simulation (M&S) effort by incorporating platform simulators, applications and networks modeling to optimize the TTNT networks for warfighter capability. Continue the Consolidated Automated Support System (CASS) Test Program Sets (TPS) efforts for the MIDS JTRS TTNT terminal. Complete design and testing of the CASS TPS; build and test the three prototypes for qualification testing. Continue MIDS systems engineering, communication security, IA and program management support. Begin Core Waveform, Link 16 Lead Service work to include System of Systems Analysis of Link 16 networks, waveform Mission Threads/Kill Chains and associated Information Exchange Requirements (IERs) to guide Joint fielding and terminal development recommendations with associated prioritizations. Develop basic digital model to guide Link 16 development strategies. Develop a Link 16 reference implementation platform for prototyping					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
and to conduct frequency testing and testing other changes in standards and/or mandated updates. Continue with Link 16 development fixes and updates. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** FY 2021 to FY 2022 funding request overall decreases by $15.810M due to the MIDS JTRS Link 16 Hardware development effort entering into testing in FY 2022; the development work is complete and the effort moves into the testing phase. Risk reduction efforts for MIDS JTRS Software/Firmware development, risk reduction for Field Loadable capability, and the NSA standards update also complete in FY 2021 and no further funding is pending. There is an increase in FY 2022 for Core Waveform upgrades, but overall PU 3020 decreases from FY 2021 to FY 2022.					
Accomplishments/Planned Programs Subtotals	39.703	82.227	66.417	0.000	66.417

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Multifunctional Information Distribution System Joint Tactical System (MIDS JTRS) development was initiated as a major modification to the MIDS-LVT using an Engineering Change Proposal to the existing production contracts. The U.S. prime contractors from the MIDS-LVT program, Data Link Solutions (DLS) and Viasat Inc., cooperatively designed and developed each of the MIDS JTRS terminal variants and Block Upgrade 2 for MIDS-LVT. The U.S. implemented a continuous competition strategy between DLS and ViaSat that will be maintained throughout the MIDS-LVT and MIDS JTRS production phases. This strategy has been successfully used on all MIDS variants.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Link 16 Waveform Development	WR	NIWC PAC : San Diego, CA	0.000	0.523	Feb 2020	0.300	Jan 2021	0.300	Jan 2022	-		0.300	-	-	-
TTNT Waveforrm/SW Update	C/CPFF	DLS : Cedar Rapids, IA	0.000	0.000		2.250	Jan 2021	2.275	Dec 2021	-		2.275	-	-	-
TTNT Waveforrm/SW Update	C/CPFF	ViaSat : San Diego, CA	0.000	0.000		1.092	Jan 2021	1.517	Dec 2021	-		1.517	-	-	-
TTNT Post Dev Problem Report Fixes	C/CPFF	DLS : Cedar Rapids, IA	0.000	0.000		2.544	Dec 2020	5.155	Jan 2022	-		5.155	-	-	-
TTNT Post Dev Problem Report Fixes	C/CPFF	Viasat : San Diego, CA	0.000	0.000		2.807	Jan 2021	3.637	Jan 2022	-		3.637	-	-	-
MIDS JTRS L16 HW Upgrade	C/CPFF	DLS : Cedar Rapids, IA	0.000	17.262	Oct 2019	15.608	Nov 2020	7.036	Nov 2021	-		7.036	-	-	-
MIDS JTRS L16 HW Upgrade	C/CPFF	Viasat : San Diego, CA	0.000	8.691	Oct 2019	9.777	Nov 2020	2.182	Nov 2021	-		2.182	-	-	-
MIDS EMC Features Updates/Firmware Update	C/CPFF	Viasat : San Diego, CA	0.000	1.433	Dec 2019	0.000		0.000		-		0.000	-	-	-
MIDS Mod SW/FW Risk Reduction	C/CPFF	DLS : Cedar Rapids, IA	0.000	0.301	Nov 2020	1.523	Jan 2021	0.000		-		0.000	-	-	-
MIDS Mod SW/FW Risk Reduction	C/CPFF	Viasat : San Diego, CA	0.000	0.060	Nov 2020	0.445	Jan 2021	0.000		-		0.000	-	-	-
MIDS Mod SW/FW Full Development	C/CPFF	DLS : Cedar Rapids, IA	0.000	0.000		2.722	Jul 2021	14.903	Jan 2022	-		14.903	-	-	-
MIDS Mod SW/FW Full Development	C/CPFF	Viasat : San Diego, CA	0.000	0.000		4.092	Jul 2021	9.935	Jan 2022	-		9.935	-	-	-
Field Loadable Cap Risk Reduction	C/CPFF	DLS : Cedar Rapids, IA	0.000	4.012	Feb 2020	6.224	Dec 2020	0.000		-		0.000	-	-	-
Field Loadable Cap Risk Reduction	C/CPFF	Viasat : San Diego, CA	0.000	2.313	Apr 2020	2.207	Dec 2020	0.000		-		0.000	-	-	-
Field Loadable Capability Dev	C/CPFF	DLS : Cedar Rapids, IA	0.000	0.000		0.000		3.000	Nov 2021	-		3.000	-	-	-
Field Loadable Capability Dev	C/CPFF	Viasat : San Diego, CA	0.000	0.000		0.000		2.000	Nov 2021	-		2.000	-	-	-

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Modernize Special Test Equipment WIN10	C/CPFF	DLS : Cedar Rapids, IA	0.000	0.000		5.109	Nov 2020	0.914	Nov 2021	-		0.914	-	-	-
Modernize Special Test Equipment WIN10	C/CPFF	ViaSat : San Diego, CA	0.000	0.000		1.186	Nov 2020	0.000		-		0.000	-	-	-
NSA Security Requirement Update	C/CPFF	DLS : Cedar Rapids, IA	0.000	0.234	Jun 2020	0.063	Nov 2020	0.000		-		0.000	-	-	-
NSA Security Requirement Update	C/CPFF	ViaSat : San Diego, CA	0.000	0.140	Jun 2020	0.081	Nov 2020	0.000		-		0.000	-	-	-
Test Bench Equipment for depot/lab	C/FFP	TBD : TBD	0.000	0.000		8.598	Jul 2021	0.000		-		0.000	-	-	-
Test Equipment for Depot/ lab	C/FFP	DLS : Cedar Rapids, IA	0.000	0.676	Nov 2020	0.832	Mar 2021	0.000		-		0.000	-	-	-
Test Equipment for Depot/ lab	C/FFP	ViaSat : San Diego, CA	0.000	0.589	Nov 2020	0.886	Mar 2021	0.000		-		0.000	-	-	-
		Subtotal	0.000	36.234		68.346		52.854		-		52.854	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CSS TPS/Depot Support	WR	NAVAIR : North Island San Diego, CA	0.000	0.078	Nov 2020	4.736	Oct 2020	2.895	Jan 2022	-		2.895	-	-	-
Modeling and Sim Suppt TTNT	WR	NAVAIR : China Lake, CA	0.000	0.371	Nov 2019	0.650	Dec 2020	1.073	Dec 2021	-		1.073	-	-	-
Logistics Depot Test Facility Support	WR	NIWC PAC : San Diego, CA	0.000	0.127	Oct 2020	0.000		0.000		-		0.000	-	-	-
CORE Waveform Support	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.000		6.540	Oct 2021	-		6.540	-	-	-
I-Level Support Equipment	C/CPFF	Viasat : San Diego, CA	0.000	0.000		1.590	Nov 2020	0.000		-		0.000	-	-	-

