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

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0401119F / <i>C-5 Airlift Squadrons (IF)</i>
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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	-	22.742	17.507	6.100	0.000	6.100	0.000	20.673	51.348	52.490	0.000	170.860
671307: <i>C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)</i>	-	22.742	17.507	6.100	0.000	6.100	0.000	20.673	51.348	52.490	0.000	170.860
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**A. Mission Description and Budget Item Justification**

C-5M Replace multi-functional controls and display (RMCD) program is a comprehensive effort to ensure appropriate RMCD Line Replaceable Units (LRU) are developed and installed on the C-5M allowing aircraft operation in accordance with civil airspace access mandates for both US National Airspace System (NAS) and international civil airspace. The C-5M RMCD program ensures system standardization and interoperability with other DoD systems to the maximum extent possible and directly supports airworthiness certification. The purpose of the program is to find a suitable replacement for the current Multi-functional Display Unit (MFDU) LRUs while maintaining existing interfaces to legacy equipment and providing for future growth opportunities. Additionally, the replacement LRUs must have the Ethernet load capability to reduce Operational Flight Programs (OFP) load times, and the program will implement a power solution for Mission Planning Equipment (MPE). Operational Flight Programs (OFP) updates/aggregation are required to support the latest aircraft display technologies and will be designed to ensure seamless integration into the platform. Aircraft wiring will be replaced/upgraded as required. Use of mixed displays (current and new) is not permissible due to human factors considerations. It is anticipated equipment will be predominately commercial off-the-shelf or non-developmental items.

The RMCD program is a modification to mitigate the obsolescence of the current control and display units. This effort centers around modifying the current display units to obtain sufficient capacity/capability to support integration of new system capabilities with margin for growth by upgrading displays and correcting any mission essential deficiencies identified during development, including additions of an Ethernet loading capability and a power solution for the MPE. This modification may include software development, data, cyber security, testing, installation, spares, Systems Integration Lab (SIL), program support, etc.

The modification helps to maintain aircraft availability as the new multi-functional controls and displays replaces the current controls and displays, which are experiencing severe diminishing manufacturing source (DMS) issues. Failure to upgrade the displays to support aircraft availability will create a significant operational impact to the support of Geographic Combatant Command (GCCs) and maintaining U.S. National objectives.

Funding supports studies and analysis, risk reduction efforts, Advisory and Assistance Services (A&AS), program support costs, change orders, and other government costs such as travel, directorate support, government furnished equipment (GFE), and over and above costs. Funding also provides Diminishing Manufacturing Sources (DMS) through studies and analysis.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver 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,

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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.

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D.

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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	30.560	17.507	0.000	0.000	0.000
Current President's Budget	22.742	17.507	6.100	0.000	6.100
Total Adjustments	-7.818	0.000	6.100	0.000	6.100
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-0.056	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-6.690	0.000			
• SBIR/STTR Transfer	-1.072	0.000			
• Other Adjustments	0.000	0.000	6.100	0.000	6.100

**Change Summary Explanation**

FY 2021 funding was decreased by a total of \$7.818 million which included reprogramming actions for \$6.690 million for higher Air Force priorities and \$1.072 million for Small Business Innovation Research.

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 FY 2023 cannot be made in a relevant manner.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<b>Title:</b> C-5 Replace Multi-Functional Controls and Display	22.742	17.507	6.100
<b>Description:</b> Replace Multi-Functional Controls and Display will enable the C-5M to achieve wartime mission requirements by maintaining fleet availability (mission capable rate).			
<b>FY 2022 Plans:</b>			

