Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0401318F / *CV-22*							
COST ($ in Millions)	**Prior Years**	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
Total Program Element	64.519	27.704	22.519	18.502	0.000	18.502	16.606	14.873	15.183	15.459	41.970	237.335
676033: *CV-22 RDT&E POST PRODUCTION*	64.519	27.704	22.519	18.502	0.000	18.502	16.606	14.873	15.183	15.459	41.970	237.335
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 mission critical aircraft modifications to improve operational effectiveness, platform survivability, and aircraft availability.

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 evaluate 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 weapon system capability requirements for potential solutions to satisfy these requirements.

Nacelle Improvements: Funds the design and development of the CV-22 nacelle to reduce ingestion of sand/dust and other particulate matter into the engine, increase engine time on wing and overall aircraft readiness/availability rates, and reduce operations and support costs. This is Air Force Special Operations Command's #1 priority for the CV-22 weapon system.

Other/Future Capabilities: The CV-22 aircraft funds improved operational safety, suitability, cyber security, and mission effectiveness. Funding also provides for future modification planning, and for aircraft engineering changes/upgrades to address diminishing manufacturing source (DMS) and component obsolescence issues adversely affecting aircraft readiness and operational availability rates.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CV-22 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0401318F / *CV-22*

This program is in Budget Activity 7, Operational Systems 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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	28.702	22.519	16.641	0.000	16.641
Current President's Budget	27.704	22.519	18.502	0.000	18.502
Total Adjustments	-0.998	0.000	1.861	0.000	1.861
• 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	-0.998	0.000			
• Other Adjustments	0.000	0.000	1.861	0.000	1.861

Change Summary Explanation

$1.861M increase for Enhance Self-deployment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Enhanced Self-Deployment Capabilities	14.182	5.548	8.361
Description: Incrementally develops capabilities to enhance self-deployment capabilities, such as improved ice protection, engine performance, navigation, communications, and battle space awareness/networking capabilities; situational awareness; electronic warfare; weapons systems; defensive avionics systems and architecture; weight reduction initiatives; modular avionics/ cyber security implementation; airborne networking, and changes to the underlying aircraft systems necessary to enable these capabilities.			
FY 2018 Plans: Conduct risk reduction and assessment of emerging and existing technologies. Continue design and development activities to integrate the Intelligence Broadcast Receiver (IBR) upgrade.			
FY 2019 Plans: Continue design and development activities to enhance situational awareness, modular avionics/cyber security implementation, and begin development of electronic warfare integration.			
FY 2018 to FY 2019 Increase/Decrease Statement:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0401318F / *CV-22*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Funding increased due to continued design and beginning of electronic warfare integration.			
Title: Nacelle Improvements	13.522	16.971	10.141
Description: Funds provided for design, development, and testing of V-22 Nacelle Improvements; Infrared Suppressor (IRS), Electric Power System Upgrade, Generator Control Unit (GCU); nacelle wiring, heat exchanger, engine health monitoring, nacelle structure, and performance buyback. Common nacelle improvements for both the CV-22 and MV-22 fleets will increase overall aircraft readiness/availability, reduce platform operating life cycle costs, and mitigate impacts to aircraft performance and survivability. These improvements will be integrated, tested, and fielded as a single modification to minimize cost and impact on fleet operations and readiness. ***FY 2018 Plans:*** Improved Inlet Solution (IIS): Complete DT&E, analyze DT&E results, correct deficiencies found during DT&E, begin OT&E. GCU: Begin EMD of GCU redesign/relocate. Competitively select redesigned GCU. IRS: Begin EMD of new IRS solution, begin OT&E planning. ***FY 2019 Plans:*** Continue test, design, and development of Nacelle Improvements, Electrical Power System upgrade, and IRS redesign. IIS: Complete closeout of Inlet Barrier Filter DT&E effort. Initiate alternative method of increasing engine air particle separation efficiency. GCU: Continue EMD efforts to improve reliability, reparability, and maintainability IRS: Continue EMD efforts by developing and analyzing data to improve reliability; select from candidate solutions. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased as a result of effort maturity.			
Accomplishments/Planned Programs Subtotals	27.704	22.519	18.502

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 PE 1160403BB: *Special Operations, Aviation Systems*	1.549	14.259	22.533	-	22.533	28.461	8.500	8.000	18.000	0.000	101.302
• APAF 02 Line Item Special Operation: *CV-22 Modification*	47.786	42.178	32.529	-	32.529	33.594	31.285	56.535	50.918	314.225	609.050

