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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	22.798	25.701	39.868	0.000	39.868	26.767	24.715	5.000	3.000	0.000	147.849
674777: <i>E-4B Aircraft Modernization</i>	-	22.798	25.701	39.868	0.000	39.868	26.767	24.715	5.000	3.000	0.000	147.849
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note

This program, BA 7, PE 0302015F, project 674777, E-4B Systems Integration Laboratory (SIL), is a new start.

A. Mission Description and Budget Item Justification

The four (4) aircraft E-4B National Airborne Operations Center (NAOC) fleet satisfies the military need for an airborne operations center with communications capabilities permitting military and civilian leadership to monitor and control military and civil national assets during all phases of conflict (nuclear and non-nuclear) or natural disaster. The E-4B NAOC fleet also satisfies the military requirement to provide a highly survivable node of the National Military Command System (NMCS).

This program's developmental modifications include, but are not limited to, upgrades and enhancements to aircraft structures, propulsion system, fuel system, environmental control system, electrical generation and distribution systems, flight safety and navigation systems (with their associated communications equipment), and the Systems Integration Lab. Modifications may enhance the aircraft's mission capabilities necessary for the E-4B fleet to execute its mission, to include but not limited to those necessary for the Senior Leadership Command, Control and Communications System (SLC3S), National Leadership Command Capability (NLCC), and Nuclear Command, Control, and Communications (NC3). Funds may also be used to explore and develop modifications, upgrades, and future systems required to meet evolving mission requirements. This budget supports the following developmental modifications and studies/projects currently underway or planned for accomplishment:

- The Mobile User Objective System (MUOS) program upgrades the E-4B's Ultra-High Frequency (UHF) Radio transmitters to be MUOS capable to meet E-4B Capability Development Document (CDD) and CJCSI 6250.01F requirements. MUOS provides securable data and full duplex voice communications while simultaneously monitoring a second frequency. The MUOS upgrade will provide interoperability with MUOS waveforms for voice and data communications and with other nuclear and national command and control (C2) centers and aircraft by replacing the legacy USC-42 UHF SATCOM radios with a MUOS capable radio. FY22 was the last year of funding for this program.

- Survivable Super High Frequency (SSHF) will upgrade and replace portions of the E-4B's Jam-Resistant Secure Communications (JRSC) system to meet existing Presidential Policy Directive (PPD)-35 and National Security Presidential Directive (NSPD)-51/Homeland Security Presidential Directive (HSPD)-20 requirements and to ensure continued connectivity and interoperability as satellite and communications infrastructure evolves. Expected modifications include, but are not limited to, component and sub-system upgrades and replaces portions of the current Super High Frequency (SHF) system that are obsolete or near end of service life. A replacement to the SHF system is required as secure, survivable communications capability transitions from the Defense Satellite Communications System (DSCS). A risk-reduction study was completed in FY19 to further define the acquisition strategy of the SSHF program. The program will be acquired in 2 increments: Increment

UNCLASSIFIED

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1 will include technical solutions such as upgrading the existing modems, systems integration lab, and Ka-band system. Increment 2 will add new modem technology, new Ku-band system, common workstation, and upgrades to the X-band system.

The total cost of the E-4B SSHF Inc 2 RP Middle Tier of Acquisition effort is 172.50 million, including RDT&E. E-4B SSHF Inc 2 is not fully funded across the Future Years Defense Program. The Department of the Air Force is assessing all options to address the funding shortfalls for MTA programs including additional funding in a future budget request, performance trades based on technical maturity, or transition to alternative pathways.

- The E-4B Systems Integration Laboratory (SIL) program will develop a test environment configured to represent the mission systems of the E-4B with connectivity to mission networks and services. E-4B SIL started as the Test Accreditation Integration Lab (TAIL) 5 for development of the E-4B SSHF program. The E-4B SIL program will expand the capabilities of TAIL 5 beyond SSHF to include the other mission communication systems within the E-4B. The E-4B SIL is necessary to minimize modernization and technical refresh schedules by reducing time on aircraft for install, test, ground connections/configurations, technical orders, redlines/rework, and training. Schedule reduction by the E-4B SIL will directly support increased Aircraft Availability (AA). The E-4B SIL will be developed in three blocks in FY24-FY27: Block 1 will focus on voice systems, Block 2 will focus on data systems, and Block 3 will integrate the remaining communication systems.

