Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy												Date: March 2023
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 0604262N / *V-22A*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	9,916.095	89.448	125.233	137.597	-	137.597	117.745	128.179	103.747	112.708	Continuing	Continuing
1425: *V-22*	9,904.583	70.958	98.007	95.569	-	95.569	39.753	32.372	12.417	0.000	0.000	10,253.659
3090: *V-22 Improvement Program*	11.512	14.387	27.226	42.028	-	42.028	77.992	95.807	91.330	112.708	Continuing	Continuing
9999: *Congressional Adds*	0.000	4.103	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.103
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 212												

A. Mission Description and Budget Item Justification

The V-22 Osprey is an Acquisition Category IC Joint Program led by the Department of the Navy for the purpose of developing, testing, evaluating, procuring and fielding a tilt rotor, vertical takeoff and landing aircraft for Joint Service application. The V-22 program is designed to provide an aircraft to meet the amphibious/vertical assault needs of the Marine Corps, the Carrier Onboard Delivery needs of the Navy, and the special operations needs of the Air Force and the United States Special Operations Command (USSOCOM). The MV-22 variant replaced the CH-46E in the Marine Corps and the CMV-22 variant will replace the C-2A in the Navy. The CV-22 variant replaced the MH-53J and MH-53M and augments the C-130 in the Air Force and USSOCOM. The V-22 is capable of flying over 2,100 nautical miles, with a single refueling, giving the services the advantage of a vertical/short take-off and landing aircraft that can rapidly self-deploy to any location in the world. This program is funded under Engineering Manufacturing and Development for correction of deficiencies and includes Block B upgrades which encompassed engineering and manufacturing development of new end-items prior to the production incorporation decision as well as Block C suitability and effectiveness development upgrades. Currently converting all Block B to Block C configuration. Capability Development Document interoperability requirements were addressed through a spiral upgrade acquisition strategy. It was the first spiral upgrade providing Key Enabling Department of Defense mandated open systems architecture upgrades for the mission computer hardware and software while simultaneously addressing required interoperability common avionics upgrades and current avionics obsolescence issues. Future development efforts will include pre-planned-product-improvements in the capability development document and re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program as prioritized by the United States Marine Corps (USMC) or an Urgent Universal Needs Statement.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy	Date: March 2023
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	105.729	125.233	136.158	-	136.158
Current President's Budget	89.448	125.233	137.597	-	137.597
Total Adjustments	-16.281	0.000	1.439	-	1.439
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-13.498	0.000			
• SBIR/STTR Transfer	-2.783	0.000			
• Program Adjustments	0.000	0.000	0.623	-	0.623
• Rate/Misc Adjustments	0.000	0.000	0.816	-	0.816

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 9999: *Congressional Adds*		
Congressional Add: *V-22 oil coolers*	4.103	0.000
Congressional Add Subtotals for Project: 9999	4.103	0.000
Congressional Add Totals for all Projects	4.103	0.000

Change Summary Explanation

FY 2024 increased by a total of $1.439 million since the previous President's Budget submission due to the following adjustments:
1. Increased by $0.623 million to support CMV-22's Fuel Cell Obsolescence, Joint Precision Approach and Landing System (JPALS), and to support CMV-22's NEXTGEN Navy Mission Planning System.
2. Increased by $0.816 million for inflationary and working capital fund rate adjustments.

Schedule:
Project Unit 1425:
1. Hardware Development - Improved Inlet Solution Engine Air Particle Separator Phase 1 has been completed. Planetary Pinion and Zinc Nickle have been added to the schedule.
2. CMV Development - CMV ECP corrected to end in 3rd Qtr FY 2023, and Capability FOT&E corrected to end in 4th Qtr FY 2025 as it was incorrect on the schedule. Production was deleted from the schedule. Capabilities FOT&E has been broken out separately to capture requirements not included in the original development effort.
3. IRS Re-design - Schedule updated to include Bell Boeing contracts.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Navy	Date: March 2023
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*

4. Open Systems Architecture / Cyber Security - Schedule updated to reflect the rephasing of the Joint Avionics Reconfigurable Virtual Information System (JARVIS) program. JARVIS Phase 1 was completed in FY-21 and Phase II began in FY-22.
4. Degraded Visual Environment/Helmet Mounted Display - DVE/HMD is dependent on the Platform Data Service (PDS) / Ethernet Expansion Device (EED) schedule which has slipped. Schedule updated to reflect the delay in the PDS/EED program. A/C Testing has been deleted and Developmental and Operational Testing have been added. Test Readiness Review and Fleet Incorporation have been deleted.

Schedule:
Project Unit 3090:
1. Hardware Development - Schedule updated to reflect testing through FY 2028 and title updated to Airframe Hardware Development.
2. Flight Control System Re-design - Schedule updated to reflect a delay in delivery of hardware for the test benches. HW Qual and Fleet Inc. have been deleted as they were in error on the schedule. ECP Step 2 and Kits/Installs have been broken out separately. Test Readiness Review and FT-3 have been added to the schedule.
3. Open Systems Architecture/Cyber Security - Schedule updated to reflect current Platform Data Service / Ethernet Expansion Device effort.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy											Date: March 2023	
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604262N / *V-22A*				Project (Number/Name) 1425 / *V-22*			
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
1425: *V-22*	9,904.583	70.958	98.007	95.569	-	95.569	39.753	32.372	12.417	0.000	0.000	10,253.659
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 212

A. Mission Description and Budget Item Justification

The V-22 Osprey is an Acquisition Category IC Joint Program led by the Department of the Navy for the purpose of developing, testing, evaluating, procuring and fielding a tilt rotor, vertical takeoff and landing aircraft for Joint Service application. The V-22 program is designed to provide an aircraft to meet the amphibious/vertical assault needs of the Marine Corps, the Carrier Onboard Delivery (COD) needs of the Navy, and the special operations needs of the Air Force and the United States Special Operations Command (USSOCOM). The V-22 is replacing the CH-46E in the Marine Corps with the MV-22; will supplement the H-60 in the Navy with the MV-22; and replace the MH-53J and MH-53M as well as augment the C-130 in the Air Force and USSOCOM with the CV-22. The V-22 is capable of flying over 2,100 nautical miles, with a single refueling, giving the services the advantage of a Vertical/Short Take-off and Landing aircraft that can rapidly self-deploy to any location in the world. This program is funded under Engineering Manufacturing and Development (EMD) for correction of deficiencies and includes Block B upgrades which encompassed engineering and manufacturing development of new end-items prior to the production incorporation decision as well as Block C suitability and effectiveness development upgrades. Currently converting all Block B to Block C configuration. Capability Development Document interoperability requirements were addressed through a spiral upgrade acquisition strategy. It was the first spiral providing Key Enabling, Department of Defense mandated, open systems architecture upgrades for the mission computer hardware and software while simultaneously addressing required interoperability common avionics upgrades and current avionics obsolescence issues. Future development efforts will include Pre-Planned-Product-Improvements in the Capability Development Document and re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program as prioritized by the United States Marine Corps (USMC) or an Urgent Universal Needs Statement.

FY 2024 continues Airframe Hardware Development to fund development efforts in support of V-22 Block upgrades, Time on Wing, and Safety Improvement efforts. Continues engineering, logistics, flight test, flight test support and addresses the correction of deficiencies and obsolescence. Continues V-22 software development/ mission computer obsolescence initiatives such as transition tech demo and modular avionics mission computer re-design. Continues efforts to resolve Enhanced Standby Flight Instrument (ESFI) and Fuel Cell obsolescence issues. Continues Input Quill Assembly re-design related to Hard Clutch Engagement.

FY 2024 continues Propulsion/Mission Care Hardware Development to fund the flight/engine hours that are necessary for the design, development, validation and verification of the V-22 propulsion and power systems at the Patuxent River squadron. Rolls-Royce will continue to provide engine support and development of V-22 flight testing.

