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 0605217N *I Common Avionics*							
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	134.475	34.430	53.782	60.117	-	60.117	-	-	-	-	-	-
0572: *JT Service/NV Std Avionics CP/SB*	134.475	34.430	53.782	60.117	-	60.117	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

This project provides for the identification, study, design, development, demonstration, test, evaluation, and qualification of standard avionics capabilities for Navy use, and wherever practicable, use across all Services and Foreign Military Sales. Such air combat electronics developments include communications and airborne networking, navigation and sensors, flight avionics, safety systems, and flight mission information systems for both forward fit and retrofit aircraft. These efforts continue to maintain federated systems while encouraging transition of procurements to support a modular system for enhanced performance and affordability. Consideration is given up front to reduce acquisition costs through larger procurement quantities that satisfy multi-aircraft customer requirements and that reduce life cycle costs in the areas of reliability, maintainability, and training.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production decision.

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	37.055	54.540	52.321	-	52.321
Current President's Budget	34.430	53.782	60.117	-	60.117
Total Adjustments	-2.625	-0.758	7.796	-	7.796
• Congressional General Reductions	-	-0.758			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.546	0.000			
• SBIR/STTR Transfer	-1.078	0.000			
• Program Adjustments	0.000	0.000	9.401	-	9.401
• Rate/Misc Adjustments	-0.001	0.000	-1.605	-	-1.605

Change Summary Explanation

The FY 2022 funding decrease of $1.605 million is due to miscellaneous rate adjustments.
The FY 2022 funding request increase of $9.401 million is due to the following:

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Tactical Communication (TACCOM) increase by $8.265 million due to the development and integration of Advanced Crypto Capability (ACC), TSV 3.1.1 Single Channel Ground and Airborne Radio System (SINCGARS 3.1). Navy adjustment to fund TSV/SINCGARS modernization - Driven by DoD CIO's Capability Planning Guidance.

Realigned $1.012M from PU 3371 MAGTF EW Interoperability Development, PE 0604270N to PU 0572 Common Avionics, PE 0605217N for Digital Interoperability (DI) / Marine Air Ground Task Force (MAGTF) Agile Networking Gateway Link (MANGL) for proper alignment of task resulting in zero sum adjustment.

Common Mission Computing & Displays (CMCD) increased by $0.265 million in FY22 for a zero-sum realignment of funds with no new start to correct the appropriation from APN-5 to RDTE for the MULE lab to assess MCA processor performance and requirements to support the incorporation of a new HUD in the T-45 aircraft.

Collaborative Warfare (CW) decreased by $0.141 million in FY22 due to a Navy Collaborative Warfare reduction.

Schedule:

Tactical Communications (TACCOM): Overall schedule changed due to the development and integration of Advanced Crypto Capability (ACC), TSV 3.1.1 Single Channel Ground, and Airborne Radio System (SINCGARS 3.1). Navy adjustment to fund TSV/SINCGARS modernization - Driven by DoD CIO's Capability Planning Guidance.
Completes TRANSEC & Crypto Mod TSV Suite B in 2Q/22.
Added Gen5A TSV 3.1.1 Crypto Mod Tactical Anti-Jam SINCGARS, SATURN commencing in 2Q/22.
Added Gen6 TSV 3.1.1 Crypto Mod Tactical Anti-Jam SINCGARS, ACC, SATURN 4 commencing in 4Q/21.
Nomenclature changed under T&E, remove delta certs and added distinct GEN5 and GEN6 certs.
Removed OFP S/W Baseline and ECP Production Milestone and added Gen5/6 TSV 3.1.1 ECP Approval 1Q/22.
Included Deliveries for all Gen5/6 Version Releases.

Digital Interoperability (DI)/Marine Air Ground Task Force (MAGTF) Agile Networking Gateway Link (MANGL):
FY21: Nomenclature title change from CDR to Design Review, change from 1Q/21 to 1Q/22; Test Articles CA Qty 4 change from 2Q/21 to 3Q/21.
FY22: Nomenclature title change from Milestone C to MTA Rapid Prototype Approval, change from 4Q/22 to 3Q/21; Nomenclature title change from LRIP to Test Articles Contract Award Qty changed from six (6) to three (3); Nomenclature title change from ES/TEMPEST;DT Grnd Test/JTIC Test/Rpt/Cyber Test to the following: Qualification Testing, Cyber Security Tabletop. Nomenclature title change from DT & OT Flt Test/Rpt to Flight Demonstration Test/Report from 1Q/22-2Q/22 to commencing 3Q/22.

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 0605217N / *Common Avionics*				Project (Number/Name) 0572 / *JT Service/NV Std Avionics CP/SB*			
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**
0572: *JT Service/NV Std Avionics CP/SB*	134.475	34.430	53.782	60.117	-	60.117	-	-	-	-	-	-
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

(U) Common Avionics FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

A. Mission Description and Budget Item Justification

Joint Services/Navy Standard Avionics Components and Subsystems: This project provides for the identification, study, design, development, demonstration, test, evaluation, and qualification of standard avionics capabilities for Navy use, and wherever practicable, use across all Services and Foreign Military Sales. Standard avionics capabilities under
development include the Joint Service Review Committee for Avionics Standardization (JSRC-AS), Communication Navigation Surveillance/Air Traffic Management (CNS/ATM), Tactical Communications (TACCOM), Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II), Collaborative Warfare (CW), Avionics Component Improvement Program (AvCIP), Avionics Architectures Team (AAT), Digital Interoperability (DI)/Marine Air Ground Task Force (MAGTF) Agile Networking Gateway Link (MANGL), and Common Mission Computing and Displays (CMCD). Participation in Human Factors Quality Management Board ensures Navy safety upgrades and mandatory safety improvements for naval aircraft.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Title: Joint Service Review Committee for Avionics Standardization (JSRC-AS)	0.628	0.740	0.831	0.000	0.831
Articles:	-	-	-	-	-
Description: The JSRC-AS program supports Congressional and Assistant Secretary of the Navy for Research, Development and Acquisition direction to control the growing proliferation of unique avionics and improve coordination among the services through the identification, development, and promotion of investigative and development efforts across the services and U.S. Coast Guard. The JSRC-AS supports the development, analysis and review of new avionics requirements with potential for joint service application. The JSRC-AS consists of an O-6 Level principal from each service and U.S. Coast Guard, as well as the appropriate staff, to support joint service working group efforts. The JSRC-AS reports to the O-7 level tri-service Aviation Common Systems Board who reports to the O-9 level Joint Aeronautical Commanders Group.					
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
Provide leadership in support of the Navy's interest to the JSRC-AS tri-service committee promoting commonality and joint programs with focus on interoperability, communications, navigation, Joint Services avionics obsolescence management, and update of the Core Avionics Master Plan. ***FY 2022 Base Plans:*** Provide leadership in support of the Navy's interest to the JSRC-AS tri-service committee promoting commonality and joint programs with focus on interoperability, communications, navigation, Joint Services avionics obsolescence management, and update of the Core Avionics Master Plan. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** The increase of $0.091 million from FY21 to FY22 is due to the results of a Congressional General Reduction in FY21 that delayed efforts from FY21 to FY22.					
Title: Communication Navigation Surveillance/Air Traffic Management (CNS/ATM)	4.229	0.131	0.140	0.000	0.140
Articles:	-	-	-	-	-
Description: This program will conduct and support CNS/ATM research, studies, development, integration, demonstration, test and evaluation efforts for Naval aviation platforms in development. Platform integration of Mode Select (S), 8.33 kHz, Reduced Vertical Separation Minimum (RVSM), Required Navigation Performance Area Navigation (RNP RNAV) to include M Code, and Automatic Dependent Surveillance-Broadcast Out (ADS-BO) functional integration and certification efforts into Naval aircraft. Assist with insertion of communication, navigation, surveillance, and supporting technologies and conduct capability certification on developmental platforms such as F-35, CH-53K, and Unmanned Air Systems. Capabilities include Mode S, 8.33 kHz, RVSM, RNP RNAV, ADS-BO, and other civil and military capabilities. ***FY 2021 Plans:*** Continue to evaluate technologies and develop solutions to support platform integrations. ***FY 2022 Base Plans:*** Continue to evaluate technologies and develop solutions to support platform integrations. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:***					