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NSA Certification Support	MIPR	NSA : Fort Meade, MD	0.000	0.000		0.015	Mar 2021	0.100	Dec 2021	-		0.100	-	-	-
Modeling and Sim Suppt TTNT	MIPR	AFRL : Rome, NY	0.000	0.000		1.500	Mar 2021	0.000		-		0.000	-	-	-
		Subtotal	0.000	0.576		8.491		10.608		-		10.608	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
JTEL	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.300	Jan 2021	0.300	Jan 2022	-		0.300	-	-	-
TTNT DT/OT Support	WR	NIWC PAC : San Diego, CA	0.000	0.000		2.232	Feb 2021	0.059	Nov 2021	-		0.059	-	-	-
MIDS JTRS Link 16 Hardware EMC Testing	WR	NIWC PAC : San Diego, CA	0.000	0.000		0.000		0.300	Jan 2022	-		0.300	-	-	-
DT OT Support	WR	COMOPTEVFOR : Norfolk, VA	0.000	0.050	Feb 2021	0.000		0.000		-		0.000	-	-	-
		Subtotal	0.000	0.050		2.532		0.659		-		0.659	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering Support	MIPR	MITRE : Bedford, MA	0.000	0.100	May 2020	1.431	Dec 2020	0.906	Dec 2021	-		0.906	-	-	-
Government Engineering Support	WR	NIWC PAC : San Diego,CA	0.000	1.359	Sep 2020	0.699	Nov 2020	0.700	Nov 2021	-		0.700	-	-	-
Information Assurance	MIPR	CERDEC : Aberdeen Proving Ground, MD	0.000	0.000		0.259	Jan 2021	0.300	Jan 2022	-		0.300	-	-	-

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Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3020 / *MIDS/JTRS*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Data Link Analysis	WR	NAVAIR : Pax River, MD	0.000	0.122	Jan 2020	0.294	Jan 2021	0.215	Jan 2022	-		0.215	-	-	-
Engineering Support	C/CPFF	Sentek Global : San Diego, Ca	0.000	0.440	May 2020	0.000		0.000		-		0.000	-	-	-
Information Assurance, Risk and Program Support	C/CPFF	G2 : San Diego, Ca	0.000	0.717	May 2020	0.000		0.000		-		0.000	-	-	-
SIPR Connections	MIPR	ARL : Aberdeen, MD	0.000	0.105	Feb 2020	0.000		0.000		-		0.000	-	-	-
Information Assurance, Risk and Program SupportText	MIPR	AFRL : Rome, NY	0.000	0.000		0.175	Feb 2021	0.175	Dec 2021	-		0.175	-	-	-
		Subtotal	0.000	2.843		2.858		2.296		-		2.296	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	39.703		82.227		66.417		-		66.417	-	-	N/A

