Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy												Date: May 2017
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 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	9,127.759	74.366	189.423	171.386	-	171.386	137.814	167.426	94.955	119.109	184.398	10,266.636
1425: *V-22*	9,127.759	74.366	189.423	171.386	-	171.386	137.814	167.426	94.955	119.109	184.398	10,266.636
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 is replacing the CH-46E and CH53A/D in the Marine Corps and the CMV-22 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 A and 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. 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 or an Urgent Universal Needs Statement. Development efforts include Mission System Upgrade, Electrical System Upgrades, Infrared Suppressor, Engine Air Particle Separator, Swashplate Actuator, Mid-Wing Process Unit, ARC 210 Series Radio, Mission Computer Obsolescence Initiative, Weapon Systems Development, AAR-47 Hostile Fire Indicator, Time on Wing, Digital Interoperability, Blue Force Tracker/Netted Weather and Common Configuration Readiness and Modernization (CC-RAM) Nacelle redesign.

FY18 will provide for additional Aircraft Mission Maneuvering Envelope Expansion, Velocity Not to Exceed Expansion, Digital Interoperability, Software Reprogrammable Payload, Time on Wing and Reliability Improvement efforts such as Improved Inlet Solution (IIS) development as well as development and testing of Additive Manufacturing processes for selected MV-22 components.

The MV-22 Hardware Development Airframe continues to fund development efforts by Bell-Boeing. Continue development in support of MV-22 Block upgrades and Time on Wing and efforts such as IIS. Continue engineering, logistics, flight test, flight test support and address the correction of deficiencies and obsolescence. Continue MV-22 software development/mission computer obsolescence initiatives such as transition tech demo and map replacement demo. Continue V-22 Integrated Aircraft Survivability Equipment to include correcting deficiencies of the current swashplate actuator, EAPS, radar warning system, integration with an upgraded missile warning and active infrared countermeasure system, and providing integrated threat warning information on the aircraft main flight displays.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*

MV-22 Hardware Development Propulsion will continue to fund the flight/engine hours necessary for developmental testing at the Patuxent River squadron. Rolls-Royce will continue to provide engine support and development of MV-22 flight testing.

FY18 continues MV-22 Digital Interoperability (DI), United States Marine Corps Aviation wide implementation of software defined radios, such as Software Reprogrammable Payload, capable of migration to advanced waveforms and payloads, providing enhanced digital connectivity between forces using dissimilar waveforms and/or protocols. DI will enable fleet integration of new capability through the use of tablets with custom applications. DI is also envisioned to include logistics tracking (cargo and personnel) with the use of Radio Frequency Identification technology, advanced Electronic Warfare/Cyber capability, and threat data capturing/off-boarding.

FY18 continues MV-22 Software Reprogrammable Payload is a single common payload module that is open architecture, government owned, flexible, and reconfigurable to support simultaneous missions and applications making maximum use of available bandwidth and ensuring interoperability. Provides a bridge and translator to allow various systems/waveforms to collaborate and provides the V-22 operator and passenger with a common operating picture. MV-22 is the lead platform for integration of Software Reprogrammable Payload Spiral II.

FY18 continues effort started under PE: 0605525N. The Navy Variant (CMV) Hardware Development effort consists of an Engineering Change Proposal (ECP) to modify MV-22 into the CMV configuration to perform the Carrier Onboard Delivery (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 radio to transmit/receive beyond line of sight over water and (3) a public address system for use while transporting passengers.

FY18 continues the V-22 Aerial Refueling System (VARS) capability. VARS will provide V-22 tanker capability to the Marine Air Ground Task Force, enabling safe and efficient execution of all missions, tactical or humanitarian. The system will allow the V-22 to provide fuel to other Air Combat Element aircraft, such as F-35B and CH-53E/K, while en-route, in the objective area, or during recovery, extending the operational reach/duration. With the V-22 deployed onboard, amphibious assault ships would gain an organic aerial refueling capability, maximizing response time and agility.

FY18 continues Electrical System re-design and reliability improvement effort started in the Hardware Development Airframe line. This effort will assess and select engineering solutions to improve the Variable Frequency Generator and Generator Control Unit components. Increased V-22 electrical system reliability and capacity is required to accommodate demands on electrical power system as additional systems are added to the V-22. Continue Nacelle redesign efforts that will improve maintainability and reliability, as well as wiring redesign.

FY18 continues Infrared Suppressor (IRS) Re-design effort started in the Hardware Development Airframe line. The IRS system masks the infrared signature of an aircraft, which increases the survivability. The current system does not meet reliability requirements and is a high readiness degrader for the V-22 fleet. This effort funds the Engineering & Manufacturing Development, as well as the instrumented flight test of a more reliable V-22 IRS upgrade.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Navy	Date: May 2017
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*

FY18 continues MV-22 Technology Insertion development effort started in the Hardware Development Airframe line. This effort provides new capabilities focused on enhancing survivability; software and hardware modularity and maturation of aircraft interfaces to support interoperability. Also includes risk reduction and development efforts such as Multi-Spectral Sensor Integration (Improved Forward Looking Infrared, Degraded Visual Environment Mitigation, Electronic Warfare), Helmet Mounted Display, Modular Avionics/Cyber Security Implementation, Enhanced Defensive Weapons Capabilities, Radio Frequency Threat Protection and Airborne Networking.

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. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	76.483	174.423	145.342	-	145.342
Current President's Budget	74.366	189.423	171.386	-	171.386
Total Adjustments	-2.117	15.000	26.044	-	26.044
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.002	0.000			
• SBIR/STTR Transfer	-2.114	0.000			
• Program Adjustments	0.000	15.000	25.850	-	25.850
• Rate/Misc Adjustments	-0.001	0.000	0.194	-	0.194

Change Summary Explanation

The FY18 funding request shows Infrared Suppressor and Technology Insertion cost elements broken out of the Hardware Development Airframe line.

Production Quantity change now reflects 6 aircraft in FY18, 7 in FY19 and FY20, 9 in FY21, and 11 in FY22. Development Test and Evaluation (DT&E) was updated to adjust for actuals. Added depth and detail to Digital Interoperability/Software Reprogrammable Payload and Electrical System Re-design schedules. New schedules added for Infrared Suppressor and Technology Insertion cost elements. The schedule for the V-22 Aerial Refueling system (VARS) has been updated to reflect contract award, contractor schedule, and design maturation as the program progresses to Preliminary Design Review in FY17. VARS kits and installs will now complete in FY22.

Technical: Not applicable

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy			Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
1425: *V-22*	9,127.759	74.366	189.423	171.386	-	171.386	137.814	167.426	94.955	119.109	184.398	10,266.636
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 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 and CH53A/D 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 for correction of deficiencies and includes Block A and 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. 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 or a Urgent Universal Needs Statement. Development efforts include Mission System Upgrade, Electrical System Upgrades, Infrared Suppressor, Engine Air Particle Separator, Swashplate Actuator, Mid-Wing Process Unit, ARC 210 Series Radio, Mission Computer Obsolescence Initiative, Weapon Systems Development, AAR-47 Hostile Fire Indicator, Time on Wing, Digital Interoperability, Blue Force Tracker/Netted Weather and Common Configuration Readiness and Modernization (CC-RAM) Nacelle redesign.

FY18 will provide for additional Aircraft Mission Maneuvering Envelope Expansion, Velocity Not to Exceed Expansion, Digital Interoperability, Software Reprogrammable Payload, Time on Wing and Reliability Improvement efforts such as Improved Inlet Solution (IIS) development as well as development and testing of Additive Manufacturing processes for selected MV-22 components.

The MV-22 Hardware Development Airframe continues to fund development efforts by Bell-Boeing. Continue development in support of MV-22 Block upgrades and Time on Wing and efforts such as IIS. Continue engineering, logistics, flight test, flight test support and address the correction of deficiencies and obsolescence. Continue MV-22 software development/mission computer obsolescence initiatives such as transition tech demo and map replacement demo. Continue V-22 Integrated Aircraft Survivability Equipment to include correcting deficiencies of the current swashplate actuator, EAPS, radar warning system, integration with an upgraded missile warning and active infrared countermeasure system, and providing integrated threat warning information on the aircraft main flight displays.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

MV-22 Hardware Development Propulsion will continue to fund the flight/engine hours necessary for developmental testing at the Patuxent River squadron. Rolls-Royce will continue to provide engine support and development of MV-22 flight testing.