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 element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22 0.0M was expended for civilian pay expenses in this program element, and in FY23 0.0M is forecasted for civilian pay expenses in this program element.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	26.331	25.701	21.212	0.000	21.212
Current President's Budget	22.798	25.701	39.868	0.000	39.868
Total Adjustments	-3.533	0.000	18.656	0.000	18.656
• 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	-3.533	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	18.656	0.000	18.656

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Change Summary Explanation FY22 adjustments for -5.033 reprogramming on FY22-11PA and +1.5M from internal reprogramming FY24 increase of 3.6M to properly align funding for SSHF, and 15.0M for the E-4B SIL block 1 development				
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
Title: E-4B Mobile User Objective System (MUOS)		2.000	0.000	0.000
Description: The MUOS program upgrades E-4B Ultra-High Frequency (UHF) Radio transmitters to be MUOS capable to meet the E-4B CDD and CJCSI 6250.01F. MUOS provides securable data and full duplex voice communications while simultaneously monitoring a second frequency. The MUOS upgrade will provide interoperability with MUOS waveforms for voice and data communications and with other nuclear and national C2 centers and aircraft by replacing the legacy USC-42 UHF Satellite Communication (SATCOM) radio system.				
FY 2023 Plans: No FY23 efforts				
FY 2024 Plans: No FY24 efforts				
Title: Survivable SHF		20.798	25.701	24.868
Description: Survivable Super High Frequency (SSHF) will upgrade and replace portions of the E-4B's Jam-Resistant Secure Communications (JRSC) system to meet existing Presidential Policy Directive (PPD)-35 and National Security Presidential Directive (NSPD)-51/Homeland Security Presidential Directive (HSPD)-20 requirements and to ensure continued connectivity and interoperability as satellite and communications infrastructure evolves. Expected modifications include, but are not limited to, component and sub-system upgrades and replaces of portions of the current SHF system that are obsolete or near end of service life. A replacement to the SHF system is required as secure, survivable communications capability transitions from the Defense Satellite Communications System (DSCS). A risk-reduction study was completed in FY19 to further define the acquisition strategy of the SSHF program. The program will be acquired in 2 increments: Increment 1 will include technical solutions such as upgrading the existing modems, systems integration lab, and Ka-band system. Increment 2 will add new modem technology, new Ku-band system, common workstation, and upgrades to the X-band system.				
FY 2023 Plans: - Continue Increment 2 development activities. - Continue design of common workstation. - Continue development of new modem technology.				
FY 2024 Plans:				

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
- Continue Increment 2 development activities. - Continue design of common workstation. - Continue development of new modem technology. FY 2023 to FY 2024 Increase/Decrease Statement: In FY24 development efforts will transition to prototype and SIL integration.			
Title: E-4B Systems Integration Laboratory (SIL) Description: The E-4B Systems Integration Laboratory (SIL) program will develop a test environment configured to represent the mission systems of the E-4B with connectivity with mission networks and services. E-4B SIL started as the Test Accreditation Integration Lab (TAIL) 5 for development of the E-4B SSHF program. The E-4B SIL program will expand the capabilities of TAIL 5 beyond SSHF to include the other mission communication systems within the E-4B. The E-4B SIL is necessary to minimize modernization and technical refresh schedules by reducing time on aircraft for install, test, ground connections/configurations, technical orders, redlines/rework, and training. Schedule reduction by the E-4B SIL will directly support increased Aircraft Availability (AA). The E-4B SIL will be developed in three blocks in FY24-FY27 to support AA: Block 1 will focus on voice systems, Block 2 will focus on data systems, and Block 3 will integrate the remaining communication systems. FY 2023 Plans: No FY23 efforts FY 2024 Plans: Begin Block 1 (voice system) development FY 2023 to FY 2024 Increase/Decrease Statement: FY24 is the first year of funding for this effort	0.000	0.000	15.000
Accomplishments/Planned Programs Subtotals	22.798	25.701	39.868