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0401318F / *CV-22*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 04 Line Item V022A0: *CV-22 (MYP)*	97.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	97.000
• APAF 05 Line Item V02200: *CV-22 Mods*	63.395	60.990	60.416	-	60.416	61.548	63.933	121.147	66.661	518.104	1,016.194
• APAF 06 Line Item 000999: *CV-22 Initial Spares/Repair Parts*	0.882	0.241	0.000	-	0.000	0.000	1.983	6.346	0.000	0.000	9.452
• APAF 07 Line Item C0V220: *CV-22 Post-Production Support*	0.000	4.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.500
• RDTE 05 PE 0604262N: *V-22A Navy*	149.113	171.386	135.522	-	135.522	134.939	93.363	117.119	119.461	184.398	1,105.301

Remarks

In addition to the funding identified in the table above, prior year funding includes $520.411 in RDT&E, DW, BA07, PE 1160421BB: Special Operations, CV-22 Development, and $413.235M in RDT&E, AF, BA05, PE 0401318F: CV-22

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.

--Nacelle Improvements: NAVAIRSYSCOM plans to award a cost plus fixed fee contract for Nacelle Improvements by QTR3 FY2018. IRS and GCU will utilize some combination of sole source and competitive contracts.

--Enhanced Self-Deployment Capabilities: The Army Technology Applications Program Office at Ft Eustis awarded a FFP contract in June 2016 for LRU-1 Ethernet design (IBR). The FY2018 plan is to add incremental funding for LRU-1 Ethernet (IBR) design to the existing contract.

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 increase competition where feasible, depending primarily on the level of platform integration required.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
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*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 Osprey Block 20 Development	SS/CPFF	Bell Boeing : Amarillo, TX	8.047	0.000		-		-		-		-	0.000	8.047	163.825
CV-22 Osprey Enhanced Self-deployment Capability	Various	Various : Various	30.702	11.000	Jun 2017	3.460	Mar 2018	7.361	Mar 2018	-		7.361	60.160	112.683	0.000
V-22 Osprey Nacelle Improvements	Various	Various : Various	15.895	13.522	Nov 2016	16.971	Dec 2017	8.945	Jul 2018	-		8.945	24.466	79.799	69.990
		Subtotal	54.644	24.522		20.431		16.306		-		16.306	84.626	200.529	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.

Prior Years funding ($322.656M) was executed in PE 0401318F, BA05.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 Osprey Engineering Technical Support and Studies	Various	Various : Various	2.764	1.835	Mar 2017	1.000	Mar 2018	1.000	Mar 2019	-		1.000	9.721	16.320	0.000
		Subtotal	2.764	1.835		1.000		1.000		-		1.000	9.721	16.320	N/A

Remarks

Prior Years Funding $40.454M was executed in PE 0401318F (BA05).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
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*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 Osprey Test & Evaluation Technical Support	Various	Various : Various	6.694	1.115	Jan 2017	0.900	Dec 2016	1.000	Dec 2018	-		1.000	7.323	17.032	0.000
		Subtotal	6.694	1.115		0.900		1.000		-		1.000	7.323	17.032	N/A

Remarks

Prior Years Funding $46.764M was executed in PE 0401318F (BA05).

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 Osprey Program Support	Allot	AFLCMC/WIV : Patuxent River, MD	0.417	0.232	Nov 2016	0.188	Nov 2017	0.196	Nov 2018	-		0.196	1.896	2.929	-
		Subtotal	0.417	0.232		0.188		0.196		-		0.196	1.896	2.929	N/A

Remarks

Prior Years Funding $3.361M was executed in PE 0401318F (BA05).

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	64.519	27.704		22.519		18.502		-		18.502	103.566	236.810	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
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*