Remarks

Prior Year cost data is provided under PE 0205604N Project 3020

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3020 / *MIDS/JTRS*

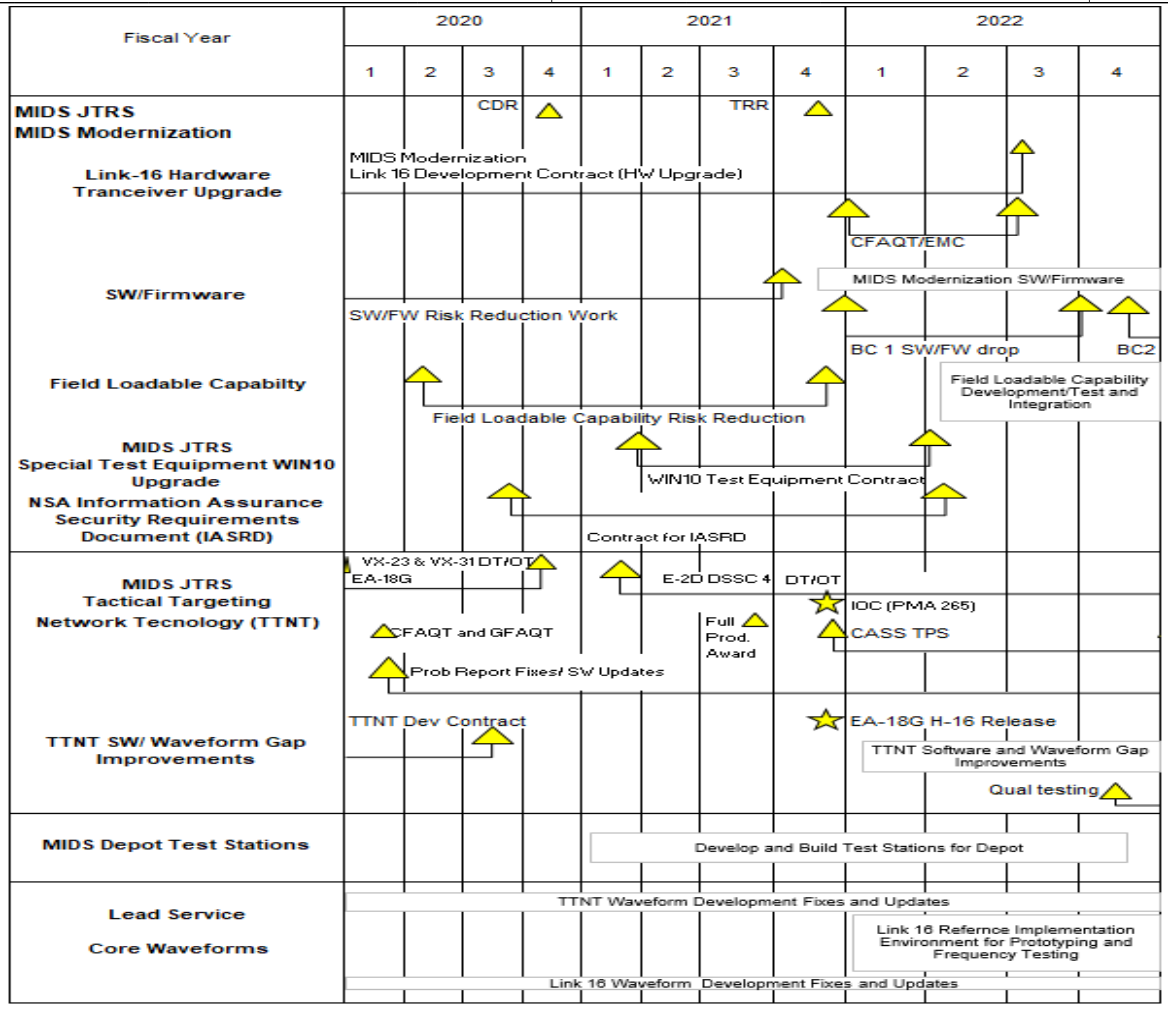

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3020 / *MIDS/JTRS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3020				
MIDS JTRS Modernization Link 16 Hardware Transceiver Upgrade: Development Contract	1	2020	3	2022
MIDS JTRS Modernization Link 16 Hardware Transceiver Upgrade: Critical Design Review	4	2020	4	2020
MIDS JTRS Modernization Link 16 Hardware Transceiver Upgrade: Test Readiness Review	4	2021	4	2021
MIDS JTRS Modernization Link 16 Hardware Transceiver Upgrade: Contractor First Article Qualification Test (CFAQT)/EMC Testing	4	2021	3	2022
MIDS JTRS Modernization Software/Firmware: Risk Reduction Work	1	2020	4	2021
MIDS JTRS Modernization Software/Firmware: MIDS Modernization SW/FW development contract	4	2021	4	2022
MIDS JTRS Modernization Software/Firmware: BC 1 SW/FW Drop 1	4	2021	4	2022
MIDS JTRS Modernization Software/Firmware: BC 2 SW/FW Drop 2	4	2022	4	2022
Field Loadable Capability: Risk Reduction Work	2	2020	4	2021
Field Loadable Capability: Field Loadable Capability Development/Test and Integration	2	2022	4	2022
MIDS JTRS Modernization Special Test Equipment (STE): STE Update WIN10 Contract	1	2021	2	2022
NSA Information Assurance Security Requirements Document (IASRD): IASRD Contract	3	2020	2	2022
MIDS JTRS Tactical Targetting Network Technology (TTNT): CFAQT and GFAQT	1	2020	1	2020
MIDS JTRS Tactical Targetting Network Technology (TTNT): VX-23 & VX-31 Developmental Test (DT) and Operational Test (OT) EA-18G	1	2020	4	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3020 / *MIDS/JTRS*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MIDS JTRS Tactical Targetting Network Technology (TTNT): Problem Report Fixes/ Reliability Growth Contract	1	2020	4	2022
MIDS JTRS Tactical Targetting Network Technology (TTNT): Consolidated Automated Support System (CASS) Test Program Sets (TPS)	4	2021	4	2022
MIDS JTRS Tactical Targetting Network Technology (TTNT): E-2D DSSC 4 DT/OT	1	2021	4	2022
MIDS JTRS Tactical Targetting Network Technology (TTNT): Full Production Award	3	2021	3	2021
MIDS JTRS Tactical Targetting Network Technology (TTNT): Initial Operating Capability	4	2021	4	2021
MIDS JTRS Tactical Targetting Network Technology (TTNT): EA-18G H16 Release	1	2022	1	2022
TTNT Waveform Gap Improvements: TTNT SW/Waveform Gap Improvements	1	2022	4	2022
TTNT Waveform Gap Improvements: Qual Testing	4	2022	4	2022
MIDS Depot Test Stations: Test Station	1	2021	4	2022
MIDS Core Waveforms: TTNT Waveform Development Fixes and Updates	1	2020	4	2022
MIDS Core Waveforms: Link 16 Waveform Development Fixes and Updates	1	2020	4	2022
MIDS Core Waveforms: Link 16 Reference Implementation Environment for Prototyping and Frequency Testing	1	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy									Date: May 2021			
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*				Project (Number/Name) 3078 / *Digital Modular Radio*			
COST ($ in Millions)	**Prior Years**	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Cost To Complete**	**Total Cost**
3078: *Digital Modular Radio*	49.373	1.854	2.770	2.530	-	2.530	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Digital Modular Radio (DMR) with Integrated Waveform (IW) and Mobile User Objective System (MUOS) capable hardware is the Navy's technical solution for the IW/ MUOS requirement. The DMR AN/USC-61(C), is the first software defined radio to become a communications system standard for the U.S. Military. The compact, multi-channel DMR provides 3G, Wideband Code Division Multiple Access (WCDMA) technology, for high speed/capacity voice and data satellite communications. DMR radios currently operate aboard U.S. Navy surface and subsurface vessels, fixed-sites and other Department of Defense (DoD) communication platforms using frequencies ranging from 2 MHz to 2 GHz. Certified to pass secure voice and data at Multiple Independent Levels of Security (MILS) over High Frequency (HF), Very High Frequency (VHF), Ultra High Frequency (UHF), and Satellite Communications (SATCOM) channels, the DMR system was developed to the U.S. Navy's specifications and meets all the stringent environmental, Electromagnetic Interference (EMI) and performance requirements for use in the U.S. Fleet. This system is formally specified by both Fleet Commanders as a threshold capability, for global maritime command control and communications in a Distributed Maritime Environment, to execute current warfighting plans and is required for National Command and Control capability. This program is for continued development/integration of the IW and MUOS waveforms into the DMR in accordance with Military Standards 188-181,2,3. Additionally, the enhancements of High Frequency Distribution Amplifier Group (HFDAG) and HF Automated Link Establishment (ALE) will also be developed/integrated into the DMR. HFDAG is a follow-on HF solution to fulfill transmit and receive HF communication capability with various modes of operation, such as ALE, for Navy platforms. HFDAG will utilize the existing DMR as the exciter/receiver. Generation 3 (GEN 3) HF ALE/HF wideband provides Navy users with improved HF communications, increased transmission rates from radio to radio, and serves as a supplement to SATCOM when SATCOM networks are overloaded or unavailable. IW uses a Time Division Multiple Access (TDMA) communication system in an attempt to improve satellite bandwidth utilization over legacy SATCOM waveforms. This enables demand assigned services on UHF SATCOM networks to support new applications that require better performance and higher channel throughput. The MUOS waveform will enable MUOS satellites to provide worldwide communication satellite coverage for DoD requirements. MUOS will provide functionality comparable to commercial mobile phone systems.

FY 2022 will fund DMR to complete v6.5.3 Advance HF (AHF) Functionality Development, continue software integration and porting of MUOS w/f 3.2, and complete the development of updated DMR Crypto Mod SINCGARS 3.X phase 1 to Critical Design Review (CDR) software to be compliant with the latest National Security Agency (NSA) cryptographic modernization specifications.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2020**	**FY 2021**	**FY 2022 Base**	**FY 2022 OCO**	**FY 2022 Total**
Title: DMR	1.854	2.770	2.530	0.000	2.530
Articles:	-	-	-	-	-
Description: Overall program efforts include investigation of emerging technologies through study, development and associated testing for feasibility of program insertion. DMR, with IW and MUOS capable hardware, is					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
the Navy's technical solution for the IW/MUOS requirement. As the Navy's primary technical solution, DMR provides the UHF SATCOM IW and MUOS waveform capability to the Fleet. The MUOS waveform enables MUOS satellites to provide worldwide communication satellite coverage for DoD requirements, with functionality comparable to commercial mobile phone systems. ***FY 2021 Plans:*** FY 2021 DMR will begin v6.5.3 Advanced HF(AHF) Functionality Development, conduct submarine Emissions Control (EMCON) testing to meet core capability requirements for submarines, 3.1.6 development support activities in preparation for porting the new waveform starting in FY22, and continue development of updated DMR SINCGARS 3.1 Cryptographic Equipment Application (CEA) software to be compliant with the latest National Security Agency (NSA) cryptographic modernization specifications. ***FY 2022 Base Plans:*** FY 2022 will continue v6.5.3 Advanced HF(AHF) Functionality Development and MUOS w/f 3.2 integration and porting, complete Crypto Mod SINCGARS 3.X phase 1. Begin Crypto Mod SINCGARS 2.x phase 2, and complete HF v6.5.3 GEN3 development test. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The funding decrease from FY21 to FY22 is due to the completion of submarine Emissions Control (EMCON) testing to meet core capability requirements for submarines.					
Accomplishments/Planned Programs Subtotals	1.854	2.770	2.530	0.000	2.530

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/3010: *Shipboard Tactical Comms*	47.811	53.743	43.212	-	43.212	-	-	-	-	-	-

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

D. Acquisition Strategy

General Dynamics Mission Systems (GDMS), formerly General Dynamics C4 Systems (GDC4S), owns the technical data rights to the Digital Modular Radio (DMR). Due to this fact, they are the only contractor with the unique capabilities and technical know-how to perform the required design work to complete the Integrated Waveform (IW) upgrade, the Mobile User Objective System (MUOS) interoperability efforts, and cryptographic modernization development.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IW/MUOS Development	C/CPIF	GDMS : Scottsdate, AZ	24.671	0.000		0.000		0.000		-		0.000	-	-	-
HF ALE Development	C/CPIF	GDMS : Scottsdale, AZ	10.069	0.000		1.210	May 2021	1.547	Oct 2021	-		1.547	-	-	-
IW/MUOS Development	WR	NIWC PAC : San Diego, CA	0.600	0.000		0.000		0.000		-		0.000	-	-	-
HF ALE Development	WR	NIWC PAC : San Diego, CA	0.499	0.214	Oct 2019	0.417	Mar 2021	0.200	Oct 2021	-		0.200	-	-	-
Cryptographic Modernization Development	C/CPIF	GDMS : Scottsdale, AZ	0.259	0.611	Oct 2019	0.300	May 2021	0.000		-		0.000	-	-	-
Cryptographic Modernization Development	WR	NIWC PAC : San Diego, CA	0.000	0.132	Dec 2019	0.238	Mar 2021	0.200	Dec 2021	-		0.200	-	-	-
		Subtotal	36.098	0.957		2.165		1.947		-		1.947	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering Support	Various	NIWC PAC : San Diego, CA	7.682	0.160	Dec 2019	0.249	Mar 2021	0.228	Dec 2021	-		0.228	-	-	-
		Subtotal	7.682	0.160		0.249		0.228		-		0.228	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Testing	Various	NIWC PAC : San Diego, CA	2.624	0.000		0.227	Mar 2021	0.229	Dec 2021	-		0.229	-	-	-
JITC Testing	WR	JITC : Ft. Huachuca, AZ	0.469	0.100	Sep 2020	0.000		0.000		-		0.000	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Interoperability Testing	WR	NIWC PAC : San Diego, CA	0.000	0.402	Nov 2019	0.129	Mar 2021	0.063	Nov 2021	-		0.063	-	-	-
Test and Evaluation	WR	NIWC PAC : San Diego, CA	0.000	0.179	Nov 2019	0.000		0.000		-		0.000	-	-	-
Certification Authorization	MIPR	NSA : Ft. Meade, MD	0.030	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	3.123	0.681		0.356		0.292		-		0.292	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	BAH : San Diego, CA	2.470	0.056	Nov 2019	0.000		0.063	Nov 2021	-		0.063	-	-	-
		Subtotal	2.470	0.056		0.000		0.063		-		0.063	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	49.373	1.854		2.770		2.530		-		2.530	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