FY18 continues MV-22 Digital Interoperability (DI), United States Marine Corps Aviation wide implementation of software defined radios, such as Software Reprogrammable Payload, capable of migration to advanced waveforms and payloads, providing enhanced digital connectivity between forces using dissimilar waveforms and/or protocols. DI will enable fleet integration of new capability through the use of tablets with custom applications. DI is also envisioned to include logistics tracking (cargo and personnel) with the use of Radio Frequency Identification technology, advanced Electronic Warfare/Cyber capability, and threat data capturing/off-boarding.

FY18 continues MV-22 Software Reprogrammable Payload is a single common payload module that is open architecture, government owned, flexible, and reconfigurable to support simultaneous missions and applications making maximum use of available bandwidth and ensuring interoperability. Provides a bridge and translator to allow various systems/waveforms to collaborate and provides the V-22 operator and passenger with a common operating picture. MV-22 is the lead platform for integration of Software Reprogrammable Payload Spiral II.

FY18 continues effort started under PE: 0605525N. The CMV Hardware Development effort consists of an Engineering Change Proposal (ECP) to modify MV-22 into the CMV configuration to perform the Carrier Onboard Delivery (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 radio to transmit/receive beyond line of sight over water and (3) a public address system for use while transporting passengers.

FY18 continues the V-22 Aerial Refueling System (VARS) capability. VARS will provide V-22 tanker capability to the Marine Air Ground Task Force, enabling safe and efficient execution of all missions, tactical or humanitarian. The system will allow the V-22 to provide fuel to other Air Combat Element aircraft, such as F-35B and CH-53E/K, while en-route, in the objective area, or during recovery, extending the operational reach/duration. With the V-22 deployed onboard, amphibious assault ships would gain an organic aerial refueling capability, maximizing response time and agility.

FY18 continues Electrical System re-design and reliability improvement effort started in the Hardware Development Airframe line. This effort will assess and select engineering solutions to improve the Variable Frequency Generator and Generator Control Unit components. Increased V-22 electrical system reliability and capacity is required to accommodate demands on electrical power system as additional systems are added to the V-22. Continue Nacelle redesign efforts that will improve maintainability and reliability, as well as wiring redesign.

FY18 continues Infrared Suppressor (IRS) Re-design effort started in the Hardware Development Airframe line. The IRS system masks the infrared signature of an aircraft, which increases the survivability. The current system does not meet reliability requirements and is a high readiness degrader for the V-22 fleet. This effort funds the Engineering & Manufacturing Development, as well as the instrumented flight test of a more reliable V-22 IRS upgrade.

FY18 continues MV-22 Technology Insertion development effort started in the Hardware Development Airframe line. This effort provides new capabilities focused on enhancing survivability; software and hardware modularity and maturation of aircraft interfaces to support interoperability. Also includes risk reduction and development

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

efforts such as Multi-Spectral Sensor Integration (Improved Forward Looking Infrared, Degraded Visual Environment Mitigation, Electronic Warfare), Helmet Mounted Display, Modular Avionics/Cyber Security Implementation, Enhanced Defensive Weapons Capabilities, Radio Frequency Threat Protection and Airborne Networking.

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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: MV-22 Hardware Development Airframe	13.714	21.768	16.827	0.000	16.827
Articles:	-	-	-	-	-

Description: The MV-22 Hardware Development Airframe continues to fund development efforts by Bell-Boeing. Continue development in support of MV-22 Block upgrades and Time on Wing/Reliability Improvements efforts such as Improved Inlet Solution (IIS), Condition Based Maintenance development, development and testing of Additive Manufacturing processes for selected MV-22 components, Miniaturized Airborne Global Positioning and electrical system capacity efforts. Continue engineering, logistics, flight test, flight test support and address the correction of deficiencies and obsolescence efforts such as Swashplate Actuator, Engine Air Particle Separator, including training upgrades and developments. Continue MV-22 software development/sustainment efforts such as transition tech demo, map replacement demo and Mission Computer Obsolescence Initiative re-design. Continue V-22 Integrated Aircraft Survivability Equipment to include correcting deficiencies and obsolescence issues, to include the current radar warning system, integration with an upgraded missile warning and active infrared countermeasure system, cockpit interface units, electrical power system, and providing integrated threat warning information on the aircraft main flight displays.

FY 2016 Accomplishments:
Continue MV-22 development efforts by Bell-Boeing. Rolls-Royce will continue to provide engine support and development of MV-22 flight testing. Continue MV-22 software development/sustainment efforts. Continue development in support of MV-22 Block upgrades and Time on Wing efforts such as IIS & Condition Based Maintenance Plus (CBM+) development. Continue engineering, logistics, flight test, flight test support and address correction of deficiencies. Continue contracted development efforts on test aircraft. Continue electrical system capacity and reliability improvement efforts.

FY 2017 Plans:
Continue MV-22 development efforts by Bell-Boeing. Rolls-Royce will continue to provide engine support and development of MV-22 flight testing. Continue MV-22 software development/sustainment efforts such as Mission Computer Obsolescence Initiative re-design and modular software. Continue development in support of MV-22 Block upgrades and Time on Wing/Reliability Improvement efforts such as IIS and CBM+. Continue