FY 2024 continues the CMV-22 Hardware Development efforts which consist of an Engineering Change Proposal (ECP) to modify the MV-22 into the CMV-22 configuration to perform the COD mission. The ECP will add such things as (1) the capability to meet the range requirements that the COD mission demands, (2) a high frequency (HF) radio to transmit/receive beyond line of sight (BLOS) over water, (3) a public address (PA) system for use while transporting passengers, (4) an improved cargo handling system, and (5) enhanced fuel jettison system. CMV-22 will continue developmental testing to include envelope expansion, Electromagnetic Environment

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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Effects testing, HF radio testing, Carrier Suitability and integration testing. CMV-22 will continue to support development efforts such as: Obsolescence, Center Console re-design, Modular Avionics/Cyber Security Implementation and Fuel Cell obsolescence. Continues Input Quill Assembly re-design related to Hard Clutch Engagement.

FY 2024 continues Open System Architecture/Cyber Security development efforts to provide new capabilities focused on enhancing reliability, survivability, software and hardware modularity, and maturation of robust aircraft data interfaces. Continues risk reduction and development efforts such as Cyber-Resilient interoperability, Modular Avionics/Cyber Security Implementation, Cyber Safe Flight Control improvements,and Cockpit Avionics re-design. Continues research, requirements analysis, and design and development of obsolescence mitigation solutions for aging V-22 Avionics systems to overcome obsolete hardware availability. Replacement systems will be designed to provide compatibility with all legacy interfaces and functions while resolving deficiencies, meeting expanding needs, and leveraging emerging hardware and software technologies to mitigate future obsolescence.

FY 2024 continues risk reduction and developmental efforts for improved situational awareness and safety in Degraded Visual Environment (DVE) situations. A Digital Helmet Mounted Display (HMD) system integrated with a Synthetic Vision Processor operating in an Ethernet Environment is required to interface and function with the new Enhanced Visual Acuity (EVA) system being developed. The DVE/HMD safety improvement is a Deputy Commandant for Aviation priority.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: V-22 Airframe Hardware Development	15.171	28.911	19.527	0.000	19.527
Articles:	-	-	-	-	-
Description: The V-22 Airframe Hardware Development continues to fund development efforts in support of V-22 Block upgrades, electrical system capacity efforts, and Time on Wing/Reliability Improvement efforts such as testing of Additive Manufacturing processes for selected V-22 components. Continues Aircraft Mission Maneuvering Envelope Expansion and Safety Improvement efforts. Continues engineering, logistics, flight test, flight test support and addresses the correction of deficiencies and obsolescence. Continues V-22 software development/sustainment efforts such as transition tech demo and Modular Avionics Mission Computer Obsolescence Initiative re-design. Continues to resolve ESFI obsolescence. Continues development of particle separation solutions that will improve maintainability and reliability which will facilitate improved mission capable rates and long-term operational success.					
FY 2023 Plans: Continues V-22 software development efforts. Continues development in support of V-22 Block upgrades, Time on Wing/Reliability Improvements such as testing of Additive Manufacturing processes for selected V-22 components. Continues Aircraft Mission Maneuvering Envelope Expansion and Safety Improvement efforts such as Condition Based Maintenance. Continues engineering, logistics, flight test and flight test support. Addresses					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
correction of deficiencies and obsolescence efforts, Air Data Unit, cockpit interface units, training upgrades and developments and in addition ESFI. Continues reliability improvement efforts as well as re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program, to include Planetary Pinion and Zinc Nickel . Begin Primary Lightning Control Unit re-design. ***FY 2024 Base Plans:*** Continues V-22 software development efforts. Continues development in support of V-22 Block upgrades, Time on Wing/Reliability Improvements such as testing of Additive Manufacturing processes for selected V-22 components. Continues Aircraft Mission Maneuvering Envelope Expansion and Safety Improvement efforts. Continues engineering, logistics, flight test and flight test support. Addresses correction of deficiencies and obsolescence efforts such as air data unit, cockpit interface units, training upgrades and developments, fuel cell and ESFI. Continues reliability improvement efforts as well as re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program to include Input Quill Assembly re-design related to Hard Clutch Engagement. Continues Planetary Pinion and Zinc Nickel. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease in FY 2024 for Airframe Hardware Development reallocates funding from PU 1425 to PU 3090 to fund Flight Control System re-design in FY 2024.					
Title: V-22 Propulsion / Mission Care Hardware Development ***Articles:*** ***Description:*** Propulsion/Mission Care Hardware Development funds the flight/engine hours that are necessary for the design, development, validation and verification of the V-22 propulsion and power systems at the Patuxent River squadron. In addition, it pays for Rolls Royce to provide engine support and development of the V-22 flight testing. ***FY 2023 Plans:***	0.623 -	1.886 -	1.924 -	0.000 -	1.924 -