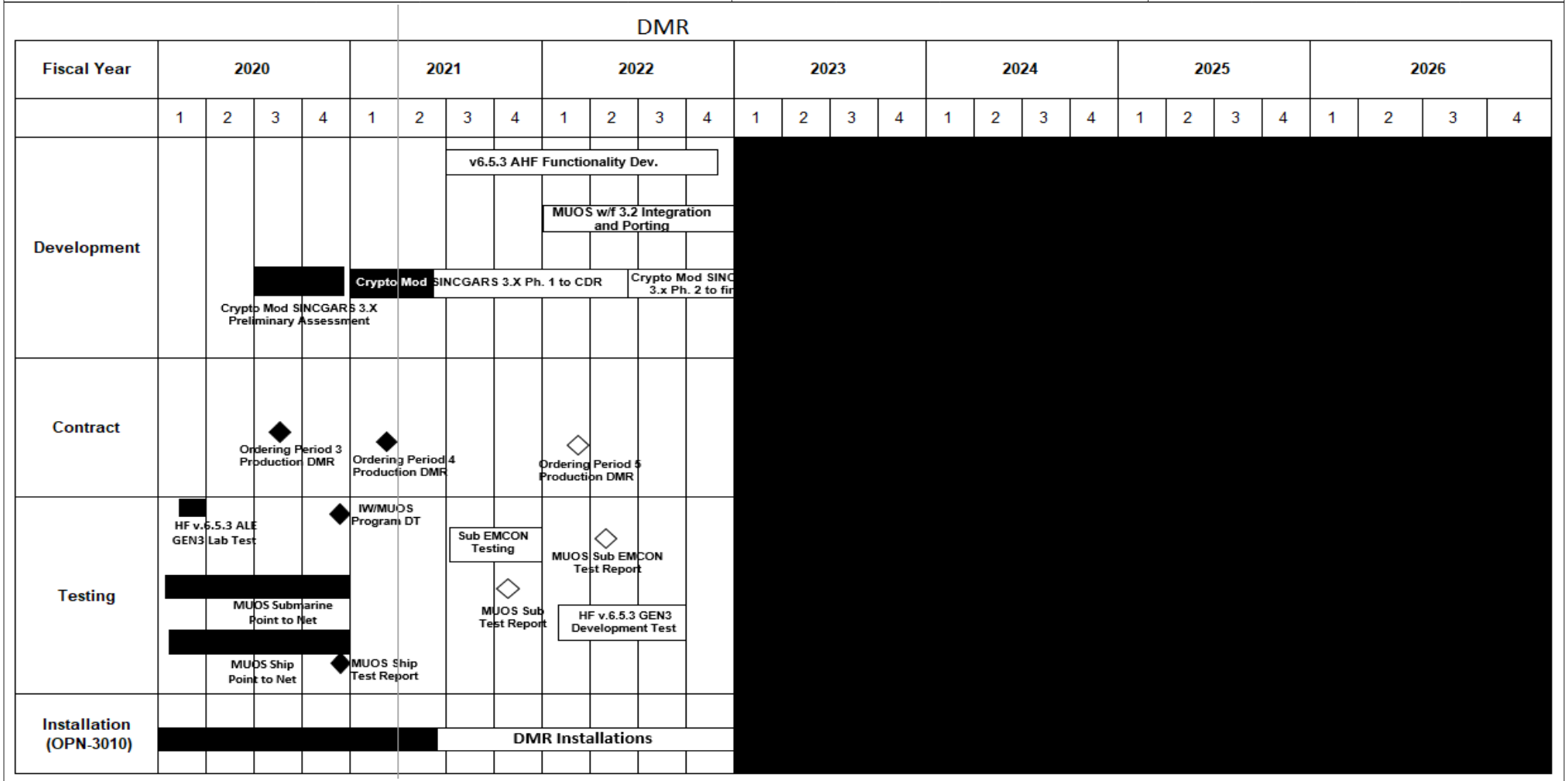

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3078 / *Digital Modular Radio*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3078				
Production Deliveries	1	2020	4	2022
DMR Installations	1	2020	4	2022
MUOS Submarine Point to Net Testing	1	2020	4	2020
MUOS Ship Point to Net Testing	1	2020	4	2020
HF ALE GEN 3 Lab Test	1	2020	1	2020
Crypto Mod SINCGARS 3.X Preliminary Assessment	3	2020	4	2020
MUOS Sub Test Report	4	2021	4	2021
IW/MUOS Program DT	4	2020	4	2020
MUOS Ship Test Report	4	2020	4	2020
Crypto Mod SINCGARS 3.x Ph. 1 to CDR	1	2021	2	2022
Submarine EMCON Testing	3	2021	4	2021
HF ALE GEN 3 AHF Functionality Development (v6.5.3)	3	2021	4	2022
MUOS w/f 3.2 Integration and porting	1	2021	4	2022
MUOS Sub EMCON Test Report	2	2022	2	2022
Crypto Mod SINCGARS 3.x Ph. 2 to finish	2	2022	4	2022
HF ALE GEN 3 Software Development (v6.5.3) Development Test	1	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 3341 / *Network Tactical Common Data Link*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
3341: *Network Tactical Common Data Link*	0.000	30.775	34.520	19.096	-	19.096	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Network Tactical Common Data Link (NTCDL) provides the ability to transmit/receive real-time Intelligence, Surveillance, and Reconnaissance (ISR) data simultaneously from multiple sources (surface, airborne, sub-surface, man-portable), and exchange command and control information (voice, data, imagery, and Full Motion Video) across dissimilar joint, service, coalition, and civil networks. NTCDL provides warfighters with the capability to support multiple, simultaneous, networked operations with currently fielded Common Data Link (CDL)-equipped air platforms (e.g. F/ A-35, P-3, and MH-60R), in addition to next generation manned and unmanned platforms (e.g., P-8, Triton, MQ-25 (Stingray), small tactical unmanned aircraft systems (STUAS) and Fire Scout). NTCDL is an incremental capability (surface, airborne, sub-surface, man-portable) providing modular, scalable, multiple-link networked communications. NTCDL benefits the fleet by providing a horizon extension for line-of-sight sensor systems for use in time-critical strike missions and supports tasking, collection, processing, exploitation, and dissemination (TCPED) via its ISR networking capability. NTCDL supports Resilient Command and Control (RC2) through its relay capability, and supports TCPED through its ISR networking capability.

