Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force											Date: February 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	92.223	17.744	16.502	17.906	0.000	17.906	18.453	17.473	17.459	17.737	41.970	257.467
676033: *CV-22 RDT&E POST PRODUCTION*	92.223	17.744	16.502	17.906	0.000	17.906	18.453	17.473	17.459	17.737	41.970	257.467
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.

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

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 in meeting CV-22 Block C/20 capability requirements.

Future Capabilities/Affordable Sustainability: Funding 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, as well as improved operational safety, suitability, cyber security, and mission effectiveness.

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, and 0605898F.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is $14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	22.519	18.502	16.606	0.000	16.606
Current President's Budget	17.744	16.502	17.906	0.000	17.906
Total Adjustments	-4.775	-2.000	1.300	0.000	1.300
• 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	-4.000	-2.000			
• SBIR/STTR Transfer	-0.775	0.000			
• Other Adjustments	0.000	0.000	1.300	0.000	1.300

Change Summary Explanation

FY18: -$4M decrease for Omnibus reprogramming. -$.775M decrease for SBIR reduction.

FY19: -$2M decrease for Congressional mark for "Improved Inlet Solution (IIS) delays".

FY20: +$1.3M increase to fully fund the IIS program.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Nacelle Improvements	12.196	8.141	10.303
Description: Funds design, development, and testing of V-22 Nacelle Improvements- Infrared Suppressor (IRS), Electric Power System Upgrade, Generator Control Unit (GCU) upgrade and relocation; nacelle wiring, heat exchanger improvements, engine health monitoring, nacelle structure, performance buyback, and upgrades other nacelle systems and components. 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 block modifications to minimize cost and impact on fleet operations and readiness.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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 2018	FY 2019	FY 2020
FY 2019 Plans: Continue test, design, and development of Nacelle Improvements, Electrical Power System upgrade, and IRS redesign. Begin studies for the future performance buyback of aircraft. IIS: Continue updated solution to the engine air particle separation efficiency DT&E effort. GCU: Continue DT&E efforts to improve reliability, reparability, and maintainability. IRS: Finalize DT&E of alternatives. Performance Buyback: Begin studies to improve future performance of aircraft. ***FY 2020 Plans:*** Continue test, design, and development of Nacelle Improvements; Electrical Power System upgrade, IRS redesign, and Performance Buyback. IIS: Continue updated solution to the engine air particle separation efficiency DT&E effort. GCU: Continue efforts to improve reliability, reparability, and maintainability IRS: Continue analyzing data and developing selected alternative to improve reliability. Performance Buyback: Continue studies to improve future performance of aircraft. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase to support the requirement for Performance Buyback studies.			
Title: Enhanced Self-Deployment Capabilities	5.548	8.361	7.603
Description: Develops capabilities to enhance self-deployment, 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 other changes to the underlying aircraft systems necessary to enable these capabilities. ***FY 2019 Plans:*** Continue design and development activities to enhance situational awareness, modular avionics/cyber security implementation, and development of electronic warfare capabilities. ***FY 2020 Plans:*** Continue design and development activities to enhance situational awareness, modular avionics/cyber security implementation, and begin integration and testing of developed electronic warfare capability. ***FY 2019 to FY 2020 Increase/Decrease Statement:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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 2018	FY 2019	FY 2020
Decrease due to reprioritizing resources.			
Accomplishments/Planned Programs Subtotals	17.744	16.502	17.906

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• RDTE 07 PE 1160403BB: *Special Operations, Aviation Systems*	12.292	22.344	28.081	-	28.081	10.093	9.634	17.942	18.360	0.000	118.746
• APAF 02 Line Item Special Operation: *CV-22 Modification*	42.178	32.529	17.256	-	17.256	21.509	38.770	45.569	70.188	314.225	582.224
• APAF 05 Line Item V02200: *CV-22 Mods*	60.990	60.416	65.348	-	65.348	122.473	164.227	151.551	146.864	518.104	1,289.973
• APAF 06 Line Item 000999: *CV-22 Initial Spares/Repair Parts*	0.241	0.000	0.000	-	0.000	6.583	10.946	3.500	0.000	0.000	21.270
• APAF 07 Line Item C0V220: *CV-22 Post-Production Support*	4.500	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	4.500
• RDTE 05 PE 0604262N: *V-22A Navy*	176.804	135.504	185.105	-	185.105	133.059	110.392	125.330	110.769	184.398	1,161.361

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: IIS, 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) with additional RAA funds added in September 2017. The FY2019 plan is to add incremental funding for LRU-1 Ethernet Design Phase 2 and Phase 3. FY2020 will begin the integration and testing phase.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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*

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 needed technical data.