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
V-22 Integrated Aircraft Survivability Equipment effort. Continue engineering, logistics, flight test, flight test support and address correction of deficiencies and obsolescence efforts such as Swashplate Actuator, Engine Air Particle Separator, also including training upgrades and developments. Continue reliability improvement efforts such as Additive manufacturing, and Miniaturized Airborne Global Positioning as well as Re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program. ***FY 2018 Base Plans:*** Continue MV-22 development efforts by Bell-Boeing. Rolls-Royce will continue to provide engine support and development of MV-22 flight testing. Continue MV-22 software development/sustainment efforts such as Mission Computer Obsolescence Initiative re-design. Continue development in support of MV-22 Block upgrades and Time on Wing/Reliability Improvement efforts such as Improved Inlet Solution. Continue engineering, logistics, flight test, flight test support and address correction of deficiencies and obsolescence efforts such as Swashplate Actuator, Engine Air Particle Separator, also including training upgrades and developments. Continue reliability improvement efforts such as Additive manufacturing, and Miniaturized Airborne Global Positioning as well as Re-design efforts to correct critical Reliability, Maintainability and Availability issues in support of readiness Operational Safety Improvement Program. ***FY 2018 OCO Plans:*** N/A					
Title: MV-22 Hardware Development Propulsion/Mission Care	0.086	0.162	0.167	0.000	0.167
Articles:	-	-	-	-	-
Description: The funding of Mission Care relates to our RDT&E program as it funds the flight/engine hours necessary for developmental testing at the Patuxent River squadron. In addition, it pays for Rolls Royce engine support at Patuxent River. ***FY 2016 Accomplishments:*** Funds continued for Mission Care flight & engine hours for developmental testing at Patuxent River squadron. ***FY 2017 Plans:*** Funds continued for Mission Care flight & engine hours for developmental testing at Patuxent River squadron. ***FY 2018 Base Plans:*** Funds continued for Mission Care flight & engine hours for developmental testing at Patuxent River squadron. ***FY 2018 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
N/A					
Title: MV-22 Digital Interoperability	4.503	9.900	12.200	0.000	12.200
Articles:	-	-	-	-	-
Description: Digital Interoperability (DI) is the United States Marine Corps Aviation wide implementation of iridium and software defined radios, such as Software Reprogrammable Payload, capable of migration to advanced waveforms and payloads, providing enhanced digital connectivity between forces using dissimilar waveforms and/or protocols. DI will enable fleet integration of new capability through the use of tablets with custom applications. DI is also envisioned to include logistics tracking (cargo and personnel) with the use of Radio Frequency Identification technology, advanced Electronic Warfare/Cyber capability, and threat data capturing/off-boarding.					
FY 2016 Accomplishments: Funds continue for development and demonstration of Digital Interoperability, including spiral development of Software Reprogrammable Payload (SRP), tablets and the custom applications. Approved Interim Airframes Change for Iridium & started initial install.					
FY 2017 Plans: Funds continue for development and demonstration of Digital Interoperability, by incorporating lessons learned into the SRP, using additional dissimilar waveforms and Protocols, tablets and the custom applications, Radio Frequency Identification technology, Electronic Warfare/Cyber capability and threat data capturing/off-boarding. Formalize iridium via and engineering change proposal to include incorporation the design into production drawings.					
FY 2018 Base Plans: Funds continue for the maturation of Digital Interoperability and assessment of effectiveness via gateway messaging, data flow, data assurance, and quality of service to support the Information Exchange Requirements to support the approved Integrated Aviation Survivability Equipment information systems Initial Capability Document, distributed electronic warfare operations, data fusion, off-boarding, and mission thread Information exchange Requirements across the range of military operations.					
FY 2018 OCO Plans: N/A					
Title: MV-22 Software Reprogrammable Payload (SRP)	5.200	6.000	6.000	0.000	6.000
Articles:	-	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Description: SRP is a single common payload module that is open architecture, government owned, flexible, and reconfigurable to support simultaneous missions and applications making maximum use of available bandwidth and ensuring interoperability. Provides a bridge and translator to allow various systems/waveforms to collaborate and provides the V-22 operator and passenger with a common operating picture. ***FY 2016 Accomplishments:*** Development begins for the SRP with the development of a conformal antenna and incorporation of Spiral II waveforms (Link 16, Bandwidth Efficient Common Data Link, Tactical Targeting Network Technology and associated hardware into the SRP radio. ***FY 2017 Plans:*** Funding continues for Software Reprogrammable Payload (SRP) Development to provide provisions for the porting of the waveforms to Software Reprogrammable Payload essential to meet USMC mission thread requirements; includes Software Integration Labs, MV-22 integration, test and development assets, provides for data forwarding, messaging, and health of services capability to achieve interoperability with existing networks and systems. ***FY 2018 Base Plans:*** Funding continues for SRP gateway development to provide for Digital Interoperability via Sensor Fusion and Integrated Aircraft Survivability Equipment. Continuation of waveform development of Spiral II waveforms (Link 16, Bandwidth Efficient Common Data Link, Tactical Targeting Network Technology and associated hardware into the SRP radio. ***FY 2018 OCO Plans:*** N/A					
Title: V-22 Aerial Refueling System Development ***Articles:***	10.800 -	24.752 -	17.323 -	0.000 -	17.323 -
Description: V-22 Aerial Refueling System (VARS) will provide V-22 tanker capability to the Marine Air Ground Task Force, enabling safe and efficient execution of all missions, tactical or humanitarian. The system will allow the V-22 to provide fuel to other Air Combat Element aircraft, such as F-35B and CH-53E/K, while en-route, in the objective area, or during recovery, extending the operational reach/duration. With the V-22 deployed onboard, amphibious assault ships would gain an organic aerial refueling capability, maximizing response time and agility. ***FY 2016 Accomplishments:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Begin funding the VARS Development Capability. VARS will provide V-22 tanker capability to the Marine Air Ground Task Force, enabling safe and efficient execution of all missions, tactical or humanitarian. This FY16 funding will complete the initial design and allow the effort to proceed through Critical Design Review (CDR). ***FY 2017 Plans:*** Continue funding for the VARS Development Capability. VARS will provide V-22 tanker capability to the Marine Air Ground Task Force, enabling safe and efficient execution of all missions, tactical or humanitarian. This FY17 funding will provide engineering to complete the basic (post-CDR) design for testing as well as upgrading Joint Mission Planning System software, and the procurement of flight test kits and flight test support. ***FY 2018 Base Plans:*** Continue funding for the VARS Development Capability. VARS will provide V-22 tanker capability to the Marine Air Ground Task Force, enabling safe and efficient execution of all missions, tactical or humanitarian. The FY18 funding will be used to continue flight testing and supply engineering support for any issues identified during flight test as well as the procurement of additional flight test kits. ***FY 2018 OCO Plans:*** N/A					
Title: MV-22 Electrical System Re-design ***Articles:*** ***Description:*** Continue Electrical System re-design and reliability improvement effort started in the Hardware Development Airframe line. This effort will assess and select engineering solutions to improve the Variable Frequency Generator (VFG), Generator Control Unit (GCU) and Constant Frequency Generator (CFG) components as well as support relocation of the GCU. Upgrading the increased V-22 electrical system reliability and capacity is required to accommodate demands on electrical power system as additional systems are added to the V-22. Continue Nacelle redesign efforts that will improve maintainability and reliability, as well as wiring redesign. This will reduce wire harnesses, connectors, wiring assemblies and will incorporate water intrusion and corrosion protection. Nacelle redesign will also accommodate Inlet Solution wiring and remote VFG/GCU provisions. ***FY 2016 Accomplishments:*** N/A ***FY 2017 Plans:***	0.000 -	20.200 -	8.200 -	0.000 -	8.200 -

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Continue Electrical System re-design and reliability improvement effort begun under the hardware development line. This effort will assess and select engineering solutions to improve the VFG and GCU components. Increased V-22 electrical system reliability and capacity is required to accommodate demands on electrical power system as additional systems are added to the V-22. Nacelle redesign will also accommodate Inlet Solution wiring and remote VFG/GCU provisions. ***FY 2018 Base Plans:*** Continue Electrical System re-design and reliability improvement effort started in the hardware development line. This effort is a two phase approach; first phase will redesign and separate the GCUs (both VFG and CFG) from the generators and relocate them to a more benign environment (such as the fuselage); second phase will redesign Variable Frequency Generator (VFG) and Generator Control Unit (GCU) to one common configuration increasing power generation capacity required to accommodate demands on electrical power system as additional systems are added to the V-22. Continue Nacelle redesign efforts that will improve maintainability and reliability, as well as wiring redesign. ***FY 2018 OCO Plans:*** N/A					
Title: V-22 CMV Development	16.084	71.563	65.185	0.000	65.185
Articles:	-	1	-	-	-
Description: Funding supports the implementation of an Engineering Change Proposal (ECP) to incorporate the new systems required for the CMV configuration to perform the Carrier Onboard Delivery (COD) mission. The ECP will add (1) the capability to meet the range requirements that the COD mission demands (2) a High Frequency radio to transmit/receive beyond line of sight over water and (3) a Public Address system for use while transporting passengers. ***FY 2016 Accomplishments:*** Funds provided for the V-22 CMV Development effort to perform the COD mission. Begin development of ECP to meet External Fuel Tank, High Frequency radio and Public Address system requirements. Begin engineering and logistics support needed to develop ECP. Develop full System Engineering Development Model (EDM). ***FY 2017 Plans:*** Continue funding for the V-22 CMV Development effort to perform the COD mission. Continue development of ECP to meet Extended Range, High Frequency radio and Public Address system requirements. Continue					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
engineering and logistics support needed to develop ECP. Build and install EDM prototype ECP kit on V-22 developmental test aircraft. ***FY 2018 Base Plans:*** Continue funding for the V-22 CMV Development effort to perform the COD mission. Support the development of Functional Test Plans and qualification efforts for the High Frequency radio to transmit/receive beyond line of sight over water and the Public Address system for use while transporting passengers. Development of the Joint Vertical Experimental Application System Software will continue. Begin tooling design and fabrication for the enlarged sponsons and wing tanks and the completion of the live fire test sponson fabrication will occur. Begin risk reduction flight testing and develop the logistics products. Begin the test Instrumentation design and planning for the CMV aircraft. ***FY 2018 OCO Plans:*** N/A					
Title: V-22 Infrared Suppressor (IRS) Re-design	0.960	8.694	10.578	0.000	10.578
Articles:	-	-	-	-	-
Description: Funding supports the development of a new or improved IRS system for the MV-22. The IRS system masks the infrared signature of an aircraft which increases the survivability. The current system does not meet reliability requirements and is a high readiness degrader for the V-22 fleet. This funding will provide for Engineering & Manufacturing Development and instrumented flight test of a more reliable V-22 IRS upgrade. ***FY 2016 Accomplishments:*** Funding provided for Broad Agency Announcement soliciting technology solutions from industry for a new or improved IRS system to support improved reliability & readiness for the MV-22 aircraft. ***FY 2017 Plans:*** Funding includes the evaluation of three prototype solutions for a new or improved V-22 Infrared Suppressor (IRS) system. Each prototype solution will be demonstrated via ground and flight testing leading to down-select one improved IRS solution for the V-22. ***FY 2018 Base Plans:*** Funding continues for the development of a new IRS system for the V-22. The IRS system masks the infrared signature of an aircraft which increases the survivability. FY18 funding will provide for continued Engineering & Manufacturing Development of upgraded IRS system. ***FY 2018 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
N/A					
Title: MV-22 Technology Insertion	2.658	5.641	11.072	0.000	11.072
Articles:	-	-	-	-	-
Description: The MV-22 Technology Insertion development effort will provide new capabilities focused on enhancing survivability; software and hardware modularity and maturation of aircraft interfaces to support interoperability. Tech Insertion includes risk reduction and development efforts such as Multi-Spectral Sensor Integration, to include Improved Forward Looking Infrared, Degraded Visual Environment Mitigation/Electronic Warfare, Helmet Mounted Display, Modular Avionics/Cyber Security Implementation, Enhanced Defensive Weapons Capabilities, Radio Frequency Threat Protection, and Airborne Networking. ***FY 2016 Accomplishments:*** Funds provided for software and hardware modularity efforts as part of Modular Avionics development to include Bus Interface Controller (BIC) development. Funds also provide for Enhanced Defensive Weapons Capabilities. ***FY 2017 Plans:*** Funds provided for software and hardware modularity efforts as part of Modular Avionics development to include BIC development. Funds also provide for Enhanced Defensive Weapons Capabilities. ***FY 2018 Base Plans:*** FY18 Technology Insertion funding provides for efforts to include risk reduction and development efforts such as Multi-Spectral Sensor Integration, including Improved Forward Looking Infrared, Degraded Visual Environment Mitigation, Electronic Warfare, Helmet Mounted Display, Modular Avionics/Cyber Security Implementation, Enhanced Defensive Weapons Capabilities, Improved Survivability (Radio Frequency Threat Protection) and Airborne Networking. ***FY 2018 OCO Plans:*** N/A					
Title: V-22 Development Support, Test and Evaluation	20.361	20.743	23.834	0.000	23.834
Articles:	-	-	-	-	-
Description: Fund Government Engineering, Contractor Engineering, including Follow-On Test Evaluation (FOT&E), Developmental Test & Engineering (DT&E), and Operational Test & Evaluation (OT&E) for the MV-22 flight events. Perform Government oversight. Execute test program risk reduction efforts, as well as fund Tactical Training Theatre Assessment and Planning Phase III program to ensure that all Navy training and testing at sea is compliant with the major Federal environmental laws.					