FY 2022 request is for NTCDL to complete the Path 1 capability development.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Network Tactical Common Data Link (NTCDL)	30.775	34.520	19.096	0.000	19.096
Articles:	-	2	-	-	-
Description: Overall program efforts include investigation of emerging technologies through study, development and associated testing for feasibility of program insertion. NTCDL is the only High Data Rate (HDR), Line of Sight (LOS) solution delivering Intelligence, Surveillance, and Reconnaissance (ISR), sensor control information and unmanned aircraft system (UAS) command and control. NTCDL uses Joint Department of Defense specifications for Common Data Link (CDL) waveforms and LOS networks across the allocated CDL frequency spectrum. New technical specifications require increasing number of simultaneous CDL links to support increasing number of CDL/ISR platforms and missions. The software for NTCDL is developed by both contractor and government. The contractor software development is responsible for the internal control of the NTCDL hardware whereas the Government Furnished Software (GFS) is responsible for interfacing with various external networks (e.g. Automated Digital Network System (ADNS)) and users (e.g. Consolidated Afloat Networks and Enterprise Services (CANES)). Engineering Development Model (EDM) development is a multi-year effort that includes two EDMs being delivered in FY21. EDM 1 will undergo Development Test for Operational Assessment,					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3341 / *Network Tactical Common Data Link*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
and EDM 2 will go through shock, environmental, and cyber testing. At the same time the two EDMs are going through testing, BAE Systems will continue development of the X/Ku antennas. EDM 2 will be repaired after testing and given the X/Ku antennas. Both EDMs will provide Full Capability and will be installed in FY23. ***FY 2021 Plans:*** FY21 plans include delivery of (1) Engineering Design Model (EDM) PAA. Conduct Developmental Test (DT) and begin preparations for Operational Assessment (OA). Continue development and integration of the EDMs, including shock. Complete integration of multiple subsystems to include: Phased Array (PAA), X/Ku-band dish antenna, End Cryptographic Unit (ECU), Below Deck Equipment (BDE) racks and radio terminals. Conduct and complete Test Readiness Review for Development Test, First Article Test, and Operation Test Readiness Review. Continue development of Government Furnished Software (GFS), development of software documentation to include Software Version Description (SVD), Requirement Traceability Matrix (RTM) and Software User Manual (SUM), and development of an EDM backfit kit. ***FY 2022 Base Plans:*** FY22 plans include delivery of the 2nd Engineering Design Model (EDM) and completion of the EDM PAA Cyber Development Test and Evaluation. Conduct and complete Joint Interoperability Test Command (JITC) Common Data Link (CDL) Interoperability E2E testing, and attain National Security Agency (NSA) Type 1 certification of ECU. Final delivery of GFS Fleet Capability Release with GFS maintenance and updates to follow. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The FY22 funding request was reduced by $15.424 million from FY21 to FY22 due to major EDM test events completing in FY21, and the anticipated completion of Path 1 development efforts mid-year FY22.					
Accomplishments/Planned Programs Subtotals	30.775	34.520	19.096	0.000	19.096

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• OPN/2950: *Network Tactical Common Data Link (CDL)*	5.193	3.556	8.795	-	8.795	-	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3341 / *Network Tactical Common Data Link*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost

Remarks

The OPN dollars through FY21 are for the CDLS Tech Refresh. NTCDL is the follow-on program and the OPN for this program starts in FY22.

D. Acquisition Strategy

NTCDL will utilize the evolutionary acquisition approach for surface, air, sub-surface, and man-portable in a 2 path development approach. Path 1 will deliver Ku-band Phased Array Antennas (PAAs) with 4 simultaneous links while Path 2 will deliver Full Capability which will include 2 additional simultaneous links (X/Ku).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3341 / *Network Tactical Common Data Link*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NTCDL Product Development	C/CPIF	BAE Systems, Int : Wayne, NJ	0.000	25.898	Oct 2019	26.259	Oct 2020	16.549	Oct 2021	-		16.549	-	-	-
NTCDL Software Development	WR	NIWC PAC : San Diego, CA	0.000	1.545	Nov 2019	1.681	Nov 2020	0.450	Nov 2021	-		0.450	-	-	-
NTCDL Software Development	C/IDIQ	Technology Unlimited Group : San Diego, CA	0.000	0.690	Feb 2020	0.636	Feb 2021	0.255	Feb 2022	-		0.255	-	-	-
		Subtotal	0.000	28.133		28.576		17.254		-		17.254	-	-	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NTCDL Systems Engineering	WR	NIWC PAC : San Diego, CA	0.000	1.406	Nov 2019	2.075	Nov 2020	0.230	Nov 2021	-		0.230	-	-	-
NTCDL Logistics Engineering	C/CPFF	CSA : San Diego, CA	0.000	0.000		0.202	Nov 2020	0.000		-		0.000	-	-	-
		Subtotal	0.000	1.406		2.277		0.230		-		0.230	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NTCDL Test and Evaluation	WR	NIWC PAC : San Diego, CA	0.000	1.207	Nov 2019	2.689	Nov 2020	0.750	Nov 2021	-		0.750	-	-	-
NTCDL Test and Review	MIPR	JITC : Fort Huachuca, AZ	0.000	0.005	Dec 2019	0.038	Dec 2020	0.040	Dec 2021	-		0.040	-	-	-
NTCDL Waveform Certification	MIPR	COMOPTEVFOR : Norfolk, VA	0.000	0.024	Dec 2019	0.020	Dec 2020	0.022	Dec 2021	-		0.022	-	-	-
		Subtotal	0.000	1.236		2.747		0.812		-		0.812	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 3341 / *Network Tactical Common Data Link*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NTCDL Program Management Support	C/CPFF	BAH : San Diego, CA	0.000	0.000		0.920	Nov 2020	0.800	Nov 2021	-		0.800	-	-	-
		Subtotal	0.000	0.000		0.920		0.800		-		0.800	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	30.775		34.520		19.096		-		19.096	-	-	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3341 / *Network Tactical Common Data Link*