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
There is no significant change from FY21 to FY22.					
Title: Tactical Communications (TACCOM)	10.993	10.745	16.504	0.000	16.504
Articles:	-	-	-	-	-
Description: This program will conduct research, studies, development, integration, demonstration, test and evaluation efforts to ensure tactical communication systems and capabilities are developed and available to support naval aviation requirements. Perform tactical communication platform integration studies and activities to determine technical and cost effective solutions across naval aviation. Develop tactical communications (voice/data) requirements, concepts and systems which have application across naval aviation. Support all necessary tasks to ensure evolution of legacy communications systems incorporating programmable Communication Security/Information Assurance, Transmission Security (TRANSEC) mandated National Security Agency (NSA) Advanced Crypto Capability (ACC) modernization initiatives, Tactical Secure Voice (TSV) Suite B, Combat Net Radio (CNR) Variable Message Format (VMF), Beyond Line-of-Sight, Satellite Communication (SATCOM) Modernization including Mobile User Objective System (MUOS), High Frequency, Second Generation Anti-Jam Tactical UHF Radio for NATO (SATURN), Single Channel Ground and Airborne Radio System (SINCGARS), Enhanced SINCGARS Improvement Program (E-SIP), SINCGARS Cryptographic Modernization with TSV 3.1.1, civil interoperability, and data link into the ARC-210 system. Support for networking requirements development and prototyping, Integrated Waveform (IW), Intelligence Broadcast System over modern Code Division Multiple Access based satellite channels, Tactical Networks, Data Links, Link 16 and Link 22. ***FY 2021 Plans:*** Continue TRANSEC SATCOM Crypto Modernization in accordance with NSA directives and TSV Suite B for interoperability. Obtain Gen6 delta NSA certification and Gen5 Joint Interoperability Test Command (JITC) certification for Operational Flight Plan (OFP) software release. Release Gen5 Ver 007. Award development of Gen6 TSV 3.1.1 crypto modernization, Single Channel Ground and Airborne Radio System (SINCGARS 3.1), Advanced Crypto Capabilities (ACC) modernization and Second Generation Anti-Jam Tactical UHF Radio for NATO (SATURN Ed. 4). ***FY 2022 Base Plans:*** Complete Crypto Modernization Gen6 TRANSEC & TSV Suite B. Award development of Gen5 TSV 3.1.1 crypto modernization, Single Channel Ground and Airborne Radio System (SINCGARS 3.1), Advanced Crypto Capabilities (ACC) modernization and Second Generation Anti-Jam Tactical UHF Radio for NATO (SATURN Ed.					

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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
4). Attain Gen6 JITC/Gen5 NSA Certifications. Release Gen6 Ver 0004. Attain approval of Gen5/6 TSV 3.1.1 ECP. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase of $5.759 million from FY21 to FY22 is due to the overlapping efforts of completing the Gen6 Crypto Mod TRANSEC & TSV Suite B, and awarding the start of the Gen5A TSV3.1.1 Crypto Mod, Tactical Antijam SINCGARS, and SATURN suite, whilst continuing the Gen6 TSV 3.1.1 Crypto Mod, Tactical Antijam SINCGARS, Advanced Crypto Capabilities, and SATURN Edition 4 systems development. The Navy's adjustment to fund these modernization efforts are driven by DoD CIO's Capability Planning Guidance.					
Title: Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II) ***Articles:*** ***Description:*** This program will conduct research, studies, development, integration, demonstration, test and evaluation efforts to meet naval aviation GPWS/TAWS II requirements. These requirements span all operational modes and operational environments, to include Degraded Visual Environment. Perform GPWS/TAWS II platform integration studies and activities to determine technical and cost effective solutions across naval aviation. Develop GPWS/TAWS II solutions tailored to platform performance and range of military operations. Develop simulation models for use at Manned Flight Simulator (MFS) or other simulation environments as required for platform tailoring. Evaluate aircraft simulation models for suitability in GPWS/TAWS II development effort. Develop GPWS/TAWS II algorithms utilizing simulation environments as real-time hardware and pilot in the loop tool. Develop and evaluate algorithm interfaces necessary for integration of the algorithm within platform host computer. Develop software code to execute GPWS/TAWS II algorithm in host platforms. ***FY 2021 Plans:*** Complete TAWS II Software Re-Architecture. Complete H-60 TAWS II Software Development Formal Build (FB)3 and deliver TAWS II FB3. Begin Lockheed Martin SC-2X Integration Testing FB3. Begin V-22 TAWS II requirements development. ***FY 2022 Base Plans:***	4.251 -	4.327 -	8.009 -	0.000 -	8.009 -

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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
Deliver H-60 TAWS II. Start on H-60 TAWS II Software Development FB4. Complete Lockheed Martin SC-2X Integration Testing FB3. Complete DT-3 Flight Test. Complete V-22 TAWS II requirements development and release RFP. Initiate FB1 Software Development. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase of $3.682 million from FY21 to FY22 is due to the execution of the V-22 TAWS II Software Development FB1 and H-60 TAWS II Software Development FB4 efforts, whilst developing V-22 requirements and completing H-60 DT-3 Flight Testing.					
Title: Collaborative Warfare (CW) ***Articles:*** ***Description:*** The CW component is a Research & Development effort to identify targeting gaps and determine the warfighting benefit of integrating networked capabilities into naval aircraft to fill those gaps. The CW component also addresses maritime targeting gaps for naval aircraft to operate more effectively with other military services. The following efforts are included but are not limited to: 1) Comprehensive naval aviation and maritime targeting cyber-resilient requirements that map fleet gaps and requirements to cross-platform naval aviation solutions. 2) Netted sensors and maritime targeting proof of concept prototype experiments and demonstrations with the Defense Advanced Research Projects Agency (DARPA) and Office of Naval Research (ONR) Future Naval Capability. Mature cyber-resilient technologies for practical application across Naval Aviation platforms, the Navy, and Joint Services. 3) Developing cyber-resilient architecture and implementation standards in support of broad Naval Aviation program integration. 4) Integrating Naval Aviation cyber-resilient requirements and Navy control system architectures for broad Naval Aviation programs. ***FY 2021 Plans:*** Coordinate Cyber Resilient OS (CROS) experiment using Defense Advanced Research Projects Agency (DARPA) and Office of Naval Research (ONR) technologies in support of a common Naval Aviation mission-computing environment, leveraging existing efforts and examining parallel development. This experiment would be in a lab environment and focused on the effectiveness of the cyber-resilient technologies. Execute CROS experiment in operationally-representative platform or systems integration lab. Work with Naval Aviation program managers to develop platform implementation plans. Continue to develop cyber-resilient requirements, standards, and architectures that assure netted-sensors' Concept of Operations and capabilities. ***FY 2022 Base Plans:***	0.323 -	0.254 -	0.107 -	0.000 -	0.107 -