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
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 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
FY 2016 Accomplishments: Funds provided for continued support of FOT&E, DT&E and OT&E to include flight control software, vehicle system operating software, inlet distortion, APR-39D(V)2, structural fatigue, envelope expansion, software airframe loads, nacelle sails, Integrated Aircraft Survivability Equipment, Nacelle Sail testing, traffic collision avoidance system, bonded tabs, aerial refueling system and refueling envelope, Tactical Training Theatre Assessment and Planning Phase III and CMV risk reduction. ***FY 2017 Plans:*** Funds provided for continued support of FOT&E, DT&E and OT&E to include flight control software, vehicle system operating software, inlet distortion, APR-39D(V)2, structural fatigue, envelope expansion, software airframe loads, nacelle sails, Integrated Aircraft Survivability Equipment, Nacelle Sail testing, traffic collision avoidance system, bonded tabs, aerial refueling system and refueling envelope, Tactical Training Theatre Assessment and Planning Phase III and CMV risk reduction. ***FY 2018 Base Plans:*** Funds provided for continued support of FOT&E, DT&E and OT&E to include flight control software, vehicle system operating software, inlet distortion, APR-39D(V)2, structural fatigue, envelope expansion, software airframe loads, nacelle sails, Integrated Aircraft Survivability Equipment, Nacelle Sail testing, traffic collision avoidance system, bonded tabs, aerial refueling system and refueling envelope, Tactical Training Theatre Assessment and Planning Phase III and CMV risk reduction. ***FY 2018 OCO Plans:*** N/A					
Accomplishments/Planned Programs Subtotals	74.366	189.423	171.386	0.000	171.386

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• APN 0164: *V-22*	1,463.564	1,579.115	697.078	-	697.078	822.748	731.925	999.432	1,196.660	3,586.235	36,823.654

Exhibit R-2A, RDT&E Project Justification: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
• APN 0590: *V-22 Series*	145.188	249.285	228.321	-	228.321	254.688	322.007	340.845	538.696	2,740.951	5,838.600
• APN 0605/J0164: *V-22 Inital Spares*	0.543	0.033	1.897	-	1.897	0.000	0.000	53.757	43.252	Continuing	Continuing
• RDTE 1160403BB: *CV-22 Special Operations, Aviation Systems*	0.000	15.590	14.259	-	14.259	21.635	27.961	8.000	0.000	0.000	90.438
• RDTE BA07 0401318F: *CV-22 USAF BA07*	26.821	16.702	22.519	-	22.519	16.641	14.731	14.985	15.293	41.970	207.360

Remarks

D. Acquisition Strategy

The MV-22 is a post Milestone III ACAT-IC program. As a result of mishaps during and subsequent to MV-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 are to 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 Engineering Manufacturing and Development 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 Government will issue an RFP to the Contractor and upon award, an Integrated Baseline Review, Preliminary Design Review, Integrated Logistics Assessment and a Critical Design Review will be held to assess the design maturity of the CMV-22. The CMV-22 will add (1) the capability to meet the range requirements that the Carrier Onboard Delivery (COD) mission demands (2) a high frequency radio to transmit/receive beyond line of sight over water and (3) a public address system for use while transporting passengers in support of the COD mission.

E. Performance Metrics

Milestone Reviews.

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MV-22 Hardware Dev Airframe	SS/CPIF	Bell Boeing : Ridley Park, PA	67.430	13.714	Jan 2016	21.768	Jan 2017	16.827	Jan 2018	-		16.827	139.474	259.213	259.213
MV-22 Hardware Dev Propulsion	SS/CPIF	Rolls-Royce Corp. : Indianapolis, IN	196.461	0.086	Nov 2015	0.162	Nov 2016	0.167	Nov 2017	-		0.167	2.125	199.001	199.001
MV-22 Digital Interoperability	WR	Various : Various	6.635	4.503	Jan 2016	9.900	Jan 2017	12.200	Jan 2018	-		12.200	40.500	73.738	-
MV-22 Software Reprogrammable Payload (SRP)	WR	NRL : China Lake, CA	0.000	5.200	Mar 2016	6.000	Jan 2017	6.000	Jan 2018	-		6.000	0.000	17.200	-
CMV-22 Development	C/CPIF	Bell Boeing : Ridley Park, PA	0.000	16.084	Mar 2016	71.563	Nov 2016	65.185	Nov 2017	-		65.185	36.726	189.558	189.558
MV-22 Aerial Refueling System Development	SS/CPIF	Bell Boeing : Ridley Park, PA	0.000	10.800	May 2016	24.752	Jan 2017	17.323	Jan 2018	-		17.323	15.210	68.085	68.085
MV-22 Electrical System Re-Design	C/BA	Bell Boeing : Ridley Park, PA	0.000	0.000		20.200	Dec 2016	8.200	Dec 2017	-		8.200	101.105	129.505	129.505
MV-22 IRS Re-design	C/BA	Various : Ridley Park, PA	0.000	0.960	Sep 2016	8.694	Dec 2016	10.578	Jan 2018	-		10.578	24.028	44.260	44.260
MV-22 Tech Insertion	C/CPFF	Bell-Boeing : Ridley Park, PA	0.000	2.658	Feb 2016	5.641	Nov 2016	11.072	Mar 2018	-		11.072	191.172	210.543	210.543
Prior year Prod Dev no longer funded in the FYDP	Various	Various : Various	5,106.472	0.000		0.000		0.000		-		0.000	0.000	5,106.472	-
		Subtotal	5,376.998	54.005		168.680		147.552		-		147.552	550.340	6,297.575	-

Remarks

FY18 shows Infrared Suppressor & Technical Insertion, previously begun in the Hardware Development Airframe line, as their own cost elements.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MV-22 Govt Engineering Sppt	WR	Various : Pax River, MD	1,106.684	2.808	Nov 2015	2.829	Nov 2016	2.887	Nov 2017	-		2.887	24.751	1,139.959	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CMV-22 Govt Engineering Sppt	WR	Various : Pax River, MD	0.000	0.820	Nov 2015	1.189	Nov 2016	1.298	Nov 2017	-		1.298	3.521	6.828	-
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	1,296.402	3.628		4.018		4.185		-		4.185	28.272	1,336.505	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MV-22 Dev Test & Evaluation	WR	NAWCAD : Pax River, MD	1,027.991	13.392	Nov 2015	13.455	Nov 2016	6.699	Nov 2017	-		6.699	64.615	1,126.152	-
MV-22 Operational Test & Evaluation	WR	OT&E Force : Norfolk, VA	55.597	1.259	Dec 2015	1.362	Dec 2016	1.476	Dec 2017	-		1.476	23.006	82.700	-
CMV-22 Dev Test & Evaluation	WR	NAWCAD : Pax River, MD	0.000	0.000		0.000		9.100	Nov 2017	-		9.100	10.280	19.380	-
Prior Year T & E no longer funded in the FYDP	Various	Various : Various	48.200	0.000		0.000		0.000		-		0.000	0.000	48.200	-
		Subtotal	1,131.788	14.651		14.817		17.275		-		17.275	97.901	1,276.432	-