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Continues flight/engine hours that are necessary for the design, development, validation, and verification of the V-22 propulsion and power systems at the Patuxent River squadron. Rolls Royce will continue to provide engine support and development of V-22 flight testing. ***FY 2024 Base Plans:*** Continues flight/engine hours that are necessary for the design, development, validation, and verification of the V-22 propulsion and power systems at the Patuxent River squadron. Rolls Royce will continue to provide engine support and development of V-22 flight testing. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase in FY 2024 for Propulsion/Mission Care Hardware Development is due to inflation.					
Title: V-22 CMV Development	11.798	16.521	22.746	0.000	22.746
Articles:	-	-	-	-	-
Description: Funding supports the implementation of an ECP to incorporate the new systems required for the CMV-22 configuration to perform the COD mission. The ECP will add (1) the capability to meet the range requirements that the COD mission demands (2) a HF radio to transmit/receive BLOS over water, (3) a PA system for use while transporting passengers, (4) an improved cargo handling system, and (5) enhanced fuel jettison system. CMV-22 will execute developmental testing to include things such as envelope expansion, Electromagnetic Environment Effects testing, HF radio testing and begin Carrier Suitability and Integration testing. Continue Obsolescence, CMV-22 Center Console re-design, Flight Control System (FCS) re-design and Modular Avionics/Cyber Security Implementation. ***FY 2023 Plans:*** Continues funding for the CMV-22 Development effort to perform the COD mission. Support the development of Functional Test Plans for the HF radio to transmit/receive BLOS over water and the PA system. Development of the Joint Vertical Experimental Application System Software will continue. Continue the developmental testing for the CMV-22 preliminary envelope expansion and Electromagnetic Environment Effects. Continue Modular Avionics software development/sustainment efforts such as Mission Computer obsolescence initiative re-design and modular software. Continue developmental efforts such as electrical system re-design, IRS re-design, and Cyber Security implementation. Continue the Carrier Suitability and Integration testing. Continue Operational testing. Continue Interoperability development for additional critical capabilities such as Link-16, Terrain Avoidance Warning System II, Mobile Users Objective System, Mobile Expeditionary Communications					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
System and secondary BLOS. Continue the spiral development of the Required Navigation Performance / Area Navigation capability to upgrade to full precision approach capability and coupled approach. Continue integration of Joint Precision Approach and Landing System (JPALS). Support the Future Readiness Initiative to fully automate data ingestion of all applicable data sources to include conditioning, cleansing, transformation, persistence and retrieval from a unified data repository in an organized, ready for use format. ***FY 2024 Base Plans:*** Continues funding for the CMV-22 Development effort to perform the COD mission. Development of the Joint Vertical Experimental Application System Software will continue. Continue Modular Avionics software development/sustainment efforts such as Mission Computer obsolescence initiative re-design and modular software. Continue developmental efforts such as Flight Control System re-design, Central Display Unit/ Keyboard Unit obsolescence re-design, Primary Lighting Control Unit re-design, Input Quill Assembly re-design related to Hard Clutch Engagement and Cyber Security implementation. Continue Interoperability development for additional critical capabilities such as Link-16, Terrain Avoidance Warning System II and Mobile Users Objective System. Continue the spiral development of the Required Navigation Performance/Area Navigation capability to upgrade the full precision approach capability and coupled approach. Continue development and integration of JPALS. Support the Future Readiness Initiative to fully automate data ingestion of all applicable data sources to include conditioning, cleansing, transformation, persistence and retrieval from a unified data repository in an organized, ready for use format. Begin Fuel Cell obsolescence re-design and Next Generation Mission Planning development. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase in FY 2024 for CMV Development is additional funding for Fuel Cell obsolescence re-design and JPALS to fully fund the CMV scope of work planned in FY 2024.					
Title: V-22 Infrared Suppressor (IRS) Re-design ***Articles:*** ***Description:*** IRS re-design and reliability improvement efforts mask the infrared signature of the V-22 aircraft, which increases the operational survivability. The current IRS system fails to meet reliability requirements and continues to be a readiness degrader. V-22 IRS system includes funds for EMD and instrumented flight test of IRS system solutions. ***FY 2023 Plans:***	0.000 -	0.500 -	0.000 -	0.000 -	0.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Funding continues the integration of the new IRS system for the V-22. The IRS system masks the infrared signature of an aircraft which increases the survivability. ***FY 2024 Base Plans:*** N/A ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease in FY 2024 for Infrared Suppressor (IRS) is due to the completion of the development effort. Any remaining efforts will be completed with FY 2023 funding.					
Title: V-22 Development Support, Test and Evaluation	26.995	25.176	25.859	0.000	25.859
Articles:	-	-	-	-	-
Description: Funds Government Engineering and Contractor Engineering, including Follow-On Test & Evaluation (FOT&E), Developmental Test & Engineering (DT&E), and Operational Test & Evaluation (OT&E) for the V-22 flight events. Perform Government oversight. Execute test program risk reduction efforts. ***FY 2023 Plans:*** Funds provided for continued support of FOT&E, DT&E and OT&E to include vehicle flight control software updates, mission systems software and hardware updates, inlet distortion, environmental control systems, structural fatigue, high density altitude envelope expansion, Nacelle Improvements, Integrated Aircraft Survivability Equipment, Sea Trials, communication systems, navigation systems, weapons systems, Degraded Visual Environment/Helmet Mounted Display (DVE/HMD), and CMV Developmental Test and Communications upgrades. ***FY 2024 Base Plans:*** Funds provided for continued support of FOT&E, DT&E and OT&E to include vehicle flight control software updates, mission systems software and hardware updates, inlet distortion, environmental control systems, structural fatigue, Nacelle improvements, Integrated Aircraft Survivability Equipment, Sea Trials, communication systems, navigation systems, weapons systems, DVE/HMD, Joint Avionics Reconfigurable Virtual Information System Mission Computer and CMV developmental upgrades. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Increase in FY 2024 for Development Support, Test and Evaluation is due to inflation and NWCF rate adjustments.					
Title: V-22 Open Systems Architecture / Cyber Security	10.571	11.995	12.235	0.000	12.235
Articles:	-	-	-	-	-
Description: Open System Architecture/Cyber Security provides non-proprietary hardware and software agnostic architecture and interfaces, focused on enhancing survivability, maturation of software and hardware modularity, rapid technology and capability insertion, obsolescence mitigation, and maturation of aircraft interfaces to support robust, Cyber-Resilient interoperability and data transfer, storage and routing. The project includes risk reduction and development efforts such as Modular Avionics Architecture, Cyber Security Implementation, and Cyber Safe Flight Control improvements for Control Display Units, Standby Flight Indicators, Keyboard Units, Engine Instrument Crew Alerting System, Primary Lighting Control Unit, Remote Frequency Indicator Selector, Heads-Up Displays, and Flight Director Panel. Provides integrated solutions for Mission Computer Obsolescence mitigation, functional upgrades, Ethernet backbone (High speed Ethernet communication), Ethernet switches and routing functions (Ethernet Expansion Devices) to enable distributed processing. Joint Avionics Reconfigurable Virtual Information System (JARVIS) along with associated JARVI modules and Ethernet connectivity for distributed modular processing are the current open system architecture efforts being developed.					
FY 2023 Plans: Continues requirements analysis, integration studies, integrated designs, risk reduction testing and developmental efforts for Modular Avionics Architecture, Cockpit Avionics obsolescence mitigation, Ethernet backbone, Ethernet switches and routing functions. Continues development of JARVIS Mission Computer System, associated JARVI modules, Ethernet switches and routing functions for distributed modular processing. Begins the Cockpit Avionics re-design.					
FY 2024 Base Plans: Continues requirements analysis, integration studies, integrated designs, risk reduction testing and developmental efforts for Modular Avionics Architecture, Cockpit Avionics obsolescence mitigation, Ethernet backbone, Ethernet Expansion device switches and routing functions. Continues development of JARVIS Mission Computer system and associated JARVI modules for distributed modular processing. Continues the Cockpit Avionics re-design.					
FY 2024 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase in FY 2024 for Open Systems Architecture/Cyber Security is due to inflation.					
Title: V-22 Degraded Visual Environment/Helmet Mounted Display (DVE/HMD)	5.800	13.018	13.278	0.000	13.278
Articles:	-	-	-	-	-
Description: The V-22 Digital HMD will reduce heads down time and provide better situational awareness and crew coordination to improve safety in DVE. A digital HMD is required to provide host power and digital video interface for the EVA system being developed. The DVE/HMD safety improvement is a Deputy Commandant for Aviation priority. ***FY 2023 Plans:*** Continues DVE developmental efforts to improve safety when conducting reduced visibility landings which will include requirements analysis, risk reduction and developmental efforts. Begin Flight Test. ***FY 2024 Base Plans:*** Continues DVE development and system integration efforts to improve safety when conducting reduced visibility landings. Efforts will include requirements analysis, risk reduction and developmental test and qualification efforts in System Integration Labs and on DT aircraft. Begin Operational Flight Test. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase in FY 2024 is for inflation.					
Accomplishments/Planned Programs Subtotals	70.958	98.007	95.569	0.000	95.569

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• APN 0164: *V-22*	1,098.263	508.700	27.216	-	27.216	59.986	50.735	0.000	0.000	0.000	35,284.344
• APN 0590: *V-22 Series*	250.512	233.128	215.997	-	215.997	248.410	279.337	306.218	335.243	1,956.086	6,230.568
• APN 0605/J0164: *V-22 Inital Spares*	15.627	26.461	30.562	-	30.562	47.519	62.957	39.862	41.254	830.459	1,094.701

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 1160403BB: *CV-22 Special Operations, Aviation Systems*	6.655	11.695	21.619	-	21.619	21.289	28.069	23.445	19.834	Continuing	Continuing
• RDTE BA07 0401318F: *CV-22 USAF BA07*	17.189	10.121	18.086	-	18.086	16.348	20.241	17.061	17.658	Continuing	Continuing
• OPN 4213: *CMV-22 SCD*	176.387	272.044	162.273	-	162.273	117.925	97.652	97.973	98.420	Continuing	Continuing