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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 develop cyber-resilient requirements, standards, and architectures that assure netted-sensors' Concept of Operations and capabilities. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease of $0.147 million from FY21 to FY22 is due to a Navy Collaborative Warfare reduction.					
Title: Avionics Component Improvement Program (AvCIP)	4.133	6.538	5.016	0.000	5.016
Articles:	-	-	-	-	-
Description: Investigate high value Return On Investment component improvement candidate projects. Design and develop solutions that correct avionics systems reliability, performance and sustainment deficiencies in support of NAVAIR Commander's Strategic Imperatives of 'Aligning existing resources to better support today's Readiness' and 'Increase Speed of Products to the Fleet.' Stop operating and sustainment cost growth by reducing costs for fielded systems and implementing life-cycle cost reduction initiatives as part of new systems development. This program positions resources for next year application to fast-track corrections to existing problematic aviation electronics systems. Projects address critical readiness issues (significant back-orders or impending sustainability failures that threaten to down aircraft), functional performance obsolescence issues (system failing to support mission requirement), and top sustainment cost drivers (out of proportion annual maintenance or repair costs). Resources enable design and development of technology insertion and product redesign or replacement to meet readiness goals, meet mission objectives, or reduce overall sustainment costs. Candidate projects are submitted via a rigorous template, reviewed by a panel of Avionics professionals, and selected based upon urgency, warfighting contributions, breadth of application and scope of Return On Investment. Resources cover non-recurring engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). ***FY 2021 Plans:*** Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters). ***FY 2022 Base Plans:***					

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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
Address current fleet problem avionics systems (top readiness degraders, cost drivers, obsolescence-driven sustainability, capability loss, fleet head-hurters). ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease of $1.522 million from FY21 to FY22 is due to the completion of ASN-139 Test & Repair Stations Future Readiness - Cross Functional Team (FR-CFT) 0014.					
Title: Avionics Architecture Team (AAT)	9.873	9.914	10.373	0.000	10.373
Articles:	-	-	-	-	-
Description: The Avionics Architecture Team (AAT) provides hardware and software (HW/SW) standards and product line development and management for common HW/SW operating environments to establish testable open architecture requirements in direct response to the Modular Open Systems Architecture (MOSA) requirement in accordance with 10 U.S.C. 2446a-2446c; Tri-Service Memorandum for Service Acquisition Executives and Program Executive Officers, 07 Jan 2019; FY17 National Defense Authorization Act (NDAA) Section 801 Open Architecture language and Section 861 Implementation of Modular Open Systems Architecture Requirements, 23 Dec 2016; FY21 NDAA Sec. 804 - Implementation of Modular Open Systems Architecture requirements, 01 Jan 2021; DoD Directive 5000.1; N6/N7 Naval Open Architecture Requirements Letter 9010, Ser. N6N7/5U916276; and SECNAVINST 5000.2F, 26 Mar 2019. The Software Open Systems Technologies (SWOST) includes the Future Airborne Capability Environment (FACE) Technical Standard. This Future Airborne Capability Environment (FACE) Technical Standard is developed through Navy, Army, Air Force, Industry and Academia collaboration in accordance with Public Law 104-113. The Hardware Open Systems Technologies (HOST) standard is developed through government and academia collaboration and is provided to industry for prototyping and implementation efforts. The Functional Architecture for Strategic Reuse (FASTR) initiative, through Platform Integration and Modeling, will define a standard process for mission level capability decomposition to support product line development and management. The AAT provides Subject Matter Experts to define and architect a set of Open Architecture Standards and product lines, design principles and guidance, development and integration tools, acquisition strategy, contracting guidance and cost estimates. The AAT will also provide Subject Matter Experts directly to weapons systems/platforms to support inclusion of Open Architecture Standards in the early stages of life cycle development. The results will enable Department of Defense (DoD) weapons systems/platforms to systematically procure open, modular and reconfigurable software architectures, reuse HW/SW and deliver scalable, portable and interoperable war fighting capabilities at a faster rate, reducing redundant development costs and increasing competition. Infrastructure components and					

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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
frameworks built to these standards will support capability upgrades on various platforms by enabling integration of common, non-proprietary applications. The AAT initiatives enable the government's role as Lead Systems Integrator, per the Weapons System Acquisition Reform Act (WSARA) 2009, and cost effectively manage data rights for reuse across the DoD. ***FY 2021 Plans:*** Provide development support, mission based engineering, systems engineering and program management for design and acquisition strategy implementation guidance, and demonstrate interoperability of the standards. Generate revisions for future editions of the FACE Technical Standard based on issues identified by government and industry consortium and develop corresponding conformance tools. Research new hardware technologies and develop Tier 2 HOST specifications to support widely adopted commercial technologies and platform requirements. Provide input to platforms developing Tier 3 HOST specifications. Assist platforms with strategies for modular functional architectures and implementation of FACE and HOST standards. Participate in international collaboration efforts to define comprehensive open architecture strategy. Generate alignment strategies for a comprehensive open architecture approach between Navy, Army, Air Force and international partners. Support the implementation of Naval Aviation's data model strategy. Provide subject Matter Expert support for platform integration and competitive source selection. Academia prototyping and demonstration efforts for Future Airborne Capability Environment (FACE), Functional Architecture for Strategic Reuse (FASTR) and Hardware Open Systems Technologies (HOST) initiatives. ***FY 2022 Base Plans:*** Provide development support, mission based engineering, systems engineering and program management for design and acquisition strategy implementation guidance, and demonstrate interoperability of the standards. Generate revisions for future editions of the FACE Technical Standard based on issues identified by government and industry consortium and develop corresponding conformance tools. Research new hardware technologies and develop Tier 2 HOST specifications to support widely adopted commercial technologies and platform requirements. Provide input to platforms developing Tier 3 HOST specifications. Implement Small Form Factor standards into the HOST environment, supporting UAV and other type platforms. Assist platforms with strategies for modular functional architectures and implementation of FACE and HOST standards. Participate in international collaboration efforts to define comprehensive open architecture strategy. Generate alignment strategies for a comprehensive open architecture approach between Navy, Army, Air Force and international partners. Support the implementation of Naval Aviation's data model strategy. Provide subject Matter Expert support for platform integration and competitive source selection. Academia prototyping and demonstration					