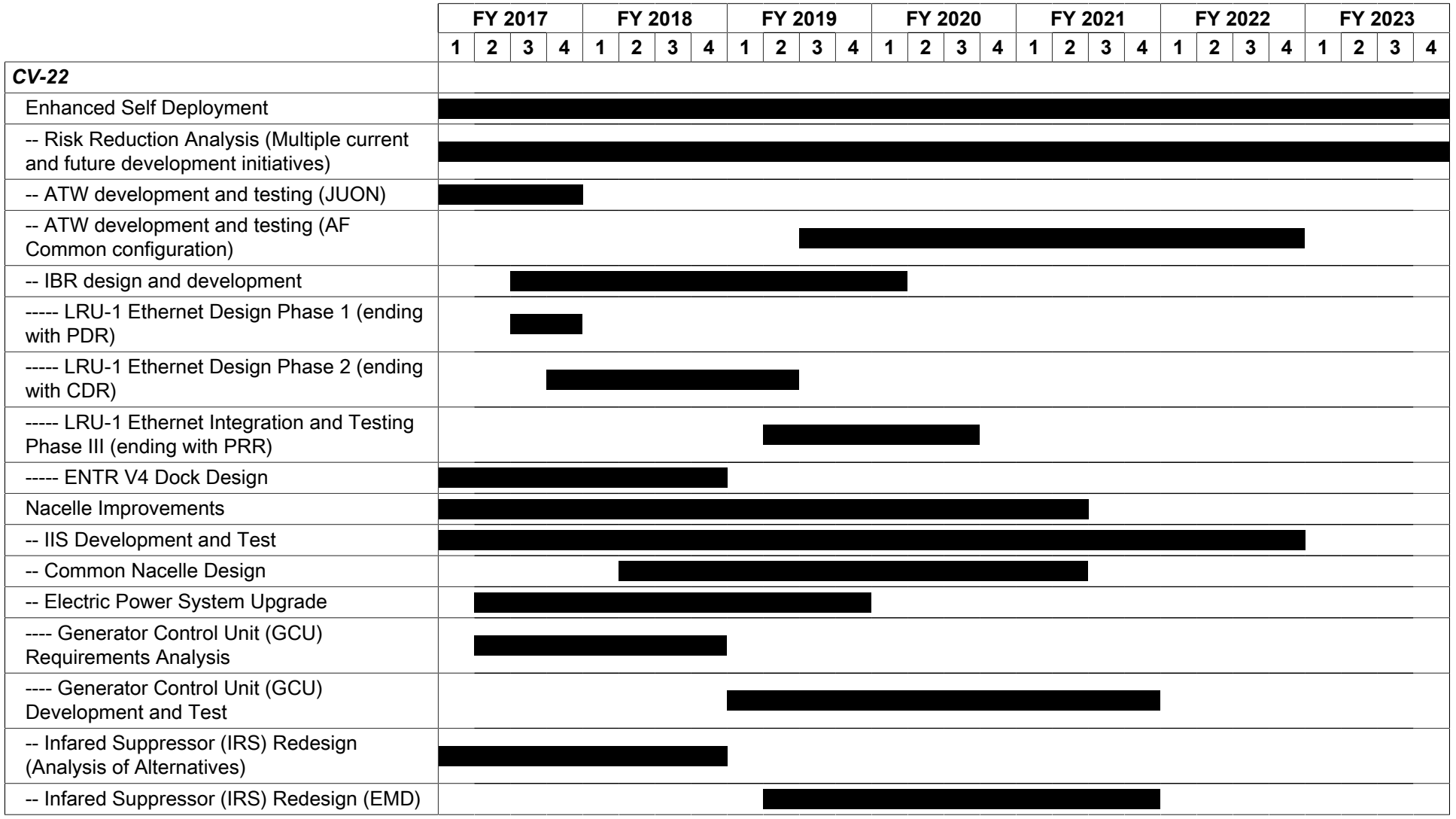

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0401318F / *CV-22*	**Project (Number/Name)** 676033 / *CV-22 RDT&E POST PRODUCTION*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CV-22				
Enhanced Self Deployment	1	2017	4	2023
-- Risk Reduction Analysis (Multiple current and future development initiatives)	1	2017	4	2023
-- ATW development and testing (JUON)	1	2017	4	2017
-- ATW development and testing (AF Common configuration)	3	2019	4	2022
-- IBR design and development	3	2017	1	2020
----- LRU-1 Ethernet Design Phase 1 (ending with PDR)	3	2017	4	2017
----- LRU-1 Ethernet Design Phase 2 (ending with CDR)	4	2017	2	2019
----- LRU-1 Ethernet Integration and Testing Phase III (ending with PRR)	2	2019	3	2020
----- ENTR V4 Dock Design	1	2017	4	2018
Nacelle Improvements	1	2017	2	2021
-- IIS Development and Test	1	2017	4	2022
-- Common Nacelle Design	2	2018	2	2021
-- Electric Power System Upgrade	2	2017	4	2019
---- Generator Control Unit (GCU) Requirements Analysis	2	2017	4	2018
---- Generator Control Unit (GCU) Development and Test	1	2019	4	2021
-- Infared Suppressor (IRS) Redesign (Analysis of Alternatives)	1	2017	4	2018
-- Infared Suppressor (IRS) Redesign (EMD)	2	2019	4	2021