Remarks

D. Acquisition Strategy

The V-22 is a post Milestone III ACAT-IC program. As a result of mishaps during and subsequent to V-22 Operational Evaluation (Apr and Dec 00), the program was restructured employing a phased approach to return to flight and tactical introduction. The Contractor and Government defined deficient areas within the program/ aircraft requiring correction prior to return to flight. A Block Upgrade approach was planned, with required efforts identified in Block "A", "B", and "C". Block "A" included those efforts necessary to return the V-22 to safe and operational fleet operations. Block "B" included those efforts necessary to improve the effectiveness and suitability of the aircraft. Block "C" includes mission enhancements like weather radar, cabin effectiveness suitability improvements, i.e., Environmental Control System, and Forward Firing ALE-47. Non-recurring development activities will be initiated and completed for all efforts identified in Block "A", "B", and "C". The Contractor will develop specific statements of work and preliminary specification change notices required to integrate the block upgrade efforts into the baseline Program. A Systems Requirements Review, Initial Design Review, and Final Design Review was held for each of the block efforts so the design maturity could be reviewed and the Government could redirect activities as appropriate. The CV-22 EMD program is also structured in Blocks to define an evolutionary approach to achieving full operational capability. Block "0" is the initial baseline CV-22 variant. Block "10" enhances mission capability with the addition of terrain following radar, additional fuel tanks, additional radios, and Block "20" includes capabilities such as radio frequency and infrared countermeasures improvements. Additional Blocks are in the planning stages to continue the growth process throughout the operational life of the weapon system. The CMV-22 will add (1) the capability to meet the range requirements that the COD mission demands (2) a HF radio to transmit/receive BLOS over water, (3) a PA system for use while transporting passengers in support of the COD mission, (4) an improved cargo handling system, and (5) enhanced fuel jettison system.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V-22 Airframe Hardware Dev	Various	Various : Various	180.589	15.171	Jan 2022	28.911	Jan 2023	19.527	Jan 2024	-		19.527	8.597	252.795	-
V-22 Propulsion Hardware Dev	SS/CPIF	Rolls-Royce Corp. : Indianapolis, IN	200.158	0.623	Nov 2021	1.886	Nov 2022	1.924	Nov 2023	-		1.924	2.209	206.800	205.551
V-22 CMV Development	Various	Various : Various	219.273	11.798	Jan 2022	16.521	Jan 2023	22.746	Jan 2024	-		22.746	8.077	278.415	-
V-22 IRS Re-design	SS/CPFF	Honeywell : Tempe, AZ	6.392	0.000	Jul 2022	0.500	Jul 2023	0.000		-		0.000	0.000	6.892	7.254
V-22 Open Systems Architecture / Cyber Security	Various	Various : Various	19.293	10.571	Mar 2022	11.995	Mar 2023	12.235	Mar 2024	-		12.235	12.784	66.878	-
V-22 Degraded Visual Environment/Helmet Mounted Display	C/CPIF	Various : Various	12.993	5.800	Sep 2022	13.018	Jul 2023	13.278	Jul 2024	-		13.278	5.595	50.684	-
Prior year Prod Dev no longer funded in FYDP	Various	Various : Various	5,319.094	0.000		0.000		0.000		-		0.000	0.000	5,319.094	-
		Subtotal	5,957.792	43.963		72.831		69.710		-		69.710	37.262	6,181.558	N/A

Remarks

Airframe Hardware Development: Decrease in FY 2024 reallocates funding from PU 1425 to PU 3090 to fund Flight Control System.
Propulsion Hardware Development: Increase in FY 2024 is due to inflation.
CMV Development: Increase in FY 2024 is additional funding for Fuel Cell obsolescence re-design and Joint Precision Approach and Landing System to fully fund the CMV scope of work planned for FY 2024.
IRS Re-design: Decrease in FY 2024 is due to the completion of developmental efforts.
Open Systems Architecture: Increase in FY 2024 is due to inflation.
Degraded Visual Environment/Helmet Mounted Display: Increase in FY 2024 is due to inflation.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V-22 MV Govt Engineering Sppt	WR	Various : Pax River, MD	1,127.121	4.628	Nov 2021	3.805	Nov 2022	4.024	Nov 2023	-		4.024	7.228	1,146.806	-
V-22 CMV Govt Engineering Sppt	WR	Various : Pax River, MD	49.329	2.628	Nov 2021	2.591	Nov 2022	2.704	Nov 2023	-		2.704	5.907	63.159	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior Year Support no longer funded in the FYDP	Various	Various : Various	189.718	0.000		0.000		0.000		-		0.000	0.000	189.718	-
		Subtotal	1,366.168	7.256		6.396		6.728		-		6.728	13.135	1,399.683	N/A

Remarks

MV Government Engineering Support: Increase in FY 2024 is due to inflation and NWCF rate adjustments.
CMV Government Engineering Support: Increase in FY 2024 is due to inflation and NWCF rate adjustments.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation (DT&E)	WR	NAWCAD : Pax River, MD	1,115.561	12.163	Nov 2021	12.184	Nov 2022	12.428	Nov 2023	-		12.428	6.790	1,159.126	-
Operational Test & Evaluation (OT&E)	WR	OT&E Force : Norfolk, VA	71.235	1.725	Dec 2021	3.786	Dec 2022	4.000	Dec 2023	-		4.000	9.182	89.928	-
Live Fire Test & Evaluation (LFT&E)	WR	NAWCWD : China Lake, CA	2.877	0.470	Nov 2021	0.155	Nov 2022	0.000	Nov 2023	-		0.000	7.851	11.353	-
Prior Year Developmental Test & Evaluation Not Funded FYDP (PYDT&E)	Various	Various : Various	48.200	0.000		0.000		0.000		-		0.000	0.000	48.200	-
		Subtotal	1,237.873	14.358		16.125		16.428		-		16.428	23.823	1,308.607	N/A

Remarks

Development Test & Evaluation: Increase in FY 2024 is due to inflation.
Operational Test & Evaluation: Increase in FY 2024 is due to inflation.
Live Fire Test & Evaluation: Decrease in FY 2024 is due to completion of the effort.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V-22 Engineering Tech Sppt	Various	Various : Various	1,051.300	1.001	Dec 2021	0.767	Dec 2022	0.782	Dec 2023	-		0.782	3.060	1,056.910	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604262N / *V-22A*	Project (Number/Name) 1425 / *V-22*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V-22 Management Sppt Svc	Various	Various : Various	159.399	0.446	Mar 2022	0.292	Jan 2023	0.298	Jan 2024	-		0.298	3.000	163.435	-
V-22 Program Mgmt Support	WR	NAWCAD : Pax River, MD	71.705	3.761	Nov 2021	0.890	Nov 2022	0.908	Nov 2023	-		0.908	3.000	80.264	-
V-22 CMV Engineering Tech Sppt	Various	Various : Various	1.463	0.000	Jan 2022	0.461	Jan 2023	0.470	Jan 2024	-		0.470	0.527	2.921	-
V-22 Travel	WR	Various : Various	17.453	0.114	Sep 2022	0.185	Sep 2023	0.185	Sep 2024	-		0.185	0.555	18.492	-
V-22 CMV Travel	WR	Various : Various	0.343	0.059	Sep 2022	0.060	Sep 2023	0.060	Sep 2024	-		0.060	0.180	0.702	-
Prior Year Mgmt Svcs no longer funded in the FYDP	Various	Various : Various	41.087	0.000		0.000		0.000		-		0.000	0.000	41.087	-
		Subtotal	1,342.750	5.381		2.655		2.703		-		2.703	10.322	1,363.811	N/A

Remarks

All increases to Management Services in FY 2024 are due to inflation.

