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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401318F / CV-22
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	143.303	17.823	17.189	10.121	0.000	10.121	18.086	16.348	16.691	17.061	Continuing	Continuing
676033: <i>CV-22 RDT&E POST PRODUCTION</i>	143.303	17.823	17.189	10.121	0.000	10.121	18.086	16.348	16.691	17.061	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 212
Project MDAP/MAIS Code(s): N42

A. Mission Description and Budget Item Justification

The CV-22 is the Air Force Special Operations Forces (SOF) variant of the joint multi-mission V-22 tilt rotor aircraft. The CV-22 provides long-range, high-speed infiltration, exfiltration, and resupply to Special Forces teams in hostile, denied, and politically sensitive areas. The Navy is the lead service for the Joint V-22 program. The Joint Program Manager is responsible for managing all variants of the V-22. Department of the Navy (DoN) funds the development of the MV-22 and CMV-22. The Air Force funds the service common portion of the CV-22 while United States Special Operations Command (USSOCOM) funds the development and procurement of SOF peculiar systems. CV-22 RDT&E funding provides for the development, integration, and testing of service-common, mission critical aircraft modifications to improve operational effectiveness, platform survivability, and aircraft availability.

Airframe Enhancements: RDT&E funds the design, development, and testing of improvements to airframe structures, aircraft electro-mechanical and hydraulic hardware, and dynamic components to counteract the effects of structural fatigue and improve the durability and readiness of V-22 aircraft. Refinement of aircraft system's components to improve longevity and/or maintainability while protecting their performance are meant to allow continued CV-22 operation as the aircraft age.

Enhanced Self-Deployment: RDT&E funding provides for the design, development, and testing of aircraft modifications to improve aircraft self-deployment capabilities (e.g. operating range, global response time) to mitigate emerging threats to the aircraft and mission accomplishment, and to identify and assess emerging air vehicle, propulsion system, avionics architecture, electronic warfare, situational awareness, and other weapon system solutions to meet CV-22 Block 20 operational requirements.

CV-22 funding also supports innovation activities to include studies, analyses, requirements definition, and quick-reaction capability prototypes/demonstrations to accelerate planning for technology transition, technology insertion and future acquisition programs.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CV-22 weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program elements 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY 2021 \$0.000 million was expended for civilian pay expenses in this program element, and in FY 2022 \$0.000 million is forecasted for civilian pay expenses in this program element.

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The FY 2023 funding request was reduced by \$7.54 million to account for the availability of unexpended prior year execution balances.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	18.385	17.189	0.000	0.000	0.000
Current President's Budget	17.823	17.189	10.121	0.000	10.121
Total Adjustments	-0.562	0.000	10.121	0.000	10.121
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.562	0.000			
• Other Adjustments	0.000	0.000	10.121	0.000	10.121

Change Summary Explanation

The FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY2023 cannot be made in a relevant manner.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Airframe Enhancement	11.414	10.498	7.021	-	7.021
Description: Airframe Enhancements, formerly known as Nacelle Modifications, funds the improvement of airframe structures, aircraft electro-mechanical hardware, and dynamic components to counteract the effects of structural fatigue and improve the durability and readiness of V-22 aircraft to include design, development, and testing of V-22 Nacelle components. This RDT&E funding provides for the design, development, and testing of redesign support or loadbearing airframe elements to provide structural reinforcement and improved longevity. Enhanced armor protective performance with reduced weight and space impacts are a possible area for development. Airframe Enhancement funds also provide for refinements of hydraulic, landing gear, or fuel system component to improve and protect their performance. Items such as pumps, lines, tanks/reservoirs/bladders and/or struts may receive enhancements to extend their life and improve their maintainability. Finally, Airframe Enhancements funds target exploring improvements to all V-22 dynamic components, from rotor					