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
Awarded amendment 1 for Other Transaction Authority (OTA for hardware development and system certification on 13 Jan 22. Based on current FY 2022 funding levels modify the current Sole Source Phase 0 Lockheed Martin Aerospace contract to bring forward Multifunction Display Unit Application Client and Display Services software development to reach Preliminary Design Review and produce Engineering Wide Area Displays and Graphics Processors for test. Break remaining Engineering and Manufacturing Development (EMD) tasks into smaller options to award in the future pending funding levels. Potential options would include certified flight worthy hardware, Full Qualification Testing, Tech Insertion, Test, and Training. Additional FY 2022 requirements will finance 578th Independent Validation & Verification and Systems Integration Laboratory testing through FY 2023 to support independent testing and airworthiness certification  <b>FY 2023 Plans:</b> Continue EMD activity options and continue hardware development to deliver Engineering Units for Displays and Graphics Processor Units.  <b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> Funding decreased due to ramp-down of EMD activities and reduction of hardware development efforts.			
<b>Accomplishments/Planned Programs Subtotals</b>	22.742	17.507	6.100

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 C00500: C-5	50.279	17.583	12.040	-	12.040	24.306	57.780	32.149	32.845	0.000	226.982
• APAF 05 0401119F: C-5 Airlift Squadrons	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• APAF 06 0401119F: C-5 Airlift Squadrons	0.200	0.000	1.269	-	1.269	2.047	3.144	0.000	0.000	0.000	6.660
• APAF 05 0401897F: TRAINING	0.000	7.848	33.987	-	33.987	0.000	0.000	0.000	0.000	0.000	41.835

**Remarks**

**E. Acquisition Strategy**  
 Program Acquisition Strategy Panel (ASP) approved program's acquisition strategy on 4 Apr 20. This strategy approved executing an Other Transaction Authority (OTA) contract to procure proof of concept hardware for test/analysis, award a Sole Source EMD contract to Lockheed Martin Aerospace for system software and hardware tech insertion, system integration, data management, systems engineering, logistics, test and training to modify 2 aircraft. At completion of EMD, the program would move into Milestone C for LRIP and production to follow.

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Delta ASP #1 to add risk reduction for hardware development and contractor software development oversight/metrics to use Agile development processes approved 08 Oct 20. Delta ASP #2 to exercise OT Hardware Amendment 1 approved 17 Dec 21. Delta ASP #3 in draft to align EMD contractor requirements based on limited funding in FY23/24 and to document software development strategy in work.		

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

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0401119F / C-5 Airlift Squadrons (IF)	<b>Project (Number/Name)</b> 671307 / C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)
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<b>Product Development (\$ in Millions)</b>				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			
Phase 0 / Integration Contract	SS/CPIF	Lockheed Martin : Marietta, GA	-	3.492	Jun 2021	7.332	Apr 2022	6.100	Nov 2022	-		6.100	Continuing	Continuing	-
Organic Software Development	PO	AFMC 578 SWES/ MXDPAA : Robins AFB, GA	-	1.853		-		-		-		-	Continuing	Continuing	-
Other Transaction Authority (OTA)	SS/FP	SOSSEC, Inc : Salem, NH	-	12.469	Jan 2022	6.495	Apr 2022	-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			-	17.814		13.827		6.100		-		6.100	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				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			
Change Orders	Various	TBD : TBD	-	-		0.017		-		-		-	Continuing	Continuing	-
Technical Deliverables	Various	TBD : TBD	-	-		-		-		-		-	Continuing	Continuing	-
PSC-OGCs	Various	WPAFB/RobinsAFB : TBD	-	0.853		-		-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			-	0.853		0.017		-		-		-	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				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			
Contractor Test/SIL	Various	TBD : TBD	-	-		-		-		-		-	Continuing	Continuing	-
SIL	PO	AFLCMC/WLS : Robins AFB, GA	-	0.212		0.403	Jun 2022	-		-		-	Continuing	Continuing	-
<b>Subtotal</b>			-	0.212		0.403		-		-		-	Continuing	Continuing	N/A





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Replace Multi-Functional Control &amp; Display</i></b>				
OTA H/W Contract Award	2	2021	2	2024
Milestone B	3	2023	3	2023
SIL	3	2023	4	2024
Phase 0 / Integration Contract	3	2021	4	2025
PDR	1	2023	1	2023
CDR	3	2023	3	2023
Milestone C	4	2025	4	2025