	Prior Years	FY 2022 Cost	FY 2022	FY 2023 Cost	FY 2023	FY 2024 Base Cost	FY 2024 Base	FY 2024 OCO Cost	FY 2024 OCO	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	9,904.583	70.958		98.007		95.569		-		95.569	84.542	10,253.659	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

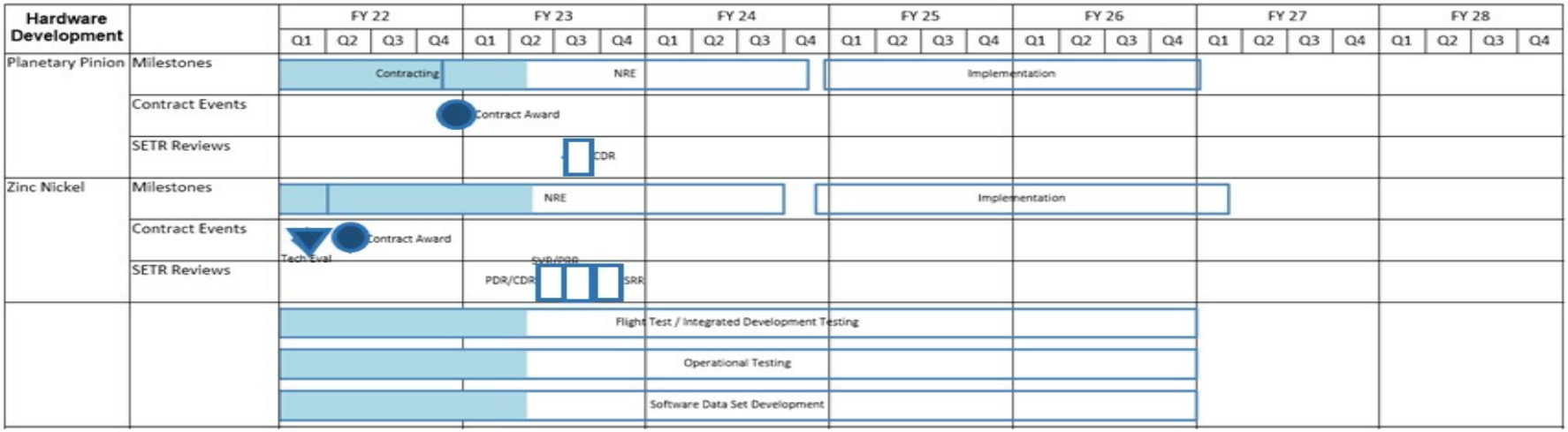

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

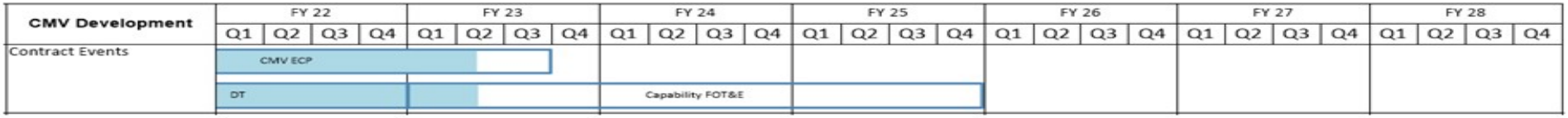

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

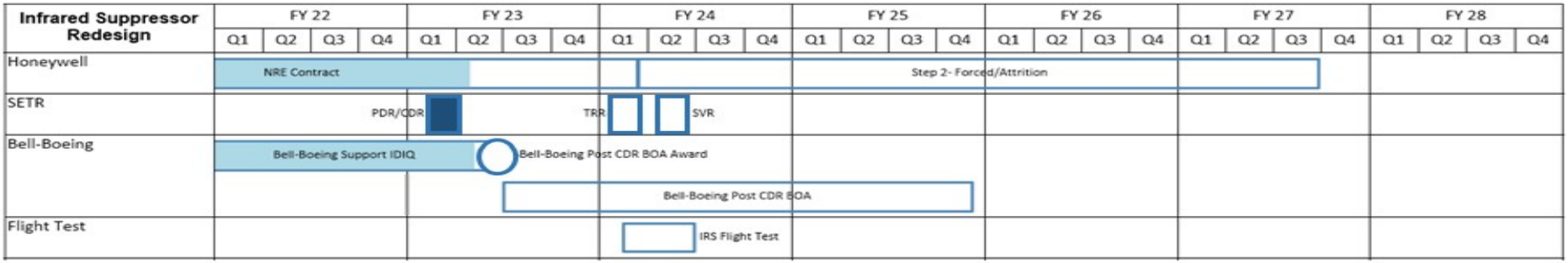

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

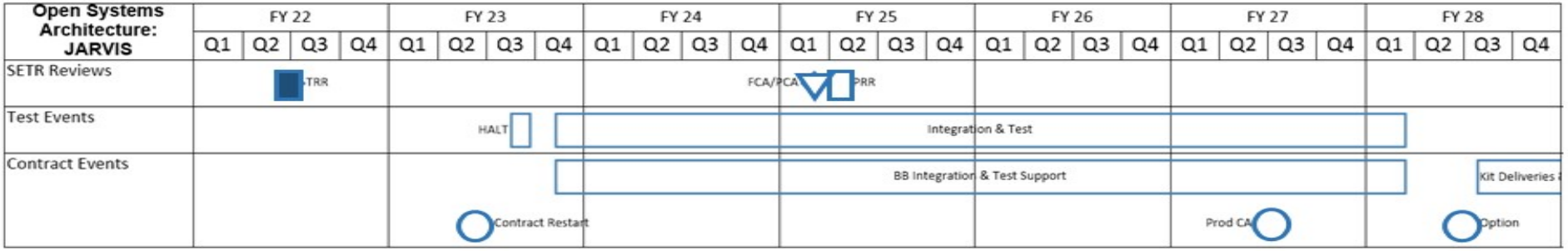

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

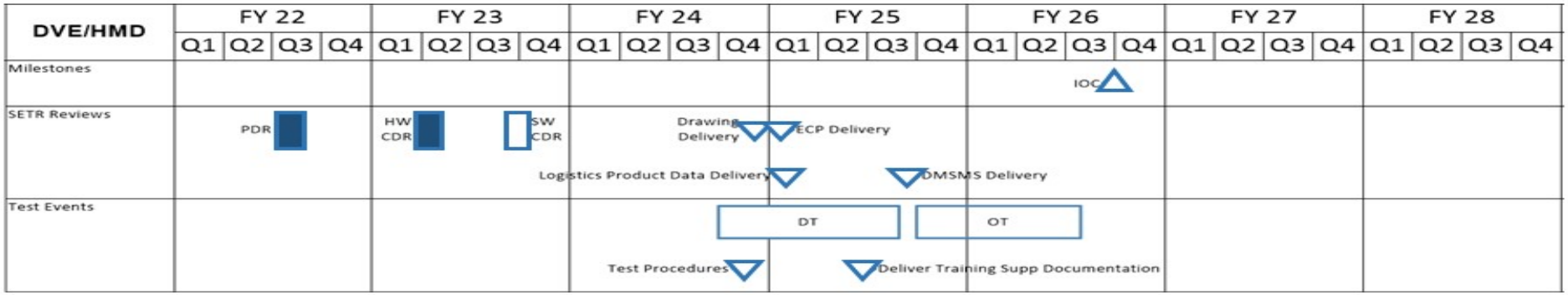

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
V-22 Hardware Development				
Reviews: Reviews: Program Design Review / Critical Design Review	2	2023	2	2023
Reviews: Reviews: System Verification Review / Program Requirements Review	3	2023	3	2023
Test & Evaluation: Development Test: Flight Test / Integrated Development Testing	1	2022	4	2026
Test & Evaluation: Operational Evaluation: Operational Testing	1	2022	4	2026
Contract Award: Contract Award: Planetary Pinion	4	2022	4	2022
Contract Award: Contract Award: Zinc Nickel	2	2022	2	2022
V-22 CMV Development				
Test & Evaluation: Development Test: Developmental Test (DT)	1	2022	4	2022
Test & Evaluation: Operational Evaluation: Follow-On Operational Test and Evaluation	1	2023	4	2025
V-22 Infrared Suppressor (IRS) Re-design				
Reviews: Reviews: Preliminary Design Review / Critical Design Review	1	2023	1	2023
Reviews: Reviews: Test Readiness Review	1	2024	1	2024
Reviews: Reviews: System Verification Review	2	2023	2	2023
Test & Evaluation: Operational Evaluation: Flight Testing	1	2024	2	2024
Contract Award: Contract Award: Bell Boeing	2	2023	2	2023
V-22 Open System Architecture / Cyber Security				
Reviews: Reviews: Test Readiness Review	2	2022	2	2022
Reviews: Reviews: Functional Configuration Audit / Physical Configuration Audit	1	2025	1	2025
Reviews: Reviews: Program Requirements Review	2	2025	2	2025
Test & Evaluation: Development Test: Highly Accelerated Life Test	3	2023	3	2023
Test & Evaluation: Development Test: Integration and Test	4	2023	1	2028