Remarks

FY18 begins Developmental Testing Risk Reduction efforts for the CMV-22 Aircraft.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MV-22 Engineering Tech Sppt	Various	Various : Various	1,047.176	0.426	Nov 2015	0.257	Nov 2016	0.259	Nov 2017	-		0.259	6.350	1,054.468	-
MV-22 Management Sppt Svc	Various	Various : Various	156.884	0.667	Nov 2015	0.674	Nov 2016	0.681	Nov 2017	-		0.681	6.918	165.824	-
MV-22 Program Mgmt Support	WR	NAWCAD : Pax River, MD	60.890	0.786	Nov 2015	0.795	Nov 2016	0.800	Nov 2017	-		0.800	10.741	74.012	-

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Navy			Date: May 2017
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 2016 Cost	FY 2016 Award Date	FY 2017 Cost	FY 2017 Award Date	FY 2018 Base Cost	FY 2018 Base Award Date	FY 2018 OCO Cost	FY 2018 OCO Award Date	FY 2018 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MV-22 Travel	WR	Various : Various	16.534	0.203	Jan 2016	0.182	Jan 2017	0.185	Sep 2018	-		0.185	2.300	19.404	-
CMV-22 Travel	WR	Various : Various	0.000	0.000		0.000		0.040	Sep 2018	-		0.040	0.080	0.120	-
CMV-22 Engineering Tech Sppt	Various	Various : Various	0.000	0.000		0.000		0.409	Jan 2018	-		0.409	0.800	1.209	-
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	1,322.571	2.082		1.908		2.374		-		2.374	27.189	1,356.124	-

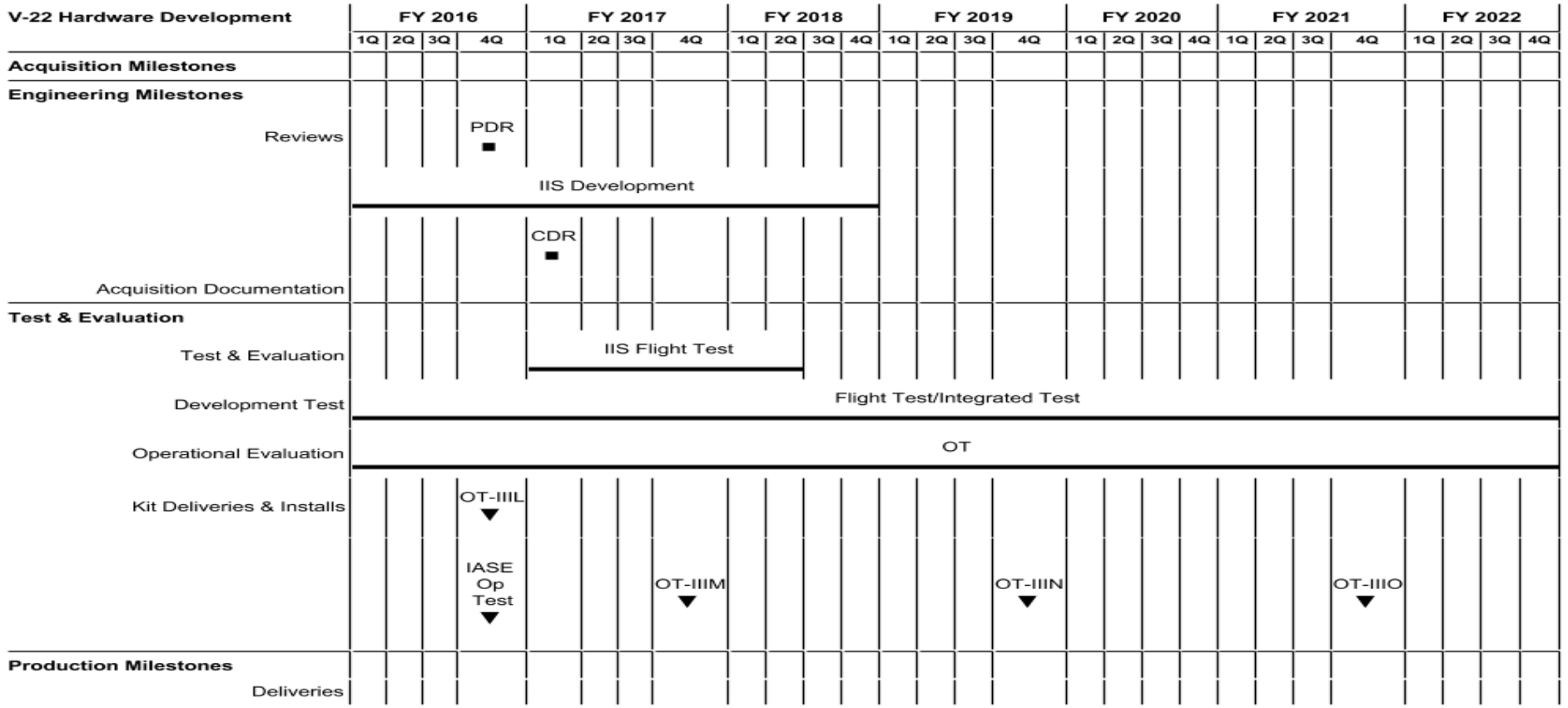
Remarks

CMV-22 Engineering Tech Support and Travel broken out separately beginning in FY-18.

	Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	9,127.759	74.366		189.423		171.386		-		171.386	703.702	10,266.636	-