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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
efforts for Future Airborne Capability Environment (FACE), Functional Architecture for Strategic Reuse (FASTR) and Hardware Open Systems Technologies (HOST) initiatives. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase of $0.459 million from FY21 to FY22 is due to shifting to open architecture platform integration between all military branches and international partners, including implementing Small Form Factor standards into the HOST environment, supporting UAV and other type platforms.					
Title: Digital Interoperability (DI) / Marine Air Ground Task Force (MAGTF) Agile Networking Gateway Link (MANGL) ***Articles:*** ***Description:*** Digital Interoperability (DI) is the United States Marine Corps' strategy to bridge multiple generations of technology using three matured technologies; gateways, software defined radios, and Commercial Off-The-Shelf (COTS) interfaces. This modular developmental approach enables iterative migration to advanced waveforms and payloads while providing enhanced digital connectivity between forces using dissimilar technologies. DI will enable fleet integration of new capabilities on COTS tablets and Government Off-The-Shelf (GOTS) applications. DI will also enable logistics tracking and reporting (cargo and personnel) with the use of Radio Frequency Identification technology, advanced Electronic Warfare/Cyber capability, and threat data capturing/off-boarding. The architecture establishes the foundation to enable system performance data off-boarding, as well as data fusion and artificial intelligence augmentation capabilities. Development and testing of MANGL components, to include Software Reconfigurable Payload (SRP), gateways and tablets, in Hub and Spoke configurations for MV-22B. Translates messages from one tactical data link to another (i.e. Link 16 to Adaptive Networking Wideband Waveform [ANW2]) with a tactically proven gateway, thereby leveraging previous investments. Provides the foundation for Command, Control, Communications, Electromagnetic Spectrum Operations, and Intelligence exploitation of platform/sensor data off-boarding, data fusion, and distributed processing. Enables real-time blue force situational awareness and improved decision-making through the sharing of a Common Operational Picture, including friendly force positions, capabilities, and threat information for both the aircrew and embarked troops. Provides for operations in denied and degraded environments, enables range extension and distributed operations.	0.000 -	21.133 4	18.872 3	0.000 -	18.872 3

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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
SRP 2.0 is a single common payload module that is government configuration controlled architecture, and reconfigurable to support simultaneous missions and applications making maximum use of available bandwidth and ensuring interoperability all with a cyber-secure, National Security Agency (NSA) approved, cryptographic solution. There are earlier versions of the SRP (1.0 and 1.5) operationally deployed in other naval platforms. SRP 2.0 provides an imminently upgradable platform for eventual inclusion of Low Probability of Intercept (LPI)/ Low Probability of Detection (LPD) and advanced mesh waveforms for the exchange of tactical data, imagery, and video. Incorporation of new waveforms can be accomplished within 18 months vice the 36 to 48 months required for integration and initial fielding using traditional approaches. ***FY 2021 Plans:*** Centralized program management activities for acquisition documentation preparation, critical design review (CDR), system design and development, test planning, logistics support development, mission based engineering, and systems engineering. Order four (4) test articles comprising one (1) SRP 2.0, one (1) gateway, and four (4) tablets per article using existing system development contracts. Initiate integration and logistics analysis for MV-22. ***FY 2022 Base Plans:*** Continue Middle Tier of Acquisition Rapid Prototyping effort to design, develop and deliver MANGL test articles. Continue with MV-22 integration and logistics analysis. Conduct design verification testing, produce installation drawings, perform safety of flight analysis in preparation for flight demonstration. Continue with Seasite Lab/ MULE Lab/MV-22 Systems Integration Lab (SIL) build-up to support testing. Perform qualification testing. Conduct Cyber Security Tabletop. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Decrease of $2.261 million from FY21 to FY22 is due to awarding the initial increment to design, develop and deliver four (4) MANGL test articles in FY21.					
Title: Common Mission Computing and Displays (CMCD)	0.000	0.000	0.265	0.000	0.265
Articles:	-	-	-	-	-
Description: The Common Mission Computing and Displays (CMCD) program enables the development, procurement, integration, test and fielding of common capabilities through the use of commercial off the shelf mission computing and displays products as part of the CMCD family of systems across multiple platforms. As part of CMCD, the Mission Computer Alternative (MCA) provides for a current state technology common mission					

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 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
computing baseline across multiple legacy aircraft platforms to include the T-45 Goshawk, F/A-18E/F, EA-18G and E-2D Hawkeye. MCA allows for Technology Refresh activities to be conducted throughout the life cycle of the mission computer in the Multi-Use Laboratory Environment (MULE) in a proactive manner. MCA will enable platforms to remain relevant and quickly gain a tactical edge with new capabilities without waiting years for the traditional mission computer redesign, test and fielding process. Also, part of the CMCD program is the Common Display Alternatives (CDA) initiative to increase pilot tactical and situational awareness and improve the man-machine interface for naval aviators. The CDA initiative evaluates military aircraft platform requirements and commercial aircraft display products for applicability to those military aircraft platforms. Commercial displays are known for their high reliability and the incorporation of the latest technologies. ***FY 2021 Plans:*** N/A ***FY 2022 Base Plans:*** Conduct assessments of MCA platform processing needs through organic based MULE lab activities to enhance the MCA. Initiate planning for Technology and Capability Insertions and leveraging those capabilities across multiple legacy platforms. Conduct an evaluation of the T-45 MCA processing requirements in support of the platforms plans for integrating the replacement Heads Up Display (HUD) in the cockpit. Identify potential replacement processors, new interfaces and increased memory needs. ***FY 2022 OCO Plans:*** N/A ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase of $0.265 million from FY21 to FY22 for a zero-sum realignment of funds with no new start to correct the appropriation from APN-5 to RDTE for the MULE lab to assess MCA processor performance and requirements to support the incorporation of a new HUD in the T-45 aircraft.					
Accomplishments/Planned Programs Subtotals	34.430	53.782	60.117	0.000	60.117

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
• APN/0577: *Common Avionics Changes*	82.924	123.416	118.839	-	118.839	-	-	-	-	-	-

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 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

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

D. Acquisition Strategy

Communication Navigation Surveillance/Air Traffic Management (CNS/ATM) program is a system of systems. The program will encompass the integration of various systems which will be procured utilizing existing contracts for integration on forward-fit and retrofit platforms to provide CNS/ATM functionality. Tactical Communications (TACCOM) is utilizing a firm fixed price contract to Collins Aerospace for research and development of the ARC-210 Gen 5/6 and other Navy contract vehicles for integration studies. The Navy will integrate systems and components to satisfy platform requirements to achieve tactical communication capability as determined by analyses. Ground Proximity Warning System/Terrain Awareness Warning System (GPWS/TAWS II) Software Modules will be developed by a Government Software Product Team in collaboration with Industry where required. Avionics Component Improvement Program (AvCIP) will annually review, compete and select candidate component improvement proposals according to urgency, criticality of warfighting contributions, technical risk, breadth of application, and scope of Return On Investment (ROI). Projects are selected by a panel of Avionics management experts, including representatives from OPNAV N98, HQMC AWS, NAVAIR, NAVSUP, and the Fleet. Projects are executed by managers in platform or commodity offices that own the component. The AvCIP program management team manages project selection, allocates funds, monitors multiple project executions against proposed spend plans, and tracks solution performance and achievement of projected ROIs over time using Fleet maintenance and component performance databases. Cost avoidances are coordinated with OPNAV N98 to balance Flying Hour Program costs. Component improvement solutions include modular hardware, software and material upgrades. Resources cover engineering elements (including design and development, prototypes, platform integration, test and evaluation), program management and associated logistics elements (including technical data preparation, support equipment, provisioning, and training). Avionics Architectures Team (AAT) will provide acquisition strategy guidance and direct support to weapon systems/platforms implementing open systems architectures to address open architecture requirements and to conform to public law. Common Mission Computing and Displays (CMCD) enables the development, test and fielding of common capabilities through the use of commercial off the shelf mission computing and displays products across multiple platforms through the Multi-Use Laboratory Environment. Digital Interoperability (DI)/Marine Air Ground Task Force (MAGTF) Agile Networking Gateway Link (MANGL) seeks approval as a Middle Tier Rapid Prototyping/Rapid Fielding Program. An Other Transaction Authority (OTA) contracting strategy will be used to fund the prototype and procure test and lab assets. The MANGL prototype will integrate upgraded system components previously fielded by other initiatives with a government developed software reconfigurable payload.