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Contract Award: Contract Award: Joint Avionics Reconfigurable Virtual Information System Contract Award (JARVIS)	2	2023	2	2023
Production Milestones: Production Milestones: Production Contract Award	2	2027	2	2027
Production Milestones: Production Milestones: Production Option Contract Award	2	2028	2	2028
Production Milestones: Production Milestones: Kit Procurement	3	2028	4	2028
V-22 Degraded Visual Environment / Helmet Mounted Display Development				
Reviews: Reviews: System Requirement Review	1	2022	1	2022
Reviews: Reviews: Preliminary Design Review	3	2022	3	2022
Reviews: Reviews: Critical Design Review	1	2023	1	2023
Reviews: Reviews: SW Critical Design Review	3	2023	3	2023
Reviews: Reviews: Initial Operational Capability	3	2026	3	2026
Test & Evaluation: Development Test: Development Testing	4	2024	3	2025
Test & Evaluation: Operational Evaluation: Operational Testing	4	2025	3	2026

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604262N / *V-22A*	Project (Number/Name) 3090 / *V-22 Improvement Program*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
3090: *V-22 Improvement Program*	11.512	14.387	27.226	42.028	-	42.028	77.992	95.807	91.330	112.708	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The V-22 Osprey provides a dual-piloted, multi-engine, Vertical/Short Takeoff and Landing, medium lift aircraft for worldwide combat, combat support, combat service support, and Special Operations missions. V-22 Product Improvements addresses requirements necessary to meet the aircraft capabilities specified in the approved Capability Development Document. Efforts included in this Project provide near and long-term improvements to the fleet, addressing deficiencies, systems safety, obsolescence, readiness, reliability, supportability, and relevance in any designated battlespace. Efforts include hardware and software development associated with increased performance capability, avionics upgrades and improvements, increased system processing capability, and the integration with other organic and non-organic systems.

FY 2024 continues Hardware Development in support of V-22 Block upgrades, electrical system capacity efforts, Time on Wing/Reliability Improvements efforts, Aircraft Mission Maneuvering Envelope Expansion and Safety Improvement efforts. Continues engineering, logistics, flight test, flight test support and addresses the correction of deficiencies and obsolescence.

FY 2024 continues Flight Control System re-design, which will address obsolescence issues, mitigate deficiencies and provide improved capabilities through hardware and software upgrades.

FY 2024 continues Open Systems Architecture/Cyber Security research, requirements analysis and development of obsolescence mitigation solutions for aging V-22 Avionics systems to overcome obsolete hardware availability. Replacement systems will be designed to provide compatibility with all legacy interfaces and functions while resolving deficiencies, meeting expanding needs, and leveraging emerging hardware and software technologies to mitigate future obsolescence.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: V-22 Airframe Hardware Development	2.842	7.374	7.696	0.000	7.696
Articles:	-	-	-	-	-
Description: The V-22 Airframe Hardware Development funds development efforts in support of V-22 Block upgrades, electrical system capacity efforts, Time on Wing/Reliability Improvements efforts, Aircraft Mission Maneuvering Envelope Expansion, and Safety Improvement efforts. Continues engineering, logistics, flight test, flight test support, and addresses the correction of deficiencies and obsolescence.					
FY 2023 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Continues development in support of V-22 Block upgrades, Time on Wing/Reliability Improvements such as testing of Additive Manufacturing processes for selected V-22 components, Aircraft Mission Maneuvering Envelope Expansion, and Safety Improvement efforts such as Condition Based Maintenance. Continues engineering, logistics, flight test, flight test support, and addresses correction of deficiencies and obsolescence efforts. Continues reliability improvement efforts as well as re-design efforts to correct critical Reliability, Maintainability, and Availability issues in support of readiness such as Pitch Change Link Bearing re-design. ***FY 2024 Base Plans:*** Continues development in support of V-22 Block upgrades, Time on Wing/Reliability Improvements such as testing of Additive Manufacturing processes for selected V-22 components, Aircraft Mission Maneuvering Envelope Expansion, and Safety Improvement efforts. Continues engineering, logistics, flight test, flight test support, and addresses correction of deficiencies and obsolescence efforts. Continues reliability improvement efforts as well as re-design efforts to correct critical Reliability, Maintainability, and Availability issues in support of readiness such as Pitch Change Link Bearing re-design. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase in FY 2024 for Airframe Hardware Development is due to inflation and fuel pricing.					
Title: V-22 Flight Control System (FCS) Re-Design	2.053	13.101	21.102	0.000	21.102
Articles:	-	-	-	-	-
Description: The FCS re-design will address obsolescence issues, mitigate current system deficiencies and provide a foundation for improved aircraft handling qualities through hardware and software upgrades. The re-design will correct critical Reliability and Maintainability issues to increase mission effectiveness, provide additional safety, and improve readiness. ***FY 2023 Plans:*** Continues development of hardware and software architecture upgrades to mitigate obsolescence and data throughput constraints to include Flight Control Computer, Cockpit Interface Unit, and Flight Test Interface Panel. Software language upgrade development in the Cross Channel Data Link and Flight Control Computer Operational Flight program from assembly language to a Higher Order Language for future software					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
maintenance efficiency and capability. Continues Non-Recurring Engineering to complete the Critical Design Review. ***FY 2024 Base Plans:*** Continues development of hardware and software architecture upgrades to mitigate obsolescence and data throughput constraints to include Flight Control Computer, Cockpit Interface Unit, and Flight Test Interface Panel. Software language upgrade development in the Cross Channel Data Link and Flight Control Computer Operational Flight program from assembly language to a Higher Order Language for future software maintenance efficiency and capability. Continues Non-Recurring Engineering to implement Critical Design Review functions, mature box level design and validate all technical requirements in the lab leading up to Test Readiness Review to go to aircraft developmental test. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase in FY 2024 for Flight Control System (FCS) Re-Design funds the MV scope of work planned for FY 2024.					
Title: V-22 Open Systems Architecture/Cyber Security	7.137	5.759	11.461	0.000	11.461
Articles:	-	-	-	-	-
Description: Open System Architecture/Cyber Security provides non-proprietary hardware and software agnostic architecture and interfaces, focused on enhancing survivability, maturation of software and hardware modularity, rapid technology and capability insertion, obsolescence mitigation, and maturation of aircraft interfaces to support robust, Cyber-Resilient interoperability and data routing/transfers. The project includes risk reduction and development efforts such as Modular Avionics Architecture, Cyber Security Implementation, and Cyber Safe Flight Control improvements for Control Display Units, Standby Flight Indicators, Keyboard Unit, Engine Instrument Crew Alerting System, Remote Frequency Indicator Selector, Heads-Up Displays, and Flight Director Panel. Provides integrated solutions for Mission Computer Obsolescence mitigation, functional upgrades, Ethernet backbone (High speed Ethernet communication), Ethernet switches and routing functions to enable distributed processing. Joint Avionics Reconfigurable Virtual Information System (JARVIS) along with associated JARVI modules and Ethernet connectivity for distributed modular processing are the current open system architecture efforts being developed. ***FY 2023 Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Continues requirements analysis, integration studies, integrated designs, risk reduction testing and developmental efforts for Modular Avionics Architecture, Cockpit Avionics obsolescence mitigation, Ethernet backbone, Ethernet switches and routing functions. Begin the Cockpit Avionics re-design. ***FY 2024 Base Plans:*** Continues requirements analysis, integration studies, integrated designs, risk reduction testing and developmental efforts for Modular Avionics Architecture, Cockpit Avionics obsolescence mitigation, Ethernet backbone, Ethernet Expansion device switches and routing functions. Complete Standby Flight Instrument qualification and integration testing. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase in FY 2024 for Open Systems Architecture/Cyber Security is due to the escalation of Non-Recurring Engineering work leading up to the Critical Design Review.					
Title: V-22 Development Support, Test, and Evaluation	2.355	0.992	1.769	0.000	1.769
Articles:	-	-	-	-	-
Description: Funds Government Engineering and Contractor Engineering, including Follow-On Test & Evaluation (FOT&E), Developmental Test & Engineering (DT&E), and Operational Test & Evaluation (OT&E) for the V-22 Flight events. Perform Government oversight. Execute test program risk reduction efforts. ***FY 2023 Plans:*** Funds provided for continued support of FOT&E, DT&E and OT&E to include vehicle flight control updates, mission systems software and hardware updates, and high density altitude envelope expansion/verification. ***FY 2024 Base Plans:*** Funds provided for continued support of FOT&E, DT&E and OT&E to include vehicle flight control updates, mission systems software and hardware updates and Sea Trials envelope expansion. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
FY 2024 Increase for Development Support, Test and Evaluation fully funds Flight Control System for the scope of work planned in FY 2024.					
Accomplishments/Planned Programs Subtotals	14.387	27.226	42.028	0.000	42.028