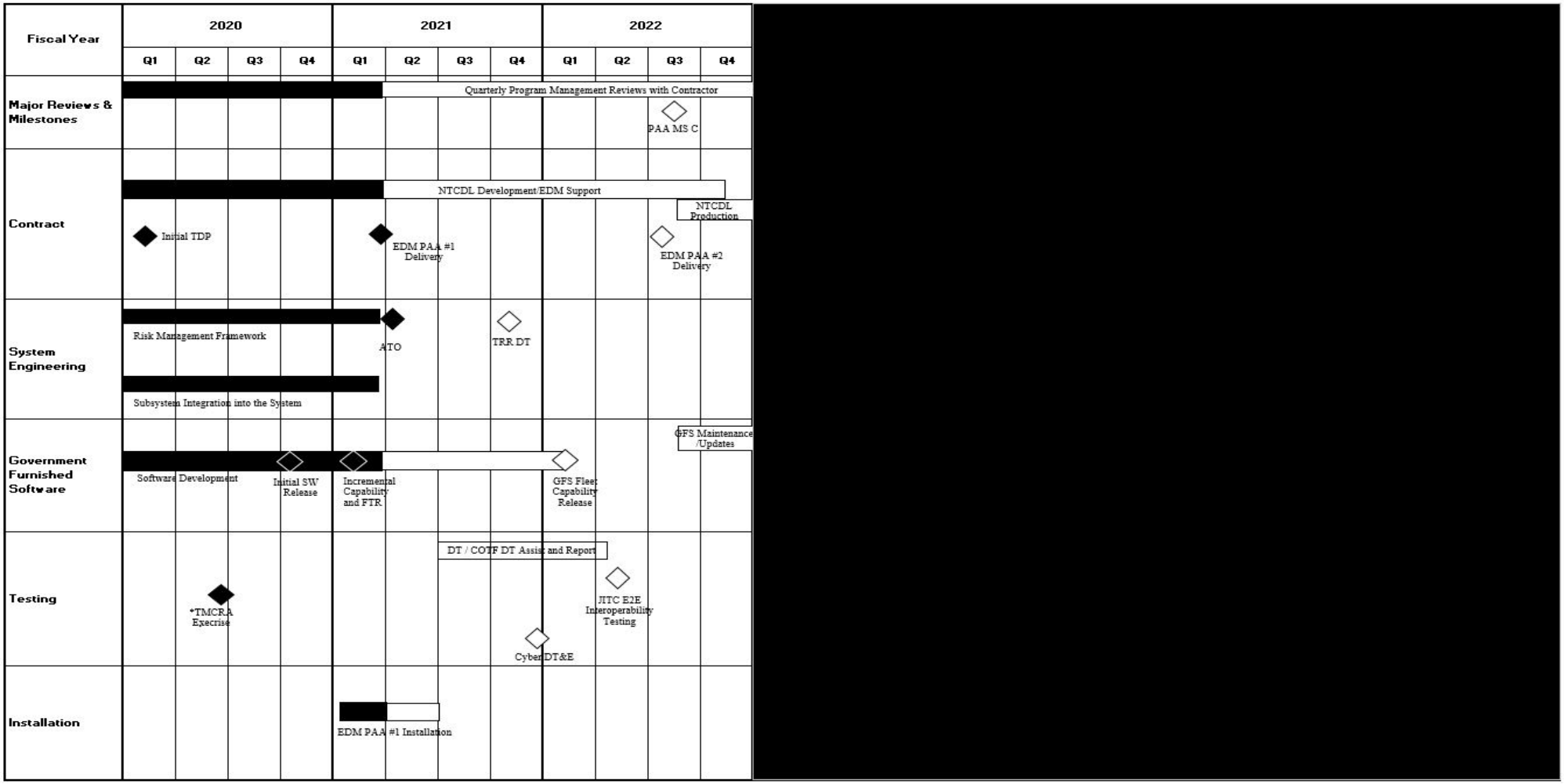

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3341 / *Network Tactical Common Data Link*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3341				
Quarterly Program Management Review with Contractor	1	2020	4	2022
Development Contract	1	2020	4	2022
Initial Technical Data Package (TDP)	1	2020	1	2020
Risk Management Framework (RMF)	1	2020	1	2021
Subsystem Integration into the System	1	2020	1	2021
Government Furnished Software (GFS) Development	1	2020	1	2022
Initial Software Release	4	2020	4	2020
Tabletop Mission Cyber Risk Assessment	2	2020	2	2020
EDM 1 PAA Delivery (Qty 1)	1	2021	1	2021
Authority to Operate (ATO) 1	2	2021	2	2021
TRR Development Testing (DT)	3	2021	3	2021
Test Readiness Review (TRR)	4	2021	4	2021
GFS Incremental Capability and Field Technical Release (FTR)	1	2021	1	2021
First Article Test (FAT) - Engineering Design Model (EDM) Phased Array Antenna (PAA)	1	2021	1	2021
Development Testing (DT) / Operational Assessment (OA) and Report	3	2021	2	2022
EDM PAA #2 Shock	3	2021	3	2021
Operational Test Readiness Review (OTRR) 1	4	2021	4	2021
GFS Fleet Capability Release	1	2022	1	2022
EDM PAA #2 Cyber Development, Testing, and Evaluation (DT&E)	1	2022	1	2022
JITC E2E Interoperability Testing	2	2022	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 3341 / *Network Tactical Common Data Link*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Milestone C	3	2022	3	2022
NTCDL Production Contract	3	2022	4	2022
GFS Maintenance/Updates	3	2022	4	2022
EDM 2 PAA Delivery (QTY 1)	3	2022	3	2022
Delta Critical Design Review (CDR) Full Capability (FC)	4	2022	4	2022
EDM CVN 72 Installation	1	2021	2	2021

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 4011 / *Naval Coastal Warfare Surv and C4I Sys*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
4011: *Naval Coastal Warfare Surv and C4I Sys*	0.000	2.699	2.975	2.141	-	2.141	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Navy Expeditionary project supports the Navy Expeditionary Combat Command (NECC) mission to detect, deter or interdict potential threats to DoN assets using agile, modular and scalable technology. NECC units have a number of current and future Command, Control, Communications, Computers & Intelligence (C4I) technological requirements for Tactical/Command Operations Center, tactical vehicles, combatant craft, and dismounted personnel. NECC operations require units to maintain effective command and control, develop and display a common tactical picture, and share intelligence and current operational information with higher headquarters, subordinate units, joint forces and coalition allies. Small, Medium and Large Scale Communication Systems (LSCS) are the C4I hub for the NECC; Navy Enterprise Tactical Command and Control (NETC2) is the converged LSCS baseline. Future C4I research and development include enhanced information transport, network cyber security posture, cloud-based architecture, assured communications in denied environments along with agility and mobility. Funding also supports testing and evaluation of cyber security issues associated with obsolescence of network items and if not addressed will impact the ability of the Program Office to maintain system accreditation under Risk Management Framework (RMF) revoking multiple LSCS assets authority to connectivity on the Department of Defense Information Network (DoDIN). Efforts are in alignment with NECC's strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities and maintain alignment with greater DoD initiatives, such as Joint Information Environment (JIE), Mission Partner Environment (MPE) in order to maintain interoperability and drive down DoN enterprise costs.

The future of large scale communications assets such as Navy Enterprise Tactical Command and Control (NETC2) (V) 1 and 2, Expeditionary Carry-on Network (ExCON), Assured Command and Control (AC2), will be converging to a Common Expeditionary and Shore Baseline culminating in a single RMF Authority to Operate (ATO). Next generation air, surface and subsurface surveillance systems, as well as enhanced C4I capabilities, are required to meet operational objectives. Future technologies are being evaluated as enabling capabilities to expand situational awareness, providing additional tactical decision aids to the local area commander. Future C4I research and development efforts will be identified within NECC strategic Expeditionary Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities to increase agility, mobility and network security posture. Additional efforts will be driven by greater DoD initiatives, such as Joint Information Environment (JIE) Inc II, in order to maintain interoperability and drive down
DoN enterprise costs.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: NECC C4ISR Modernization	2.699	2.975	2.141	0.000	2.141
Articles:	-	-	-	-	-
FY 2021 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 4011 / *Naval Coastal Warfare Surv and C4I Sys*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Investigating cloud technologies to include Software Defined Networking (SDN), Micro segmentation and Episodic Enclaves in order to pace the threat and support speed to capability. Continue to utilize a transformational and streamlined application integration process in support of information warfare and rapid program insertion. Through the use of common and automated baselines, implementing new technologies in order to enable rapid introduction of new products and technology, prevent obsolescence, and end of support issues. Continue to research the use of Development Operations (DevOps) in order to insert new technology enhancements via incremental software & hardware upgrades and deliver rapid build releases. ***FY 2022 Base Plans:*** Evaluate technologies to support migration to Department of Defense cloud environments. Expand capabilities of common infrastructure to increase speed to capability through containerization technologies and utilization of Development, Security, and Operations (DevSecOps) in order to rapidly deliver mission tailored applications and cloud based services. Implement software defined wide area network (SD-WAN) technologies to increase cyber posture. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Development of tier 1 capabilities to support multi-cloud environments will not occur in FY22 due to funding decrease between FY21 and FY22.					
Accomplishments/Planned Programs Subtotals	2.699	2.975	2.141	0.000	2.141

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Funding supports an evolutionary acquisition strategy supporting the dynamically evolving rapid action mission of Navy Expeditionary Forces. Small, Medium and Large Scale Communication Systems (LSCS) funding will align LSCS to the Deployable Joint Command and Control (DJC2) product baseline. The project will continuously analyze operational
utilization of the systems and will roll analysis results into periodic system upgrades to address cyber security vulnerabilities, obsolescence, and maximize operational effectiveness. The intent of this strategy is to drive down development, production, and logistics costs, while leveraging technologies developed for other agencies to increase the capabilities of Navy Expeditionary Forces. The baseline configuration for Large Scale Communication Systems (LSCS) is the Navy Enterprise