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 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

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
Primary Hardware Dev	Various	Various : Various	19.968	2.208	Jan 2020	5.230	Jan 2021	4.902	Jan 2022	-		4.902	-	-	-
Primary Hardware Dev	WR	NAWCAD : Patuxent River, MD	0.954	0.414	Nov 2019	0.499	Nov 2020	2.194	Nov 2021	-		2.194	-	-	-
Primary Hardware Dev DI/ MANGL	MIPR	NRL : Washington, DC	0.000	0.000		12.302	Jan 2021	11.512	Jan 2022	-		11.512	-	-	-
Primary Hardware Dev DI/ MANGL	SS/FFP	Collins Aerospace : Cedar Rapids, IA	0.000	0.000		1.055	May 2021	2.000	May 2022	-		2.000	-	-	-
Primary Hardware Dev DI/ MANGL	SS/FFP	Kranze Technology Solutions : Prospect Heights, IL	0.000	0.000		2.699	May 2021	1.105	May 2022	-		1.105	-	-	-
Aircraft Integration TACCOM	SS/FFP	Collins Aerospace : Cedar Rapids, IA	31.866	4.699	Jan 2020	3.360	Jan 2021	8.693	Jan 2022	-		8.693	-	-	-
Aircraft Integration GPWS/ TAWS II	SS/CPIF	Lockheed Martin : Owego, NY	0.304	0.792	Mar 2020	0.732	Nov 2020	0.409	Nov 2021	-		0.409	-	-	-
Aircraft Integration	Various	Various : Various	0.000	0.076	Jul 2020	0.529	Dec 2020	1.282	Dec 2021	-		1.282	-	-	-
Systems Engineering AAT	MIPR	DTIC : Fort Belvior, VA	19.644	2.196	Jan 2020	0.000		0.000		-		0.000	-	-	-
Systems Engineering AAT	MIPR	CCDC/UARC : Huntsville, AL	0.000	0.000		1.540	Jan 2021	1.563	Jan 2022	-		1.563	-	-	-
Systems Engineering TACCOM	WR	NAWCAD : Patuxent River, MD	6.156	1.867	Nov 2019	2.314	Nov 2020	1.840	Nov 2021	-		1.840	-	-	-
Systems Engineering	Various	Various : Various	8.029	2.067	Dec 2019	2.331	Dec 2020	2.849	Dec 2021	-		2.849	-	-	-
Systems Engineering	WR	NAWCAD : Patuxent River, MD	2.496	0.718	Nov 2019	0.683	Nov 2020	1.410	Nov 2021	-		1.410	-	-	-
Prior Yr Product Dev no longer funded in FYDP	Various	Various : Various	4.565	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	93.982	15.037		33.274		39.759		-		39.759	-	-	N/A

Remarks

- Primary Hardware Dev NAWCAD Pax increase in FY22 is due to the start of V-22 TAWS II program for Manned Flight Simulator and AAT implementation of Small Form Factor standards into the HOST environment, supporting UAV and other type platforms.
- Primary Hardware Dev DI/MANGL Collins Aerospace increase in FY22 is for development of Dual Power Amplifier (DPA) to support SRP Waveform. Aircraft Integration (Various) increase in FY22 is due to DI MANGL MV-22 integrations efforts.

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 0605217N / *Common Avionics*	Project (Number/Name) 0572 / *JT Service/NV Std Avionics CP/SB*	

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
- Aircraft Integration TACCOM increase in FY22 is due to the development and integration of Advanced Crypto Capability (ACC), TSV 3.1.1 Single Channel Ground and Airborne Radio System (SINCGARS 3.1). - Systems Engineering Various & NAWCAD PAX increase in FY22 is due to the development and integration of Advanced Crypto Capability (ACC), TSV 3.1.1 Single Channel Ground and Airborne Radio System (SINCGARS 3.1).															

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 Development TACCOM	SS/FFP	Collins Aerospace : Cedar Rapids, IA	0.745	0.009	Jan 2021	0.301	Mar 2021	1.394	Mar 2022	-		1.394	-	-	-
Integrated Logistics Support	WR	NAWCAD : Patuxent River, MD	1.928	0.514	Nov 2019	1.090	Nov 2020	1.263	Nov 2021	-		1.263	-	-	-
Support Development	Various	Various : Various	1.319	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	3.992	0.523		1.391		2.657		-		2.657	-	-	N/A

Remarks

Product Support increase in FY22 is due to the development and integration of Advanced Crypto Capability (ACC), TSV 3.1.1 Single Channel Ground and Airborne Radio System (SINCGARS 3.1).

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 Test and Evaluation	WR	NAWCAD : Patuxent River, MD	3.775	0.443	Nov 2019	0.327	Nov 2020	2.797	Nov 2021	-		2.797	-	-	-
Developmental Test and Evaluation	Various	Various : Various	2.646	0.000		0.000		0.000		-		0.000	-	-	-
		Subtotal	6.421	0.443		0.327		2.797		-		2.797	-	-	N/A

Remarks

T&E increase in FY22 is due to the development and integration of Advanced Crypto Capability (ACC), TSV 3.1.1 Single Channel Ground and Airborne Radio System (SINCGARS 3.1).

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 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

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
Contractor Engineering Support	Various	Various : Various	6.131	5.747	Jan 2020	2.173	Jan 2021	3.659	Jan 2022	-		3.659	-	-	-
Contractor Engineering Support TACCOM	C/CPFF	Precise : Lexington Park, MD	5.075	1.318	Dec 2019	1.337	Dec 2020	1.250	Dec 2021	-		1.250	-	-	-
Contractor Engineering Support AAT	C/CPFF	Precise : Lexington Park, MD	5.266	2.216	Dec 2019	2.890	Dec 2020	1.666	Dec 2021	-		1.666	-	-	-
Contractor Management Support	Various	Various : Various	0.000	1.694	Dec 2019	1.720	Dec 2020	0.679	Dec 2021	-		0.679	-	-	-
Contractor Management Support AAT	C/CPFF	Precise : Lexington Park, MD	0.000	1.691	Dec 2019	0.613	Dec 2020	1.535	Dec 2021	-		1.535	-	-	-
Government Engineering Support	WR	NUWC : Keyport, WA	0.000	1.386	Nov 2019	0.000		0.049	Nov 2021	-		0.049	-	-	-
Government Engineering Support	WR	NAWCAD : Patuxent River, MD	1.249	0.549	Nov 2019	3.301	Nov 2020	1.145	Nov 2021	-		1.145	-	-	-
Government Engineering Support	MIPR	NRL : Washington, DC	0.000	0.000		0.750	Jan 2021	0.000		-		0.000	-	-	-
Government Engineering Support AAT	WR	NAWCAD : Patuxent River, MD	3.850	1.579	Nov 2019	2.073	Nov 2020	1.952	Nov 2021	-		1.952	-	-	-
Program Management Support	WR	NAWCAD : Patuxent River, MD	8.321	2.227	Nov 2019	3.912	Nov 2020	2.917	Nov 2021	-		2.917	-	-	-
Program Management Support	Various	Various : Various	0.083	0.001	Nov 2019	0.001	Nov 2020	0.002	Nov 2021	-		0.002	-	-	-
Travel	WR	NAVAIR : Patuxent River, MD	0.105	0.019	Feb 2020	0.020	Feb 2021	0.050	Feb 2022	-		0.050	-	-	-
		Subtotal	30.080	18.427		18.790		14.904		-		14.904	-	-	N/A