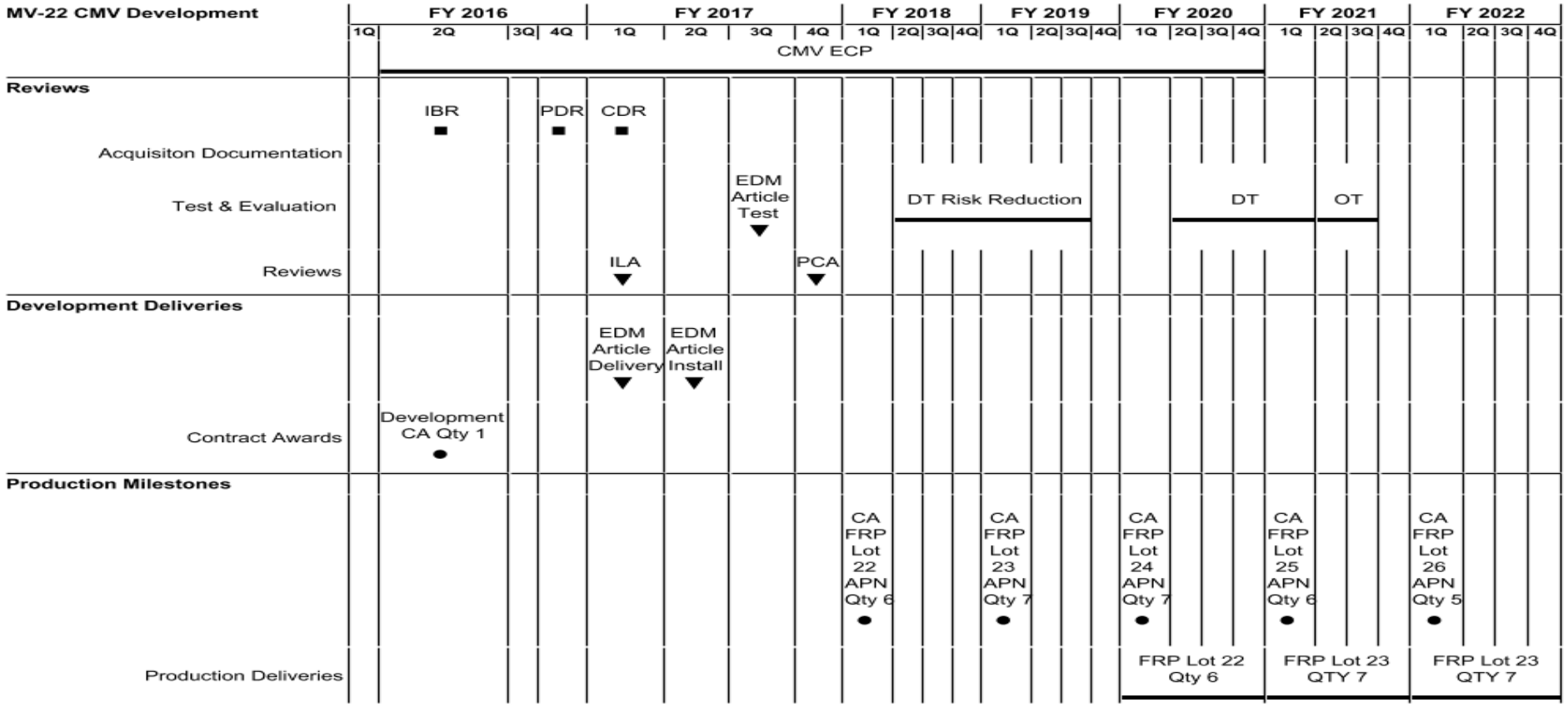
Remarks

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*



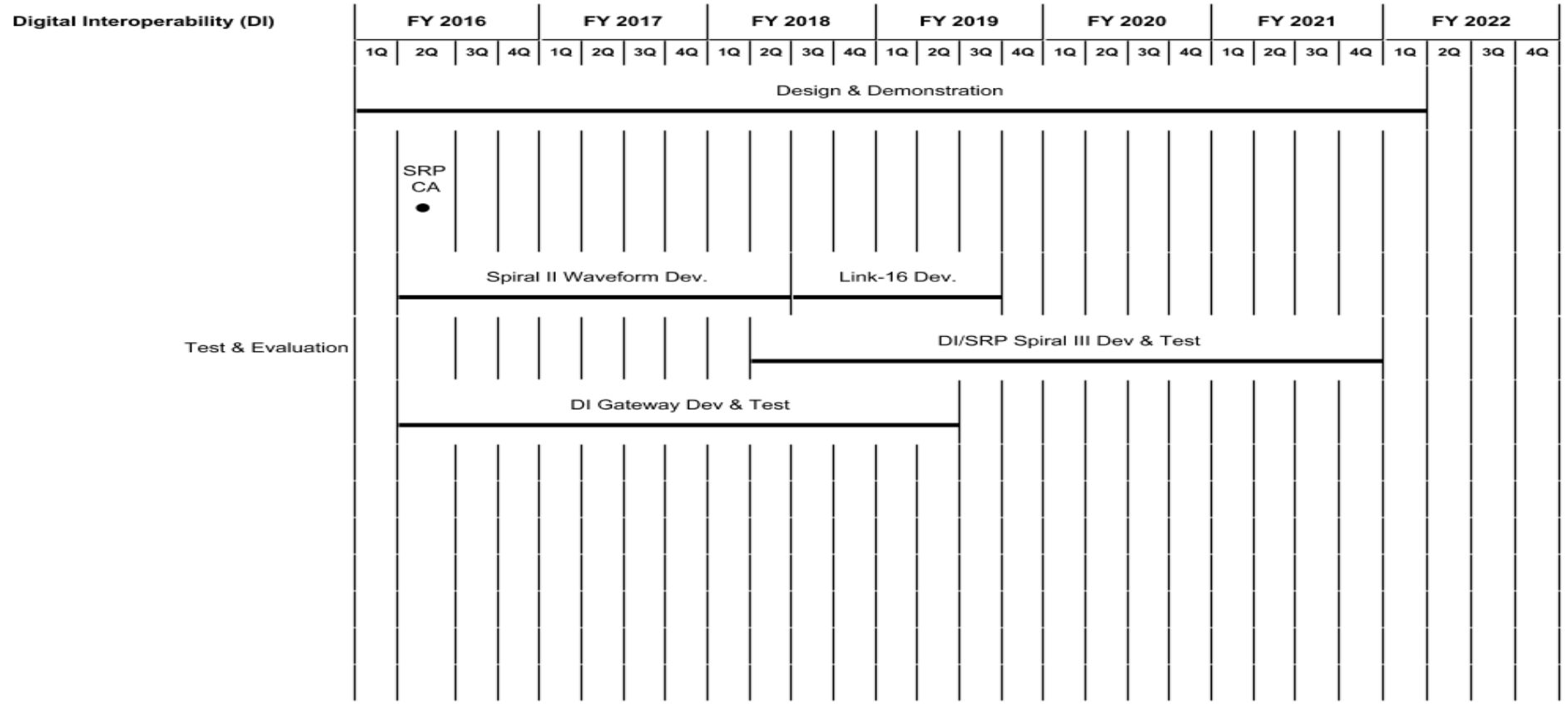
2018OSD - 0604262N - 1425

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*



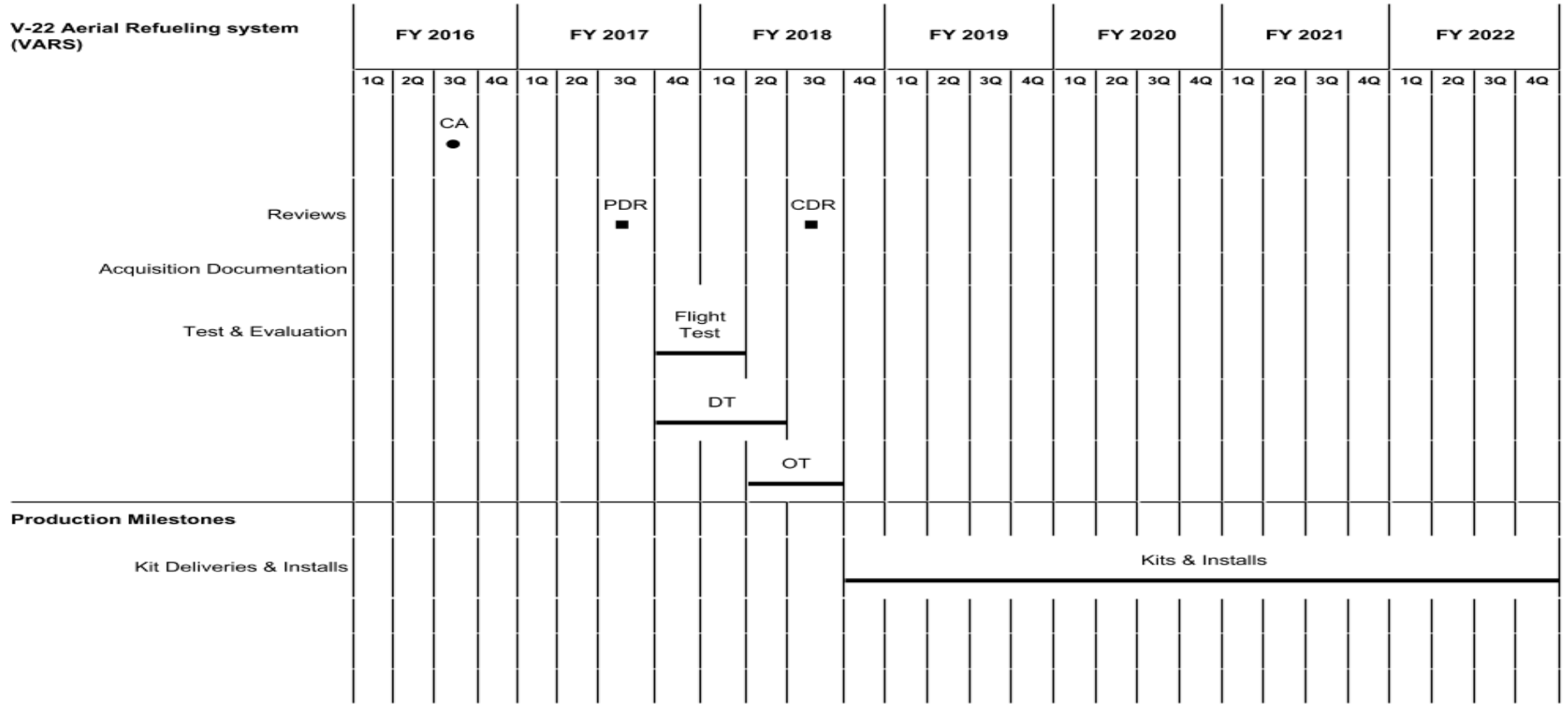
2018OSD - 0604262N - 1425

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*