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
<p>blades and heads to gearboxes and flight control surfaces with the goals of protecting them from vibrational and frictional wear and enhancing their reliability and readiness.</p> <p>FY 2022 Plans: Continue design, development, and testing of Airframe Enhancements</p> <p>FY 2023 Base Plans: Planned Projects include the following: Life Limited Aircraft Corrections (LLAC), Nacelle Vibration Suppression System (NVSS), Wheel Break Heat Stack, Leading Edge Angle Corrosion Protection, Infrared Suppressors, Shaft Driven Compressor Improvement, Gimbal Ring Redesign, Proprotor Gearbox Input Quill/ Clutch Redesign, and Proprotor Blades.</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding decreased due to re-prioritizing resources and reduced design activities.</p>					
<p>Title: Enhanced Self-Deployment Capabilities</p> <p>Description: Develops capabilities to enhance self-deployment, such as improved ice protection, engine performance, performance buyback, navigation, communications, and battle space awareness/networking capabilities/airborne mission networking (ABMN); situational awareness; electronic warfare; weapons systems; defensive avionics systems and architecture; weight reduction initiatives; modular avionics/cyber security implementation and other changes to the underlying aircraft systems necessary to enable these capabilities.</p> <p>FY 2022 Plans: Continue design and development activities to enhance situational awareness, Modular Avionics Architecture (MAA)/cyber security, and integration and develop FCC obsolescence effort.</p> <p>FY 2023 Base Plans: Continue design and development activities to enhance situational awareness, Modular Avionics Architecture (MAA)/cyber security, integration and develop FCC obsolescence effort, as well as Airborne Mission Networking (ABMN).</p> <p>FY 2023 OCO Plans: N/A</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement:</p>	6.409	6.691	3.100	0.000	3.100

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Funding decreased due to re-prioritizing resources and reduced design activities.					
Accomplishments/Planned Programs Subtotals	17.823	17.189	10.121	0.000	10.121

D. Other Program Funding Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• RDTE 07 PE 1160403BB: <i>Special Operations, Aviation Systems</i>	13.011	6.932	11.695	-	11.695	0.000	9.727	19.064	19.445	Continuing	Continuing
• APAF 02 Line Item <i>Special Operation: CV-22 Modification</i>	58.033	41.762	75.629	-	75.629	113.267	107.335	88.225	86.931	Continuing	Continuing
• APAF 04 0401318F: <i>CV-22</i>	206.220	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	206.220
• APAF 05 Line Item <i>V02200: CV-22 Mods</i>	119.396	230.962	153.026	-	153.026	157.561	163.322	164.287	156.768	Continuing	Continuing
• APAF 06 Line Item 000999: <i>CV-22 Initial Spares/Repair Parts</i>	6.574	10.525	2.254	-	2.254	0.000	0.000	0.000	0.000	0.000	19.353
• APAF 07 Line Item C0V220: <i>CV-22 Post-Production Support</i>	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• RDTE 05 PE 0604262N: <i>V-22A Navy</i>	128.100	105.729	125.233	-	125.233	136.158	106.511	122.453	105.024	Continuing	Continuing

Remarks
 In addition to the funding identified in the table above, prior year funding includes \$575.836M in RDT&E, DW, BA07, PE 1160421BB: Special Operations

E. Acquisition Strategy
 The V-22 Joint Program Office (Naval Air Systems Command (NAVAIRSYSCOM), PMA-275) is developing new capabilities for the V-22 in block increments.

--Airframe Enhancements: Life Limited Aircraft Corrections (LLAC), Nacelle Vibration Suppression System (NVSS), Wheel Break Heat Stack, Leading Edge Angle Corrosion Protection, Infrared Suppressors, Shaft Driven Compressor Improvement, Gimbal Ring Joint Redesign, Proprotor Gearbox Input Quill/Clutch Redesign, Proprotor Blades will utilize a combination of sole source and competitive contracts.

--Enhanced Self-Deployment Capabilities: Modular Avionics, Flight Control Computer, Airborne Mission Networking (ABMN) and performance buyback will utilize a combination of sole source and competitive contracts.