Remarks

- Contractor Engineering (Various) and Management Support (AAT) increase in FY22 is due to change in contract strategy for open architecture and the start of V-22 TAWS II program.
- Increase in FY22 travel is due to the FY21 COVID-19 travel restrictions that are expected to lift in FY22.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Navy			Date: May 2021
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	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	134.475	34.430		53.782		60.117		-		60.117	-	-	N/A

Remarks

(U) Common Avionics FY16 and prior is reflected in PE 0604215N, Project Unit 0572.

Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
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COMMUNICATIONS, NAVIGATION, SURVEILLANCE/AIR TRAFFIC MGMT (CNS/ATM)	FY 2020				FY 2021				FY 2022			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Acquisition Milestones												
Systems Development												
	Evaluate CNS/ATM technologies and develop solutions to support platform integrations											
Test and Evaluation												
Production Milestones												
Deliveries												

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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 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

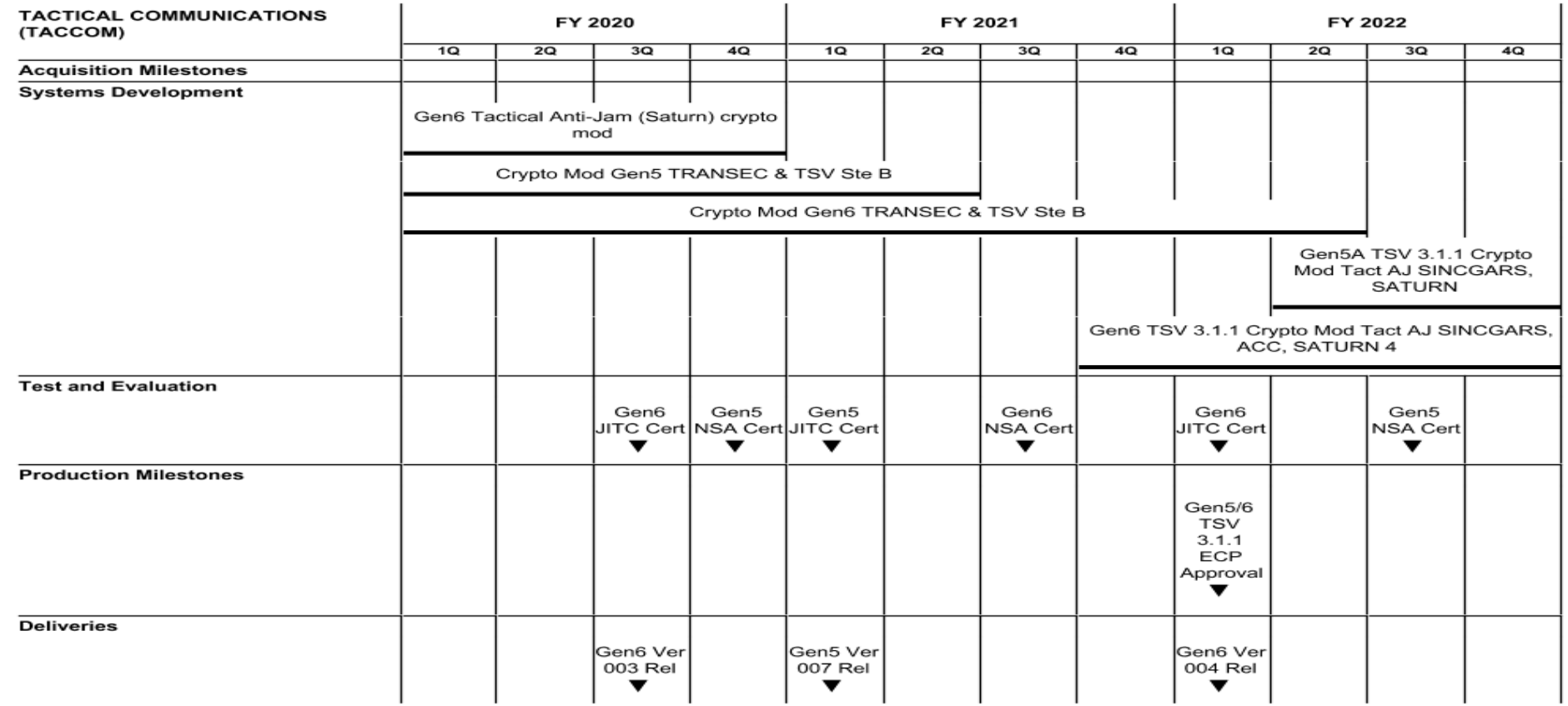

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

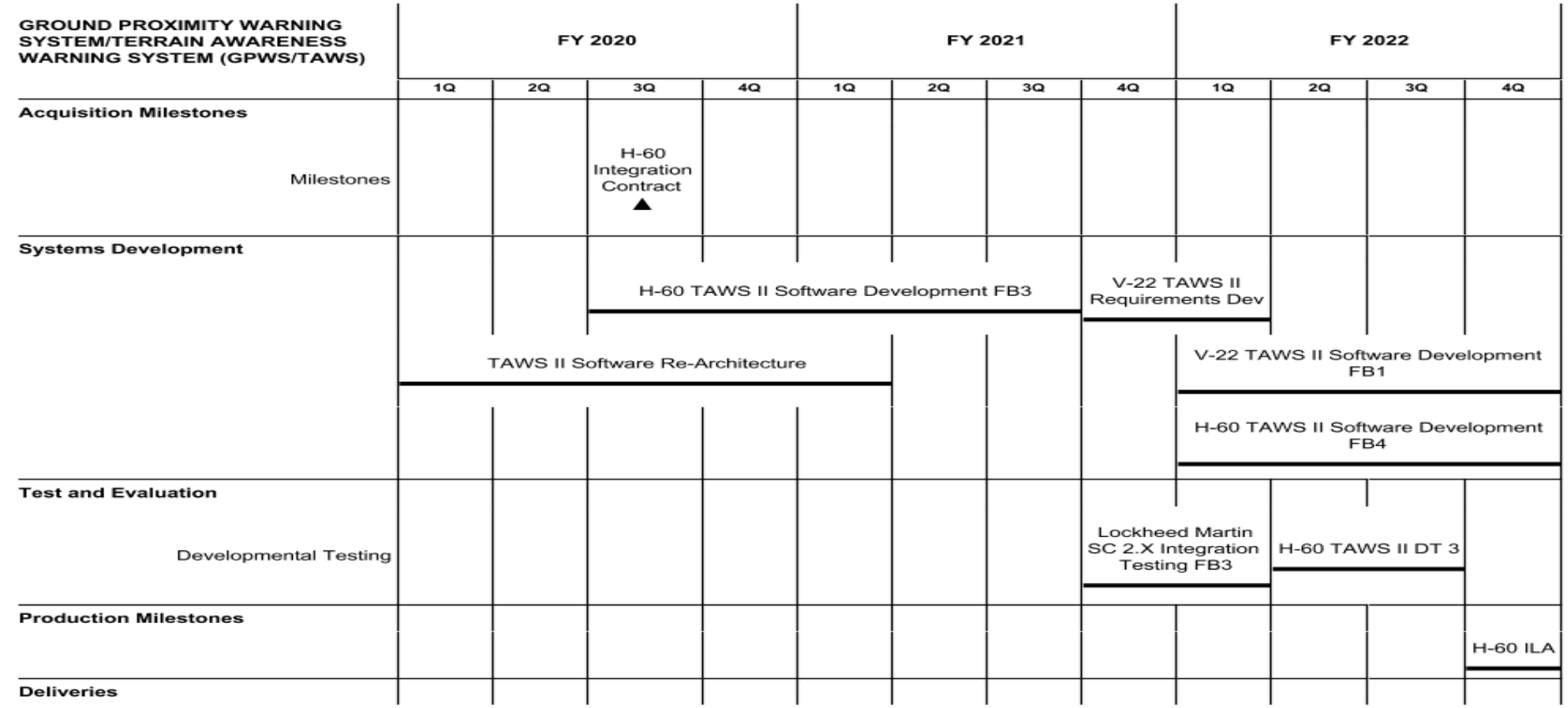

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

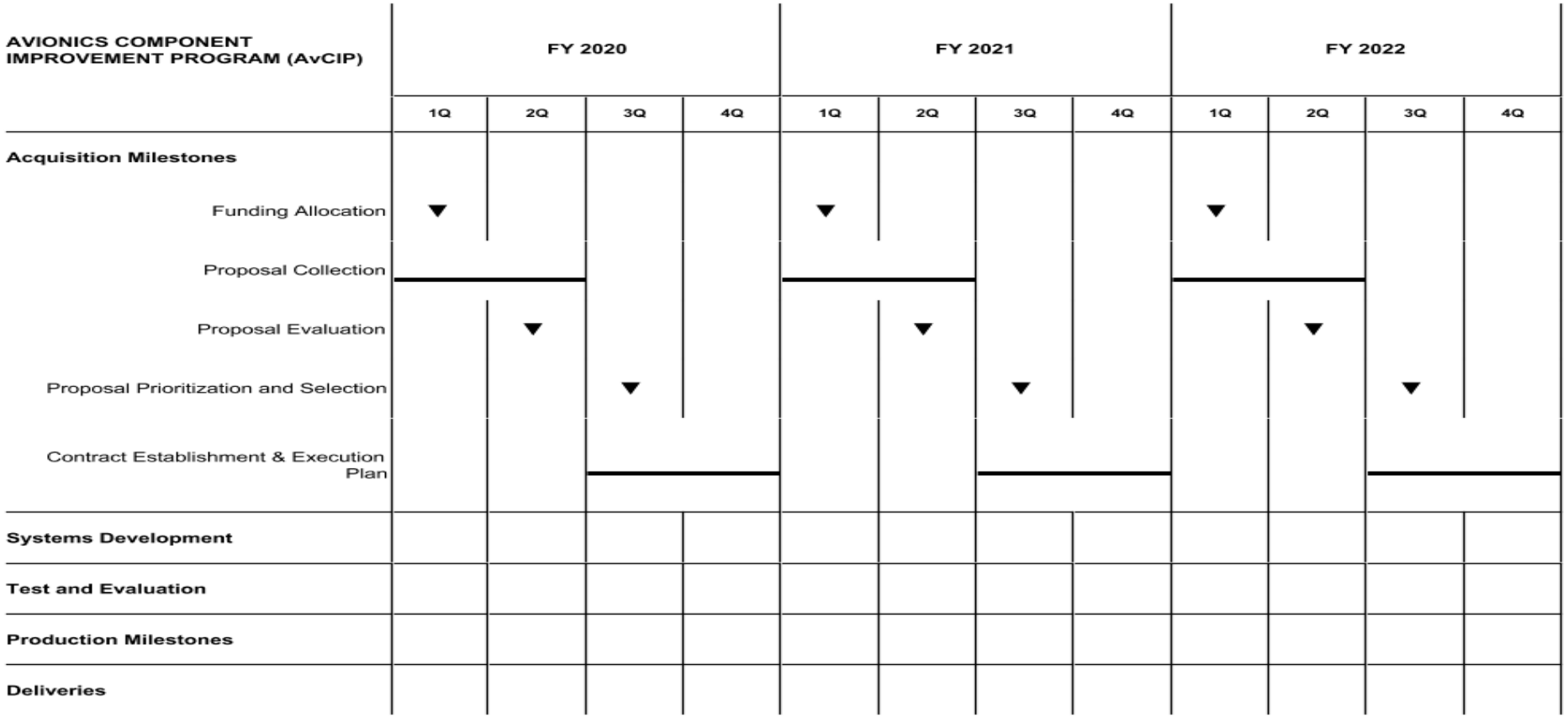

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

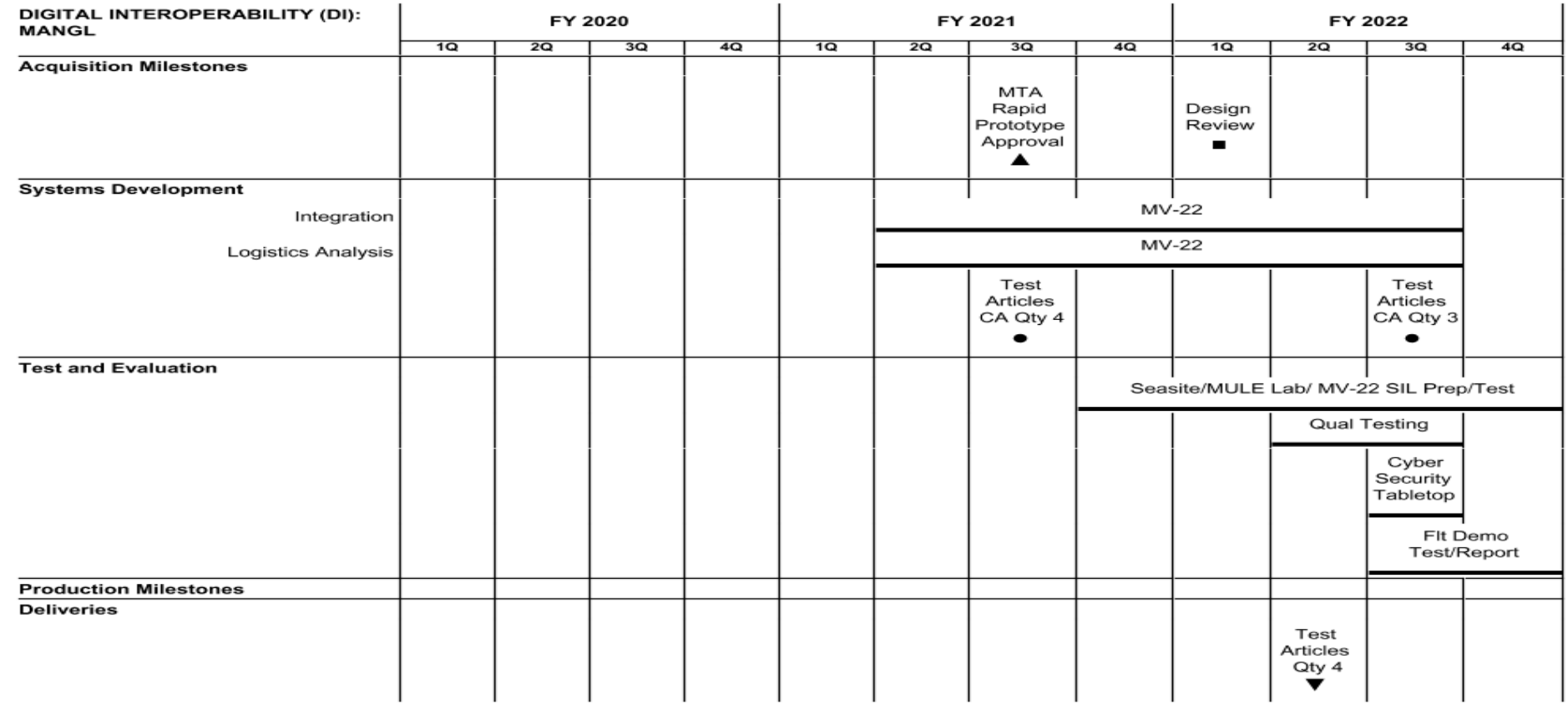

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Navy		Date: May 2021
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
COMMUNICATIONS, NAVIGATION, SURVEILLANCE/AIR TRAFFIC MGMT (CNS/ ATM)				
Systems Development: Evaluate CNS/ATM technologies and develop solutions to support platform integrations	1	2020	4	2022
TACTICAL COMMUNICATIONS (TACCOM)				