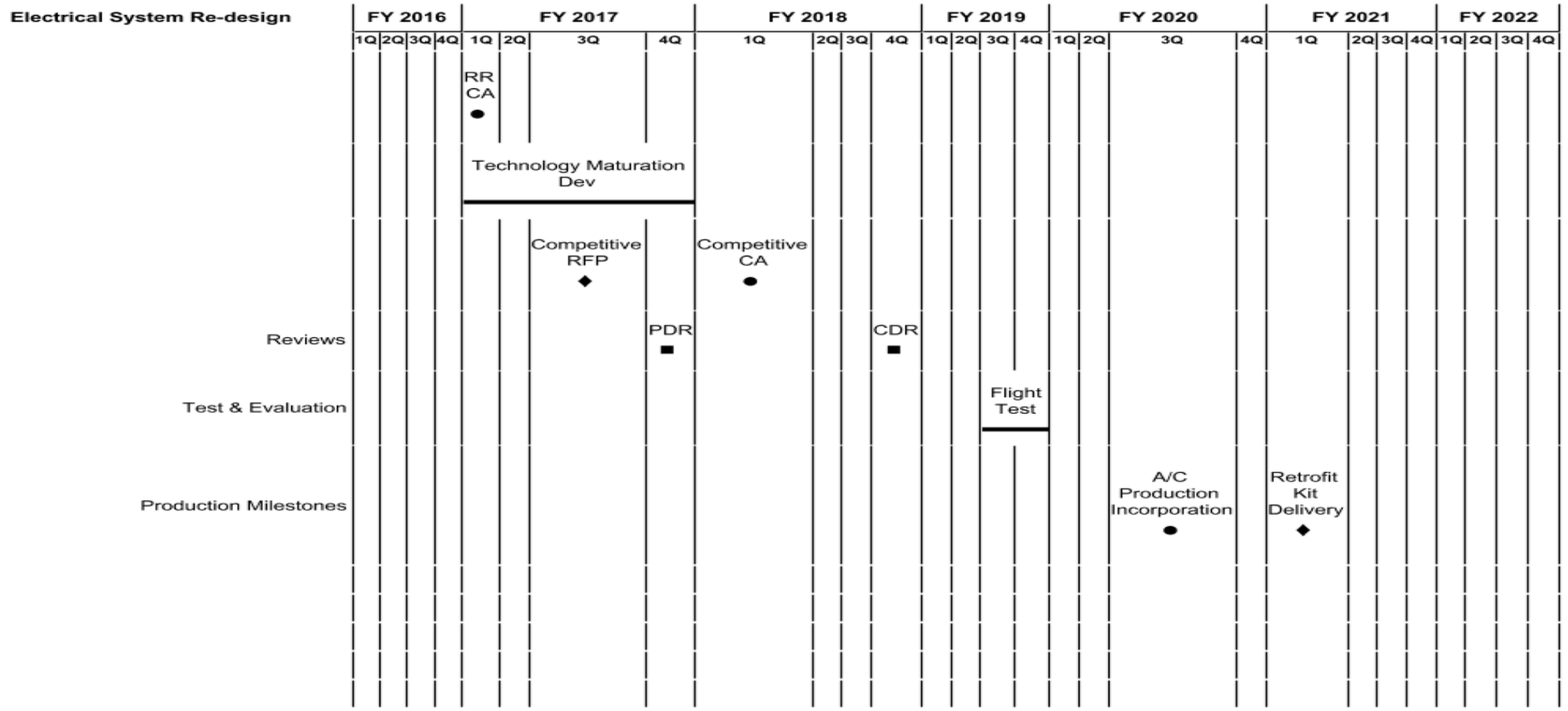
2018OSD - 0604262N - 1425

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*



2018OSD - 0604262N - 1425

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*



2018OSD - 0604262N - 1425

Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*

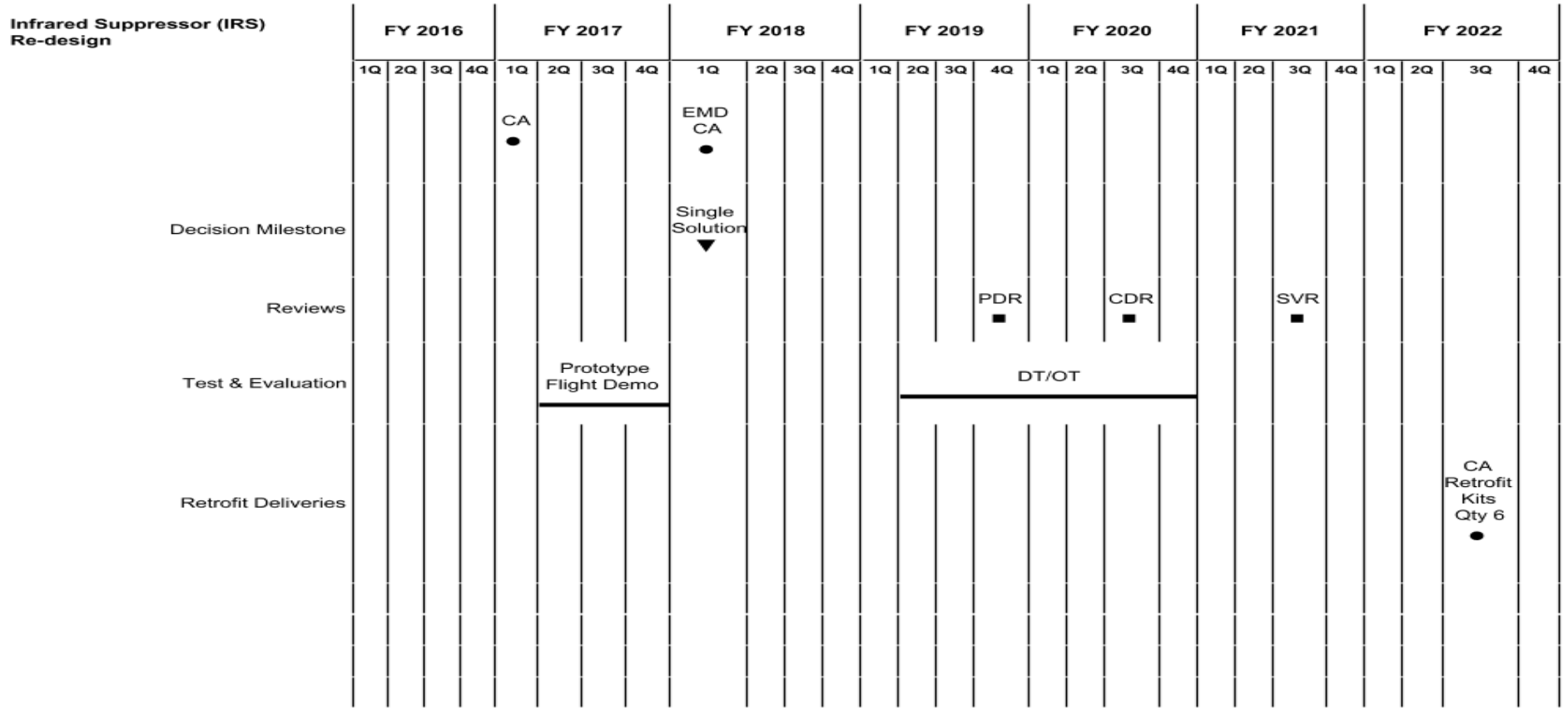
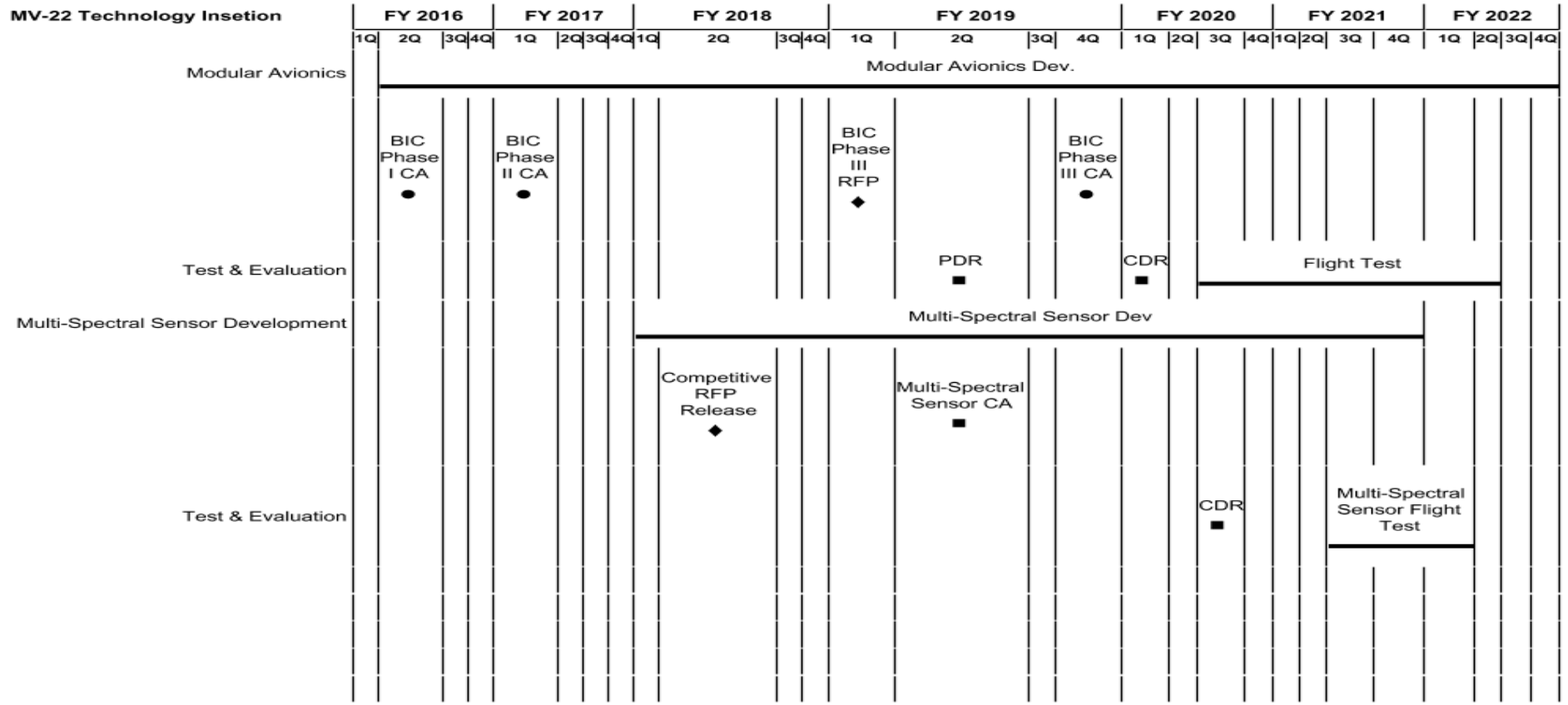