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 2020 Air Force		Date: February 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 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	8.047	163.825
V-22 Nacelle Improvements	Various	Various : Various	41.702	12.196	Dec 2017	6.945	Feb 2019	8.703	Mar 2020	-		8.703	0.000	69.546	-
CV-22 Osprey Enhanced Self-deployment Capability	Various	Various : Various	29.417	3.460	Mar 2018	7.361	Mar 2019	6.133	Jun 2020	-		6.133	60.160	106.531	0.000
		Subtotal	79.166	15.656		14.306		14.836		-		14.836	60.160	184.124	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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 Osprey Engineering Technical Support and Studies	Various	Various : Various	4.599	1.000	Mar 2018	1.000	Mar 2019	1.370	Mar 2019	-		1.370	9.721	17.690	0.000
		Subtotal	4.599	1.000		1.000		1.370		-		1.370	9.721	17.690	N/A

Remarks

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force		Date: February 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 Osprey Test & Evaluation Technical Support	Various	Various : Various	7.809	0.900	Dec 2016	1.000	Dec 2018	1.500	Dec 2019	-		1.500	7.323	18.532	0.000
		Subtotal	7.809	0.900		1.000		1.500		-		1.500	7.323	18.532	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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CV-22 Osprey Mission Support	Allot	AFLCMC/WIV : Patuxent River, MD	0.649	0.188	Nov 2017	0.196	Nov 2018	0.200	Nov 2019	-		0.200	1.896	3.129	-
		Subtotal	0.649	0.188		0.196		0.200		-		0.200	1.896	3.129	N/A

Remarks

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

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	92.223	17.744		16.502		17.906		-		17.906	79.100	223.475	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
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*

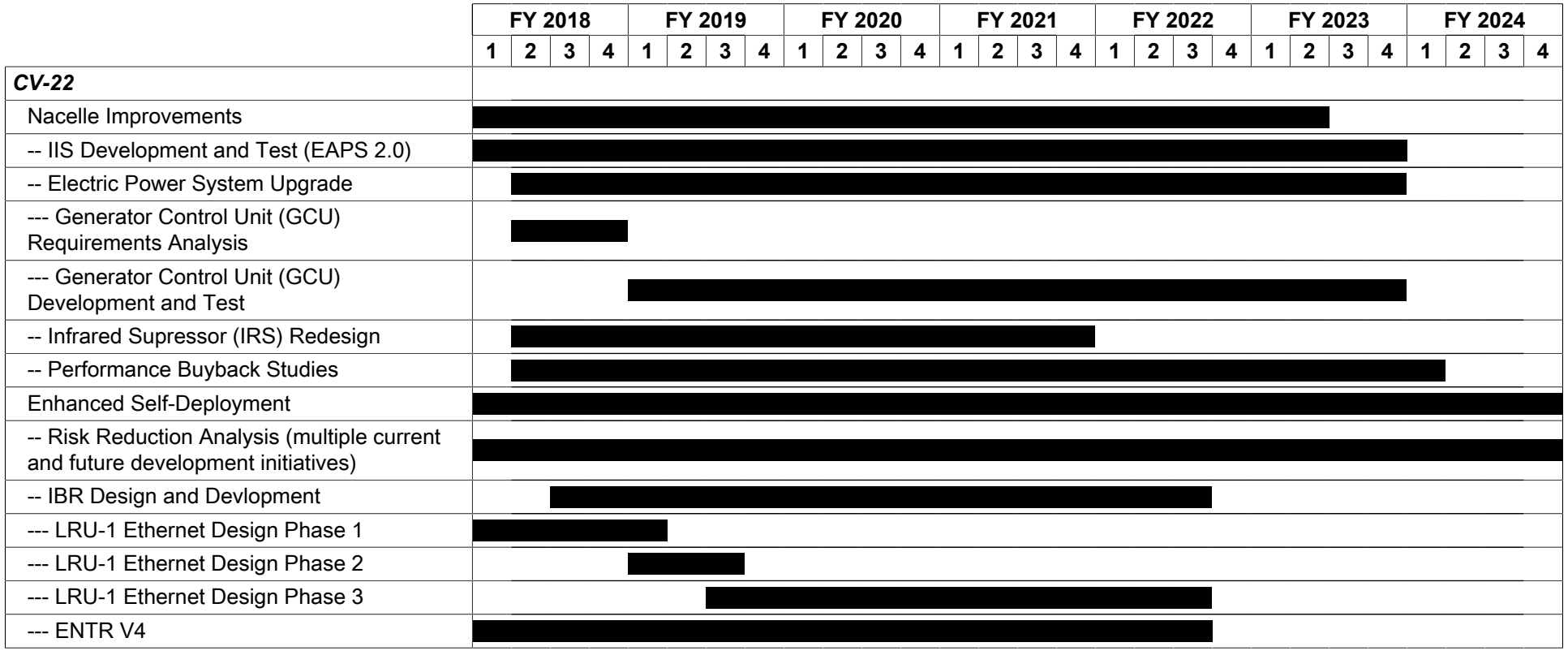

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0401318F / *CV-22*	**Project (Number/Name)** 676033 / *CV-22 RDT&E POST PRODUCTION*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CV-22				
Nacelle Improvements	1	2018	2	2023
-- IIS Development and Test (EAPS 2.0)	1	2018	4	2023
-- Electric Power System Upgrade	2	2018	4	2023
--- Generator Control Unit (GCU) Requirements Analysis	2	2018	4	2018
--- Generator Control Unit (GCU) Development and Test	1	2019	4	2023
-- Infrared Supressor (IRS) Redesign	2	2018	4	2021
-- Performance Buyback Studies	2	2018	1	2024
Enhanced Self-Deployment	1	2018	4	2024
-- Risk Reduction Analysis (multiple current and future development initiatives)	1	2018	4	2024
-- IBR Design and Devlopment	3	2018	3	2022
--- LRU-1 Ethernet Design Phase 1	1	2018	1	2019
--- LRU-1 Ethernet Design Phase 2	1	2019	3	2019
--- LRU-1 Ethernet Design Phase 3	3	2019	3	2022
--- ENTR V4	1	2018	3	2022