Systems Development: Gen6 Tactical Anti-Jam (Saturn) crypto modernization	1	2020	4	2020
Systems Development: Crypto Modernization Gen5 TRANSEC & TSV Suite B	1	2020	2	2021
Systems Development: Crypto Modernication Gen6 TRANSEC & TSV Suite B	1	2020	2	2022
Systems Development: Gen5A TSV 3.1.1 Crypto Modernization Tactical Anti-Jam SINCGARS, SATURN	2	2022	4	2022
Systems Development: Gen6 TSV 3.1.1 Crypto Modernization Tactical Anti-Jam SINCGARS, ACC, SATURN 4	4	2021	4	2022
Test and Evaluation: Gen6 JITC Cert 3	3	2020	3	2020
Test and Evaluation: Gen5 NSA Cert 1	4	2020	4	2020
Test and Evaluation: Gen5 JITC Cert 4	1	2021	1	2021
Test and Evaluation: Gen6 NSA Cert 4	3	2021	3	2021
Test and Evaluation: Gen6 JITC Cert 5	1	2022	1	2022
Test and Evaluation: Gen5 NSA Cert 5	3	2022	3	2022
Production Milestones: Gen5/6 TSV 3.1.1 ECP Approval	1	2022	1	2022
Deliveries: Gen6 Ver 003 Release	3	2020	3	2020
Deliveries: Gen5 Ver 007 Release	1	2021	1	2021
Deliveries: Gen6 Ver 004 Release	1	2022	1	2022
GROUND PROXIMITY WARNING SYSTEM/TERRAIN AWARENESS WARNING SYSTEM (GPWS/TAWS)				

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**
Acquisition Milestones: Milestones: H-60 Integration Contract	3	2020	3	2020
Systems Development: H-60 TAWS II Software Development FB3	3	2020	3	2021
Systems Development: V-22 TAWS II Requirements Development	4	2021	1	2022
Systems Development: TAWS II Software Re-Architecture	1	2020	1	2021
Systems Development: V-22 TAWS II Software Development FB1	1	2022	4	2022
Systems Development: H-60 TAWS II Software Development FB4	1	2022	4	2022
Test and Evaluation: Developmental Testing: Lockheed Martin SC 2.X Integration Testing FB3	4	2021	1	2022
Test and Evaluation: Developmental Testing: H-60 TAWS II DT 3	2	2022	3	2022
Production Milestones: H-60 Integrated Logistics Assessment	4	2022	4	2022
AVIONICS COMPONENT IMPROVEMENT PROGRAM (AvCIP)				
Acquisition Milestones: Funding Allocation: Funding Allocation4	1	2020	1	2020
Acquisition Milestones: Funding Allocation: Funding Allocation5	1	2021	1	2021
Acquisition Milestones: Funding Allocation: Funding Allocation6	1	2022	1	2022