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Appropriation/Budget Activity
3600: *Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development*

R-1 Program Element (Number/Name)
PE 0401318F / CV-22

Development activities for the V-22 program to date have been primarily performed by the prime contractor, Bell-Boeing, on a sole-source basis. Bell-Boeing is a strategic partnership between Bell Helicopter and Boeing Integrated Defense Systems. Efforts are underway to continue increasing competition where feasible, depending primarily on the level of platform integration required and Government rights to technical data.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401318F / CV-22	Project (Number/Name) 676033 / CV-22 RDT&E POST PRODUCTION
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Product Development (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
V-22 Airframe Enhancements	Various	Various : Various	77.593	8.300	Mar 2021	5.750	Mar 2022	2.821	Mar 2023	-		2.821	18.600	113.064	-
CV-22 Osprey Enhanced Self-deployment Capability	Various	Various : Various	45.299	6.409	Jun 2021	6.691	Jun 2022	3.100	Jun 2023	-		3.100	53.469	114.968	0.000
Subtotal			122.892	14.709		12.441		5.921		-		5.921	72.069	228.032	N/A

Remarks
 Block 20 Development Target Value of Contract differs from total cost because most of the Block 20 development cost was funded in PE 0401318F, BA05. In addition, the SOF peculiar development efforts were funded by USSOCOM MFP-11 funding.

 Nacelle Improvements Development Target Value of Contract differs from total cost because this is a joint development funded by Navy and Air Force.

Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CV-22 Osprey Engineering Technical Support and Studies	Various	Various : Various	7.969	1.400	Mar 2021	2.373	Mar 2022	1.900	Mar 2023	-		1.900	7.348	20.990	0.000
Subtotal			7.969	1.400		2.373		1.900		-		1.900	7.348	20.990	N/A

Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CV-22 Osprey Test & Evaluation Technical Support	Various	Various : Various	11.209	1.514	Dec 2020	2.175	Dec 2021	2.100	Dec 2022	-		2.100	5.148	22.146	0.000
Subtotal			11.209	1.514		2.175		2.100		-		2.100	5.148	22.146	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401318F / CV-22	Project (Number/Name) 676033 / CV-22 RDT&E POST PRODUCTION

FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

CV-22	
Airframe Enhancement	
-- Life Limited Aircraft Correction (LLAC)	
---Nacelle Vibration Suppression System (NVSS)	
--Wheel Break Heat Stack	
**Leading Edge Angle Corrosion Protection	
**Infrared Suppressors	
**Shaft Driven Compressor Improvement	
**Gimbal Ring Joint Redesign	
** Proprotor Gearbox Input Quill/Clutch Redesign	
**Proprotor Blades	
Enhanced Self-Deployment	
-- Modular Avionics Architecture (MAA)	
-- Flight Control Computer (FCC)	
-- Airborne Mission Networking (ABMN)	
-- Gen 6 MUOS	
-- PNT Modernization	

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401318F / CV-22	Project (Number/Name) 676033 / CV-22 RDT&E POST PRODUCTION

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CV-22				
Airframe Enhancement	1	2021	4	2027
-- Life Limited Aircraft Correction (LLAC)	2	2022	3	2023
---Nacelle Vibration Suppression System (NVSS)	3	2023	4	2026
--Wheel Break Heat Stack	2	2024	2	2026
**Leading Edge Angle Corrosion Protection	2	2022	1	2024
**Infrared Suppressors	1	2021	2	2023
**Shaft Driven Compressor Improvement	1	2021	4	2023
**Gimbal Ring Joint Redesign	1	2021	4	2023
** Proprotor Gearbox Input Quill/Clutch Redesign	1	2021	2	2025
**Proprotor Blades	2	2025	4	2027
Enhanced Self-Deployment	1	2021	4	2027
-- Modular Avionics Architecture (MAA)	4	2022	4	2025
-- Flight Control Computer (FCC)	1	2021	1	2026
-- Airborne Mission Networking (ABMN)	2	2022	4	2025
-- Gen 6 MUOS	2	2022	4	2024
-- PNT Modernization	1	2023	1	2025