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• APN 0164: *V-22*	1,098.263	508.700	27.216	-	27.216	59.986	50.735	0.000	0.000	0.000	35,284.344
• APN 0590: *V-22 Series*	250.512	233.128	215.997	-	215.997	248.410	279.337	306.218	335.243	1,956.086	6,230.568
• APN 0605/J0164: *V-22 Initial Spares*	15.627	26.461	30.562	-	30.562	47.519	62.957	39.862	41.254	830.459	1,094.701
• RDTE 1160403BB: *CV-22 Special Operations, Aviation Systems*	6.655	11.695	21.619	-	21.619	21.289	28.069	23.445	19.834	Continuing	Continuing
• RDTE BA07 0401318F: *CV-22 USAF BA07*	17.189	10.121	18.086	-	18.086	16.348	20.241	17.061	17.658	Continuing	Continuing
• OPN 4213: *CMV-22 SCD*	176.387	272.044	162.273	-	162.273	117.925	97.652	97.973	98.420	Continuing	Continuing

Remarks

D. Acquisition Strategy

V-22 Product Improvements will include design and engineering studies, cost-benefit analyses, and risk-reduction efforts to address improvements for readiness, aircraft capability, safety, component reliability, maintainability, software, and obsolescence.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V-22 Airframe Hardware Development	Various	Various : Various	0.000	2.842	Mar 2022	7.374	Jan 2023	7.696	Jan 2024	-		7.696	Continuing	Continuing	Continuing
V-22 Flight Control System Re-Design	SS/BOA	Bell Boeing : Ridley Park, PA	11.512	2.053	May 2022	13.101	Jun 2023	21.102	Jun 2024	-		21.102	Continuing	Continuing	Continuing
V-22 Open Systems Architecture/Cyber Security	Various	Various : Various	0.000	7.137	Jun 2022	5.759	Mar 2023	11.461	Mar 2024	-		11.461	Continuing	Continuing	Continuing
		Subtotal	11.512	12.032		26.234		40.259		-		40.259	Continuing	Continuing	N/A

Remarks

Hardware Development: Increase in FY 2024 is due to inflation and fuel pricing.
Flight Control System: Increase in FY 2024 funds the MV scope of work planned for FY 2024.
Open Systems Architecture/Cyber Security: Increase in FY 2024 is due to the escalation of Non-Recurring Enginering work leading up to the Critical Design Review.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V-22 Gov't Engineering Support	WR	NAWCAD : Pax River, MD	0.000	1.272	Oct 2021	0.721	Nov 2022	1.259	Nov 2023	-		1.259	Continuing	Continuing	Continuing
		Subtotal	0.000	1.272		0.721		1.259		-		1.259	Continuing	Continuing	N/A

Remarks

Government Engineering Support: Increase in FY 2024 funds Flight Control System for the scope of work planned in FY 2024.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V-22 Program Mgmt Support	WR	NAWCAD : Pax River, MD	0.000	1.083	Oct 2021	0.261	Nov 2022	0.500	Nov 2023	-		0.500	Continuing	Continuing	Continuing
V-22 Travel	WR	Various : Various	0.000	0.000		0.010	Sep 2023	0.010	Sep 2024	-		0.010	Continuing	Continuing	Continuing
		Subtotal	0.000	1.083		0.271		0.510		-		0.510	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604262N / *V-22A*	Project (Number/Name) 3090 / *V-22 Improvement Program*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Remarks															
Program Mgmt Support: Increase in FY 2024 funds Flight Control System for the scope of work planned in FY 2024.															

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.512	14.387		27.226		42.028		-		42.028	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