Exhibit R-4, RDT&E Schedule Profile: FY 2018 Navy		Date: May 2017
Appropriation/Budget Activity 1319 / 5	**R-1 Program Element (Number/Name)** PE 0604262N / *V-22A*	**Project (Number/Name)** 1425 / *V-22*



2018OSD - 0604262N - 1425

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
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				
Engineering Milestones: Reviews: Preliminary Design Review	4	2016	4	2016
Engineering Milestones: Reviews: Improved Inlet Solution - Contract Award/ Development effort	1	2016	4	2018
Engineering Milestones: Reviews: Critical Design Review	1	2017	1	2017
Test & Evaluation: Test & Evaluation: IIS Flight Test	1	2017	2	2018
Test & Evaluation: Development Test: Development Flight Test / Integrated Test (IT-IIID) & Continuous software sustainment developmental testing	1	2016	4	2022
Test & Evaluation: Operational Evaluation: Operational Testing	1	2016	4	2022
Test & Evaluation: Kit Deliveries & Installs: Operational Testing (OT-IIIL)	4	2016	4	2016
Test & Evaluation: Kit Deliveries & Installs: Integrated Aircraft Survivability Equipment - Operational Testing	4	2016	4	2016
Test & Evaluation: Kit Deliveries & Installs: Operational Testing (OT-IIIM)	4	2017	4	2017
Test & Evaluation: Kit Deliveries & Installs: Operational Testing (OT-IIIN)	4	2019	4	2019
Test & Evaluation: Kit Deliveries & Installs: Operational Testing (OT-IIIO)	4	2021	4	2021
MV-22 CMV Development				
Engineering Change Proposal	2	2016	4	2020
Reviews: Integrated Baseline Review	2	2016	2	2016
Reviews: Preliminary Design Review	4	2016	4	2016
Reviews: Critical Design Review	1	2017	1	2017
Reviews: Test & Evaluation: Engineering Development Model Test	3	2017	3	2017
Reviews: Test & Evaluation: Developmental Test Risk Reduction	2	2018	3	2019
Reviews: Test & Evaluation: Developmental Test	2	2020	1	2021
Reviews: Test & Evaluation: Operational Test	2	2021	3	2021

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
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**
Reviews: Reviews: Integrated Logistics assessment	1	2017	1	2017
Reviews: Reviews: Physical Configuration Audit	4	2017	4	2017
Development Deliveries: Engineering Development Model Delivery	1	2017	1	2017
Development Deliveries: Engineering Development Model Install	2	2017	2	2017
Development Deliveries: Contract Awards: Development Contract Award	2	2016	2	2016
Production Milestones: Lot 22 APN MV22 CMV Qty 6	1	2018	1	2018
Production Milestones: Lot 23 APN MV22 CMV Qty 7	1	2019	1	2019
Production Milestones: Lot 24 APN MV22 CMV Qty 7	1	2020	1	2020
Production Milestones: Lot 25 APN MV22 CMV Qty 6	1	2021	1	2021
Production Milestones: Lot 26 APN MV22 CMV Qty 5	1	2022	1	2022
Production Milestones: Production Deliveries: Lot 22 APN CMV Qty 6	1	2020	4	2020
Production Milestones: Production Deliveries: Lot 23 APN CMV Qty 7	1	2021	4	2021
Production Milestones: Production Deliveries: Lot 24 APN CMV Qty 7	1	2022	4	2022
Digital Interoperability (DI)				
System Design & Demonstration	1	2016	1	2022
SRP Contract Award	2	2016	2	2016
SRP Spiral II Waveform Dev.	2	2016	2	2018
Link-16 Dev./ntegration	3	2018	3	2019
Test & Evaluation: DI/SRP Spiral III Deveopment and Test	2	2018	4	2021
Test & Evaluation: DI Gateway Development & Test	2	2016	2	2019
V-22 Aerial Refueling system (VARS)				
Contract Award	3	2016	3	2016
Reviews: Preliminary Design Review	3	2017	3	2017
Reviews: Critical Design Review	3	2018	3	2018
Test & Evaluation: Prototype Test	4	2017	1	2018
Test & Evaluation: Developmental Testing	4	2017	2	2018

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
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**
Test & Evaluation: Operational Testing	2	2018	3	2018
Production Milestones: Kit Deliveries & Installs: Kits & Installs	4	2018	4	2022
Electrical System Re-design				
Risk Reduction Contract Award	1	2017	1	2017
Technology Maturation Development	1	2017	4	2017
Competitive RFP	3	2017	3	2017
Competitive Contract Award	1	2018	1	2018
Reviews: Preliminary Design Review	4	2017	4	2017
Reviews: Critical Design Review	4	2018	4	2018
Test & Evaluation: Flight Test	3	2019	4	2019
Production Milestones: Aircraft Production Incorporation	3	2020	3	2020
Production Milestones: Retrofit Kit Delivery	1	2021	1	2021
Infrared Suppressor (IRS) Re-design				
Phase I Contract Awards	1	2017	1	2017
EMD Contract Award	1	2018	1	2018
Decision Milestone: Single Solution	1	2018	1	2018
Reviews: Preliminary Design Review	4	2019	4	2019
Reviews: Critical Design Review	3	2020	3	2020
Reviews: System Verification Review	3	2021	3	2021
Test & Evaluation: Prototype Flight Demonstrations	2	2017	4	2017
Test & Evaluation: Developmental/Operational Testing	2	2019	4	2020
Retrofit Deliveries: IRS Kits Qty 6 Contract Award	3	2022	3	2022
MV-22 Technology Insetion				
Modular Avionics: Modular Avionics Deveopment	2	2016	4	2022
Modular Avionics: Bus Interface Controller (BIC) Phase I Contract Award	2	2016	2	2016
Modular Avionics: BIC Phase II Contract Award	1	2017	1	2017

Exhibit R-4A, RDT&E Schedule Details: FY 2018 Navy		Date: May 2017
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**
Modular Avionics: BIC Phase III Competitive RFP Release	1	2019	1	2019
Modular Avionics: BIC Phase III Contract Award	4	2019	4	2019
Test & Evaluation: Preliminary Design Review	2	2019	2	2019
Test & Evaluation: Modular Avionics Critical Design Review	1	2020	1	2020
Test & Evaluation: Modular Avionics Critical Flight Test	3	2020	2	2022
Multi-Spectral Sensor Development: Multi-Spectral Sensor Development Dev	1	2018	4	2021
Multi-Spectral Sensor Development: Competitive RFP Release	2	2018	2	2018
Multi-Spectral Sensor Development: Multi-Spectral Sensor Development CA	2	2019	2	2019
Test & Evaluation: Critical Design Review	3	2020	3	2020
Test & Evaluation: Flight Test	3	2021	1	2022