Acquisition Milestones: Proposal Collection: Proposal Collection4	1	2020	2	2020
Acquisition Milestones: Proposal Collection: Proposal Collection5	1	2021	2	2021
Acquisition Milestones: Proposal Collection: Proposal Collection6	1	2022	2	2022
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation4	2	2020	2	2020
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation5	2	2021	2	2021
Acquisition Milestones: Proposal Evaluation: Proposal Evaluation6	2	2022	2	2022
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection4	3	2020	3	2020
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection5	3	2021	3	2021
Acquisition Milestones: Proposal Prioritization and Selection: Proposal Prioritization and Selection6	3	2022	3	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 0605217N / *Common Avionics*	**Project (Number/Name)** 0572 / *JT Service/NV Std Avionics CP/SB*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Acquisition Milestones: Contract Establishment & Execution Plan: Contract Establishment & Execution Plan4	3	2020	4	2020
Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan5	3	2021	4	2021
Acquisition Milestones: Contract Establishment & Execution Plan: Conract Establishment & Execution Plan6	3	2022	4	2022
DIGITAL INTEROPERABILITY (DI): MANGL				
Acquisition Milestones: Design Review	1	2022	1	2022
Acquisition Milestones: Middle Tier Acquisition (MTA) Rapid Prototype Approval	3	2021	3	2021
Systems Development: Integration: MV-22	2	2021	3	2022
Systems Development: Logistics Analysis: MV-22	2	2021	3	2022
Systems Development: Logistics Analysis: Test Articles CA Qty 4	3	2021	3	2021
Systems Development: Logistics Analysis: Test Articles CA Qty 3	3	2022	3	2022
Test and Evaluation: Seasite/MULE Lab/ MV-22 SIL Prep/Test	4	2021	4	2022
Test and Evaluation: Qualification Testing	2	2022	3	2022
Test and Evaluation: Cyber Security Tabletop	3	2022	3	2022
Test and Evaluation: Flight Demonstration Test/Report	3	2022	4	2022
Deliveries: Test Articles Qty 4	2	2022	2	2022