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 4011 / *Naval Coastal Warfare Surv and C4I Sys*

Tactical Command and Control (NETC2), a system scalable to Adaptive Force Package (AFP) levels. Efforts include development of capabilities based on emergent requirements, operational feedback, alignment with Dept. of Defense initiatives such as Joint Information Environment (JIE) / Mission Partner Environment, and identification through strategic Expeditionary and Warfare Improvement Program (EXWIP) Integrated Priority Capability List (IPCL) priorities to include reach back for tactical vehicles and craft, blue force tracking, tactical data link capability, and sensor technologies in support of surveillance and reconnaissance missions.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 4011 / *Naval Coastal Warfare Surv and C4I Sys*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - Expeditionary	WR	NSWC : PANAMA CITY, FL	0.000	0.740	Nov 2019	0.815	Nov 2020	0.586	Nov 2021	-		0.586	-	-	-
Hardware/Software Development	C/CPAF	GTRI : ATLANTA, GA	0.000	1.150	Nov 2019	1.268	Nov 2020	0.912	Nov 2021	-		0.912	-	-	-
		Subtotal	0.000	1.890		2.083		1.498		-		1.498	-	-	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation - Expeditionary	WR	NSWC : PANAMA CITY, FL	0.000	0.580	Nov 2019	0.635	Nov 2020	0.458	Nov 2021	-		0.458	-	-	-
		Subtotal	0.000	0.580		0.635		0.458		-		0.458	-	-	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support - Expeditionary	WR	NIWC PAC : SAN DIEGO, CA	0.000	0.229	Nov 2019	0.257	Nov 2020	0.185	Nov 2021	-		0.185	-	-	-
		Subtotal	0.000	0.229		0.257		0.185		-		0.185	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	2.699		2.975		2.141		-		2.141	-	-	N/A

Remarks

Prior Year cost data is provided under PE 0604230N Project 0411

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 4011 / *Naval Coastal Warfare Surv and C4I Sys*

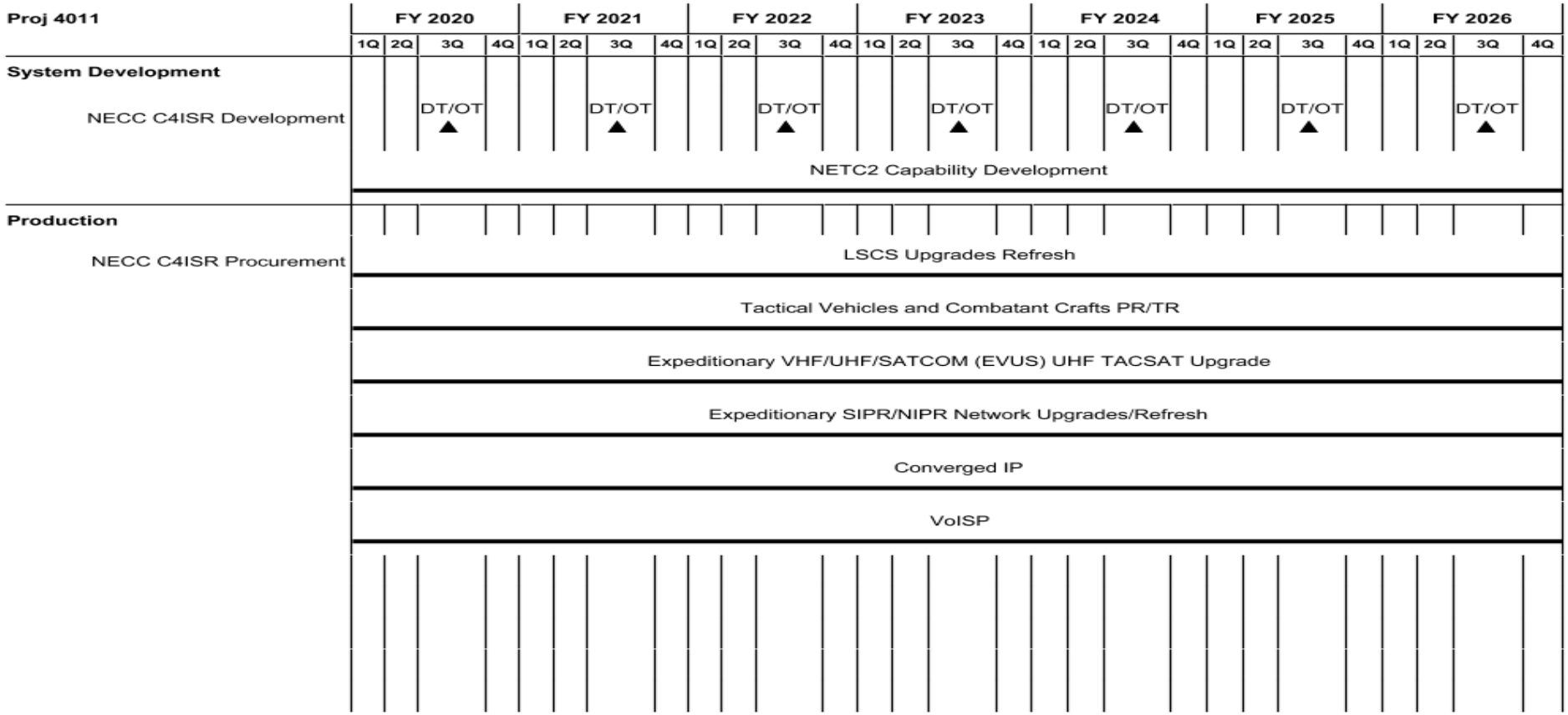

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 4011 / *Naval Coastal Warfare Surv and C4I Sys*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 4011				
System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY20	3	2020	3	2020
System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY21	3	2021	3	2021
System Development: NECC C4ISR Development: Navy C4I Test and Certification Events FY22	3	2022	3	2022
System Development: NECC C4ISR Development: NETC2 Capability Development	1	2020	4	2022
Production: NECC C4ISR Procurement: LSCS Upgrades Refresh	1	2020	4	2022
Production: NECC C4ISR Procurement: Tactical Vehicles and Combatant Crafts PR/TR	1	2020	4	2022
Production: NECC C4ISR Procurement: Expeditionary VHF/UHF/SATCOM (EVUS) UHF TACSAT Upgrade	1	2020	4	2022
Production: NECC C4ISR Procurement: Expeditionary SIPR/NIPR Network Upgrades/Refresh	1	2020	4	2022
Production: NECC C4ISR Procurement: Converged IP	1	2020	4	2022
Production: NECC C4ISR Procurement: VoISP	1	2020	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy			Date: May 2021
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	0.000	4.000	0.000	-	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Multifunctional Information Distribution System (MIDS) program office is the Performing Activity for the Navy (Lead Service for Department of Defense (DOD)), Link 16 capability and consists of two (2) product lines, MIDS Low Volume Terminal (LVT) (legacy hardware defined radio) and MIDS Joint Tactical Radio System (JTRS) (software defined radio). MIDS-LVT effort is a cooperative development program between France, Germany, Italy, Spain, and the United States with United States joint service participation (Navy, Army, Air Force), and has provided over 11,000 terminals to 48 Nations providing interoperability with North Atlantic Treaty Organization (NATO) and coalition partners. The Department of Defense (DoD) established the program to design, develop, and deliver low volume, lightweight tactical information system terminals for U.S. and allied fighter aircraft, bombers, helicopters, ships, and ground sites. MIDS-LVT significantly increases force effectiveness and minimizes hostile actions and friend-on-friend engagements. MIDS-LVT Block Upgrade 2 was executed as an ECP and provides the critical upgrades to the MIDS-LVT Terminal to enable U.S., Coalition and International partners' ability to meet the National Security Agency (NSA) mandated timelines for Cryptographic Modernization (CM) and the National Telecommunications and Information Agency (NTIA) and Federal Aviation Agency (FAA) mandated timelines for Frequency Remapping (FR).