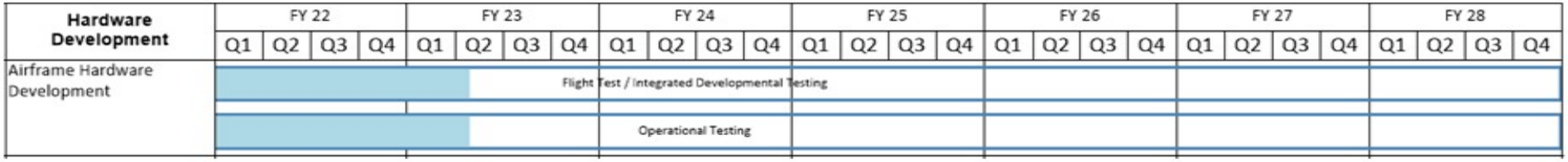

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

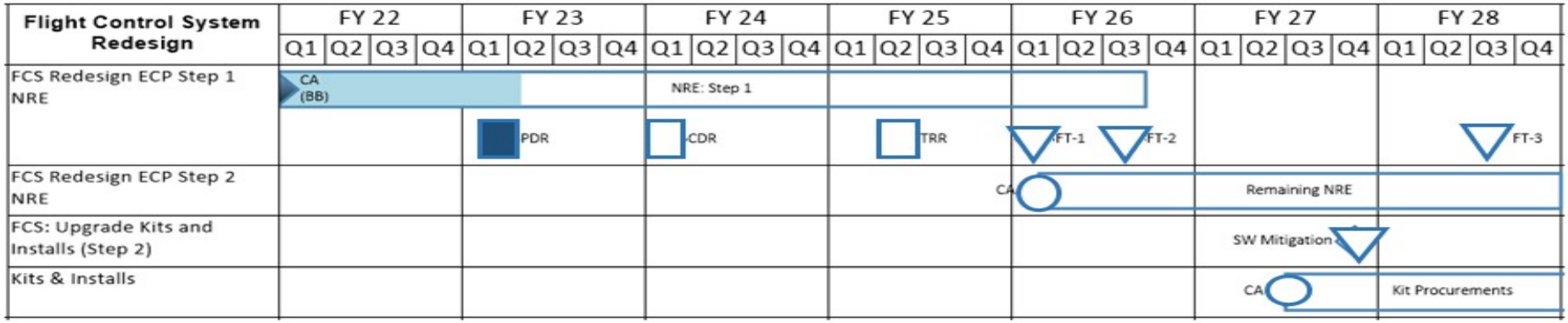

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

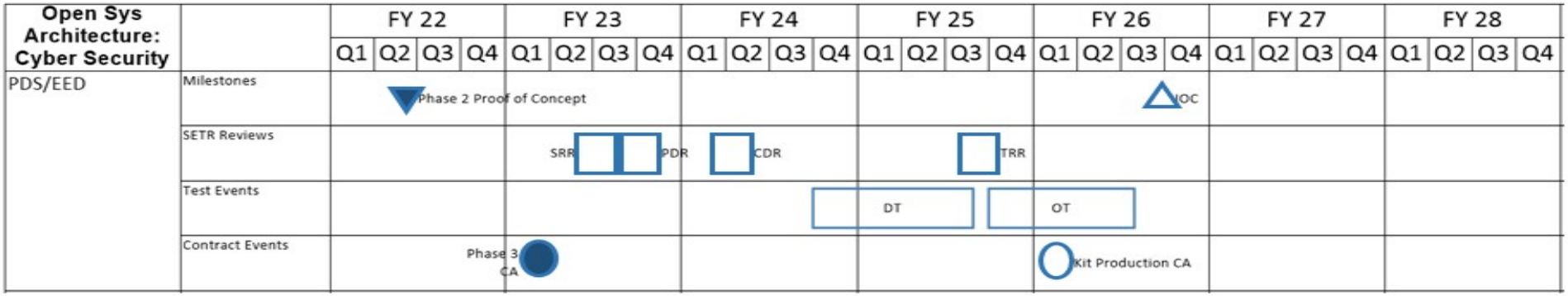

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 3090 / *V-22 Improvement Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Hardware Development				
Test & Evaluation: Developmental Testing: Flight Test / Integrated Development Testing	1	2022	4	2028
Operational Evaluation: Operational Testing	1	2022	4	2028
Flight Control System Re-Design				
Reviews: Reviews: Preliminary Design Review	1	2023	1	2023
Reviews: Reviews: Critical Design Review	1	2024	1	2024
Reviews: Reviews: Test Readiness Review	2	2025	2	2025
Test & Evaluation: Operational Evaluation: Flight Test - 1	1	2026	1	2026
Test & Evaluation: Operational Evaluation: Flight Test - 2	3	2026	3	2026
Test & Evaluation: Operational Evaluation: Flight Test - 3	3	2028	3	2028
Contract Award: Contract Award: Step 2 Contract Award	1	2026	1	2026
Production Milestones: Production Milestones: Contract Award	2	2027	2	2027
Production Milestones: Production Milestones: Kit Procurements	3	2027	4	2028
Open Systems Architecture / Cyber Security				
Reviews: Reviews: Systems Requirements Review	2	2023	2	2023
Reviews: Reviews: Preliminary Design Review	3	2023	3	2023
Reviews: Reviews: Critical Design Review	2	2024	2	2024
Reviews: Reviews: Test Readiness Review	3	2025	3	2025
Reviews: Reviews: Initial Operational Capability	2	2026	2	2026
Test & Evaluation: Developmental Testing: Developmental Testing	2	2025	4	2025
Contract Award: Contract Award: Platform Data Service / Ethernet Expansion Device	1	2023	1	2023
Production Milestones: Production Milestones: Kit Production Contract Award	1	2026	1	2026

Exhibit R-2A, RDT&E Project Justification: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604262N / *V-22A*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
9999: *Congressional Adds*	0.000	4.103	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.103
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Develop Air-Oil heat exchanger that is resistant to fouling and easy to clean on-wing for V-22 operations in sand/dust environment. Fouled heat exchangers can lead to gearbox overheat in flight and potential for catastrophic consequences. New oil cooler will reduce maintenance burden and improve performance in sand/dust environment to prevent overheating of gearbox, hydraulic, and generator oil.

Based on demonstrated system performance, the V-22 program does not intend to award a contract or obligate any of the $4.103 million FY22 Navy RDT&E Oil Cooler program increase. The proposed Oil Cooler failed to satisfy V-22 performance requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
Congressional Add: V-22 oil coolers	4.103	0.000
FY 2022 Accomplishments: Based on demonstrated system performance, the V-22 program does not intend to award a contract or obligate any of the $4.103 million FY22 Navy RDT&E Oil Cooler program increase. The proposed Oil Cooler failed to satisfy V-22 performance requirements.		
FY 2023 Plans: N/A		
Congressional Adds Subtotals	4.103	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Continue with Small Business Innovative Research (SBIR).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Navy			Date: March 2023
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604262N / *V-22A*	Project (Number/Name) 9999 / *Congressional Adds*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
V-22 Oil Coolers	SS/FFP	International Mezzo Technologies : Baton Rouge, LA	0.000	4.103	Sep 2023	0.000		0.000		-		0.000	0.000	4.103	4.000
		Subtotal	0.000	4.103		0.000		0.000		-		0.000	0.000	4.103	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	4.103		0.000		0.000		-		0.000	0.000	4.103	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 9999 / *Congressional Adds*

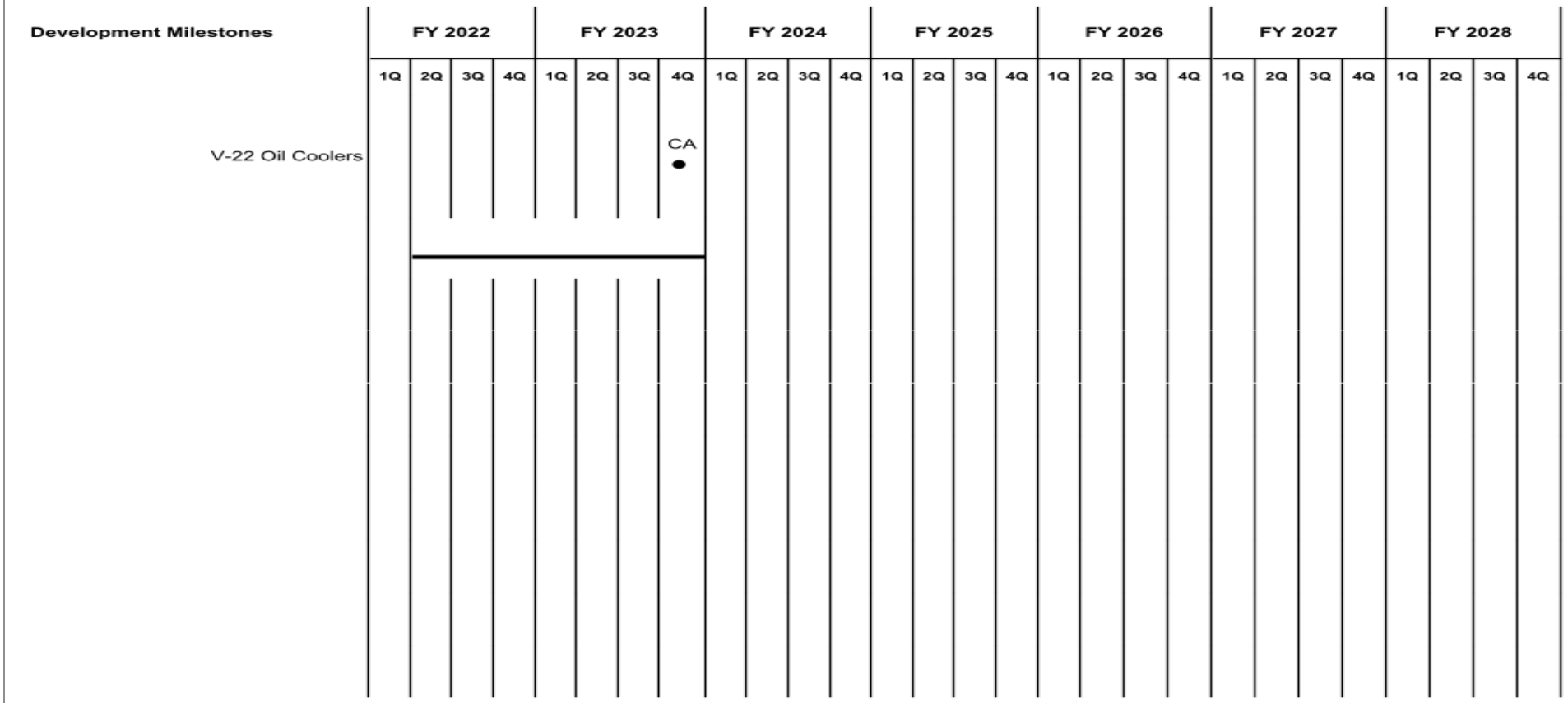

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Navy		Date: March 2023
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Development Milestones				
V-22 Oil Coolers: Contract Award	4	2023	4	2023
V-22 Oil Coolers: Requirements deveopment	2	2022	4	2023