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u> <u>Base</u>	<u>FY 2024</u> <u>OCO</u>	<u>FY 2024</u> <u>Total</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item E00400: <i>E-4B Nat Airborne Ops Center (NAOC)</i>	19.081	5.973	13.055	-	13.055	32.962	36.767	44.408	45.334	0.000	197.580
• APAF 06 Line Item 000999: <i>Initial Spares/Repair Parts</i>	0.000	5.000	0.363	-	0.363	0.372	0.378	0.387	0.395	0.000	6.895

Remarks

UNCLASSIFIED

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E. Acquisition Strategy Acquisition Strategy: The acquisition strategy for each specific modification differs based on the urgency of the requirement, definition of the capability, and technology readiness level of the components. The Acquisition Strategy for Survivable SHF is a Section 804 Middle Tier Acquisition (MTA). Increment 1 Rapid Prototype MTA was approved in April 2019. Increment 2 Rapid Prototype MTA was approved in December 2021. Management Strategy: Program management for all aircraft modifications is executed by the Commercial Derivative Aircraft Division at Tinker AFB, Oklahoma. The Program Executive Officer (PEO) for Presidential and Executive Airlift, at Wright Patterson, Ohio provides management oversight. Contracting Strategy: The contracting strategy differs for each individual modification, but normally includes an initial engineering study contract followed by a development contract. Production installations and sustainment are typically accomplished with the E-4B Contractor Logistics Support (CLS) contract.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0302015F / E-4B National Airborne Operations Center (NAOC)	Project (Number/Name) 674777 / E-4B Aircraft Modernization
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
MUOS	SS/CPIF	Raytheon : Largo, FL	-	2.000	Sep 2022	-		-		-		-	0.000	2.000	13.000
Survivable SHF	C/CPFF	L-3 : SLC, UT	-	20.798	Sep 2022	25.701	Jan 2023	24.868	Jan 2024	-		24.868	0.000	71.367	120.000
E-4B SIL	SS/CPFF	L-3 : SLC, UT	-	-		-		15.000	Apr 2024	-		15.000	0.000	15.000	50.000
Subtotal			-	22.798		25.701		39.868		-		39.868	0.000	88.367	N/A

	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	22.798	25.701	39.868	-	39.868	0.000	88.367	N/A

Remarks
 FY22, FY23, & FY24 SSHF funding supports development, integration, and test of prototype SSHF system under L-3Harris contract.
 FY22 MUOS funding supports prototype integration efforts.
 FY24 SIL funding supports Block 1 development efforts.

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0302015F / E-4B National Airborne Operations Center (NAOC)	Project (Number/Name) 674777 / E-4B Aircraft Modernization

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
E-4B Aircraft Modernization																												
MUOS Modification Integration and Testing																												
MUOS Modification Milestone Decision C																												
Survivable SHF Inc 1 Rapid Fielding Decision																												
Survivable SHF Inc 2 Integration and Testing																												
Survivable SHF Inc 2 Prototype Modification Decision																												
Survivable SHF Inc 2 Rapid Fielding Decision																												
E-4B SIL Block 1 Development																												
E-4B SIL Block 2 Development																												
E-4B SIL Block 3 Development																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>	Project (Number/Name) 674777 / <i>E-4B Aircraft Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>E-4B Aircraft Modernization</i>				
MUOS Modification Integration and Testing	2	2023	3	2023
MUOS Modification Milestone Decision C	3	2023	3	2023
Survivable SHF Inc 1 Rapid Fielding Decision	1	2023	1	2023
Survivable SHF Inc 2 Integration and Testing	1	2022	4	2024
Survivable SHF Inc 2 Prototype Modification Decision	1	2024	1	2024
Survivable SHF Inc 2 Rapid Fielding Decision	4	2024	4	2024
E-4B SIL Block 1 Development	3	2024	4	2025
E-4B SIL Block 2 Development	2	2025	3	2026
E-4B SIL Block 3 Development	2	2026	3	2027