MIDS JTRS, designed as a Pre-Planned Product Improvement (P3I) and executed as an Engineering Change Proposal (ECP) to the production MIDS-LVT configuration, and is fully compatible with MIDS-LVT. The MIDS JTRS Core Terminal achieved Full Production and Fielding (FP&F) in March 2012. It facilitated the JTRS incremental approach for fielding advanced JTRS transformational networking capability and transformed the MIDS-LVT into a 4-channel, Software Communications Architecture (SCA) compliant, Joint Tactical Radio. A form-fit-function replacement to MIDS-LVT, MIDS JTRS also adds three programmable 2 Megahertz (MHz) to 2 Gigahertz (GHz) channels capable of hosting the JTRS legacy and networking waveforms. In addition to Link 16, Tactical Air Navigation (TACAN), and voice functionality found in MIDS-LVT, MIDS JTRS has four channels and adds capabilities such as Link 16 Enhanced Throughput (ET), Link 16 FR, software programmability, CM, and Four Net Concurrent Multi-Netting with Concurrent Contention Receive (CMN-4).

MIDS JTRS Tactical Targeting Network Technology (TTNT), is a block upgrade to the MIDS JTRS CMN-4 Terminal providing an Internet Protocol-based networking capability on tactical aircraft. TTNT is a low latency, high throughput waveform that has the capability to support data exchange between fast-moving tactical aircraft, weapons, and unmanned aircraft, in addition to air, land, and sea-based command and control nodes, in a variety of air-to-air and air-to-ground missions including time sensitive targeting, air warfare, close air support, non-traditional ISR, and anti-surface warfare. TTNT and MIDS JTRS CMN-4 are critical Tactical Data Link capabilities and directly supports Naval Integrated Fire Control (NIFC) capability requirements. These capabilities provide Joint Airborne Network-Tactical Edge functionality to run advanced mission applications in a cross-platform/cross-domain tactical network enterprise.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021
Congressional Add: Multifunciontal Information Distribution System Acceleration	0.000	4.000

Exhibit R-2A, RDT&E Project Justification: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021
FY 2020 Accomplishments: N/A ***FY 2021 Plans:*** Begin the software and firmware development to add Ethernet and algorithms to the MIDS JTRS terminals for advancement and improvement (MIDS Modernization capabilities). Award the development contract to allow Ethernet capabilities into MIDS JTRS. Begin incorporating new algorithms into the operating environment.		
Congressional Adds Subtotals	0.000	4.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Multifunctional Information Distribution System Joint Tactical System (MIDS JTRS) development was initiated as a major modification to the MIDS-LVT using an Engineering Change Proposal to the existing production contracts. The U.S. prime contractors from the MIDS-LVT program, Data Link Solutions (DLS) and Viasat Inc., cooperatively designed and developed each of the MIDS JTRS terminal variants and Block Upgrade 2 for MIDS-LVT. The U.S. implemented a continuous competition strategy between DLS and ViaSat that will be maintained throughout the MIDS-LVT and MIDS JTRS production phases. This strategy has been successfully used on all MIDS variants.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2020 Cost	FY 2020 Award Date	FY 2021 Cost	FY 2021 Award Date	FY 2022 Base Cost	FY 2022 Base Award Date	FY 2022 OCO Cost	FY 2022 OCO Award Date	FY 2022 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Contract for Block Cycle 1 to new MIDS Mod Hardware	C/CPFF	DLS : Cedar Rapids, IA	0.000	0.000		2.400	Jul 2021	0.000		-		0.000	-	-	-
Development Contract for Block Cycle 1 to new MIDS Mod Hardware	C/CPFF	ViaSat : San Diego, CA	0.000	0.000		1.600	Jul 2021	0.000		-		0.000	-	-	-
		Subtotal	0.000	0.000		4.000		0.000		-		0.000	-	-	N/A

	Prior Years	FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		4.000		0.000		-		0.000	-	-	N/A

Remarks

MIDS funding can be found in PU 3020.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 9999 / *Congressional Adds*

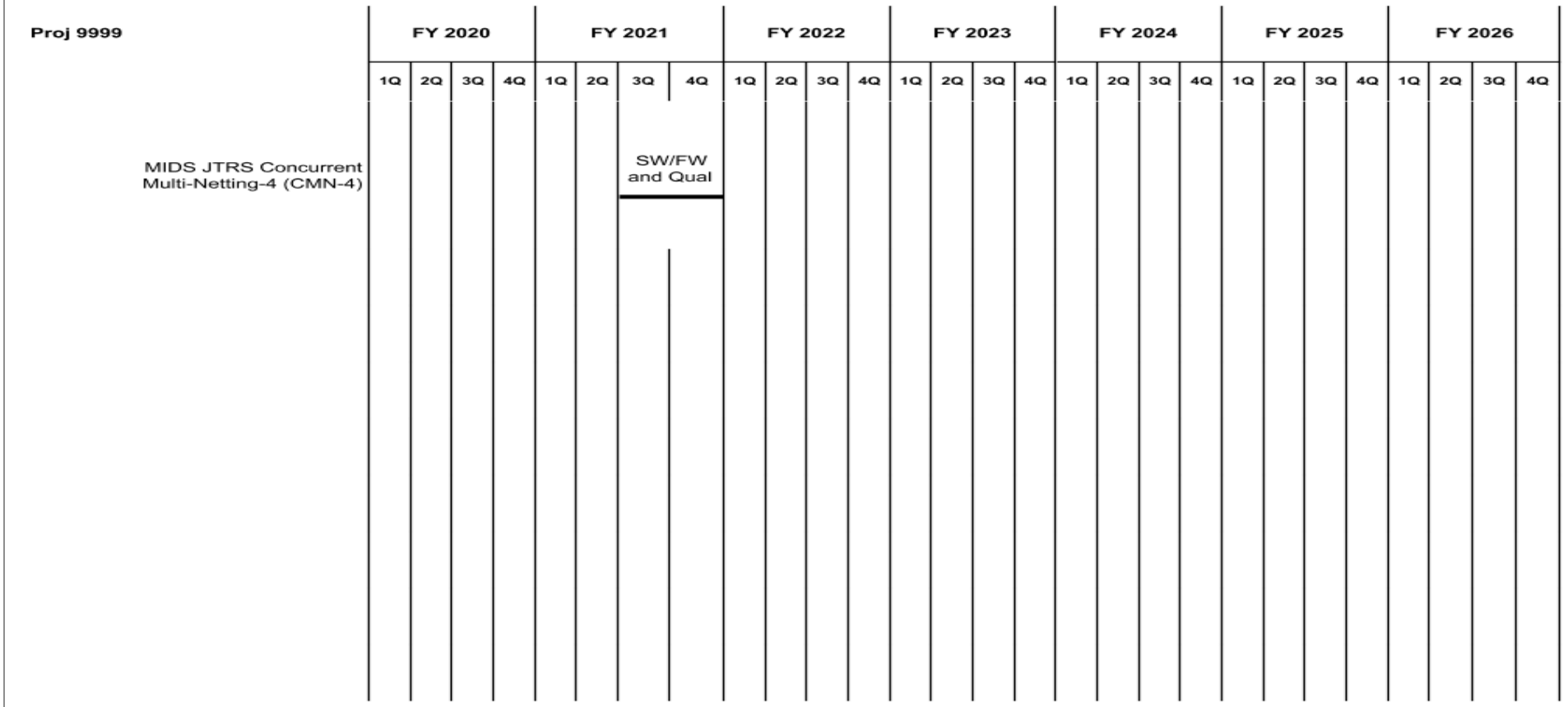

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604280N / *JT TACTICAL RADIO SYSTEM (JTRS)*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
MIDS JTRS Concurrent Multi-Netting-4 (CMN-4): Accelerating MIDS Modernization SW/FW and Qual	3	2021	4	2021