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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

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 0305207F / <i>Manned Reconnaissance Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	14.223	11.787	14.711	0.000	14.711	15.021	15.291	15.564	15.851	Continuing	Continuing
674754: <i>RC-135 Systems</i>	-	14.223	11.787	14.711	0.000	14.711	15.021	15.291	15.564	15.851	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

RC-135 operational systems development and enhancement activities support design studies, engineering analysis, non-recurring engineering and other efforts associated with the integration and modification of the RC-135 programs and their specialized mission systems, both air and ground. Associated ground systems include RIVET JOINT Ground Data Processing Systems (GDPS), Distributed Mission Shelters (DMS), Mission Crew Training Systems (MCTS), Airborne Capabilities Extension System (ACES), and the Operational Flight Trainers (OFT, a.k.a. flight deck simulators). Extensive utilization of Commercial-Off-The-Shelf (COTS) based solutions allows rapid fielding of needed capabilities through upgrades and supports Diminishing Manufacturing Sources (DMS)/Vanishing Vendor Items (VVI) logistics mitigation efforts. The results of these efforts provide for preliminary assessments of technical feasibility, operability, or military utility as well as specific engineering implementations for integration into the various systems baseline configurations.

These activities are managed by the 645th Aeronautical Systems Group (645 AESG). The 645 AESG (a.k.a. BIG SAFARI) manages engineering, ground and support systems modifications, integration, flight testing, product assurance, acceptance testing, logistics, and training activities.

Aircraft, sensor systems, and associated ground support system engineering planned for FY 2021 budget includes developmental planning, execution and support for the RC-135V/W RIVET JOINT Baselines 13 and 14 (BL-13 and BL-14), the RC-135U COMBAT SENT Baseline 6 (BL-6), and the RC-135S COBRA BALL BL-6 and BL-7 configurations. The world-wide challenge of keeping pace against technologically agile targets used by both nation and non-nation-state adversaries and the rapid evolution of COTS technologies demands a responsive and adaptive acquisition strategy for fielding incremental spiral upgrades and baseline capabilities that are logistically supportable at all locations. The 645 AESG uses an incremental baseline strategy to mitigate risk, find affordable solutions and field needed capabilities on the aircraft and associated ground support and training systems. Obsolescence and DMS/VVI logistical concerns are addressed with each baseline upgrade and assessed annually as part of the fleet sustainment responsibilities.

RIVET JOINT BL-13 upgrades consist of, but are not limited to, providing a continuous recording capability, Super Wideband Compressive Receiver (SWCR) and Nyquist Folding Receiver (NYFR), CNS/ATM avionics upgrades such as new autopilot, automated data system-broadcast (ADS-B) and Mode 5 identify friendly or foe (IFF) systems, and family of beyond-line-of-sight terminals (FAB-T) advanced extremely high frequency (AEHF) communications suite.

COMBAT SENT BL-6 developmental enhancements consist of, but are not limited to, steerable beams for the COMINT sub-system, improved SWCR capability and specific emitter identification (SEI) electronic intelligence (ELINT) sub- system, Primary Sensor Measurement System (PRISMS) merge with manual precision collections, millimeter wave and low band capabilities with PRISMS, digitizing antennas, direction finding of High Frequency signals and expanded streaming audio services and 360 degree aircraft tracking system. BL-6 RDT&E is funded via PE 0305206G.

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COBRA BALL BL-6 developmental enhancements consist of, but are not limited to, high gain S-Band antenna, large format Sapphire windows, RJ BL-13 COMINT capability, foreign instrumentation signals intelligence (FISINT) analog to digital receiver, and Brave version of the digital cockpit avionics systems to continue CNS/ATM compliance initiatives. BL-6 RDT&E is funded via PE 0301314F.

Ground Systems Baseline upgrades add the capabilities found in the corresponding RIVET JOINT Baseline upgrades (i.e., RIVET JOINT BL-12 corresponds to Ground System BL-12, RIVET JOINT BL-13 corresponds to Ground System BL-14, RIVET JOINT BL-15 corresponds to Ground System BL-15) to the Ground Systems to ensure crews receive training on the appropriate mission system configurations. Activities also include studies and analysis to support both current program planning and execution and future program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver RC-135 capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	14.223	11.787	14.738	0.000	14.738
Current President's Budget	14.223	11.787	14.711	0.000	14.711
Total Adjustments	0.000	0.000	-0.027	0.000	-0.027
• 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	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.027	0.000	-0.027

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Manned Reconnaissance Systems	14.223	11.787	14.711
Description: Non-recurring engineering (NRE) for Baseline system developments and enhancements to improve mission capabilities of the RIVET JOINT BL-14 and BL-15, COMBAT SENT BL-6, COBRA BALL BL-7, and Ground Systems BL-13 and BL-14.			

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<i>FY 2020 Plans:</i> Initiated contracts to: <ul style="list-style-type: none"> • Continue Engineering Analysis • Continue NRE and other efforts associated with the integration and modification of the RC-135 primary mission equipment • Continue Specialized Mission Systems development for the collection of both air and ground signals. <i>FY 2021 Plans:</i> Will initiate contracts to: <ul style="list-style-type: none"> • Continue Engineering Analysis • Continue NRE and other efforts associated with the integration and modification of the RC-135 primary mission equipment • Continue Specialized Mission Systems development for the collection of both air and ground signals. <i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding increased due to FY20 prioritization reduction being corrected in FY21 to planned programmed levels.			
Accomplishments/Planned Programs Subtotals	14.223	11.787	14.711

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APAF 05 Line Item DARP01: <i>RC-135</i>	394.532	227.673	191.332	-	191.332	211.736	210.502	85.720	232.123	Continuing	Continuing
• APAF 06 Line Item DARP01: <i>Initial Spares/Repair Parts</i>	49.464	83.572	51.282	-	51.282	52.328	53.262	24.699	25.150	Continuing	Continuing
• APAF 07 Line Item DARP01: <i>Aircraft Support Equipment & Facilities</i>	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• OPAF 04 Line Item 846070: <i>DARP RC-135</i>	26.262	80.654	27.663	-	27.663	27.658	28.142	28.647	29.172	Continuing	Continuing
• RDTE 07 PE 0304260F: <i>Airborne SIGINT Enterprise</i>	50.577	33.396	45.066	-	45.066	45.954	46.725	47.507	48.327	Continuing	Continuing

Remarks

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E. Acquisition Strategy

The RC-135 RIVET JOINT, COBRA BALL, and COMBAT SENT configured aircraft are maintained and kept technologically relevant through an incremental baseline upgrade acquisition strategy. Technology upgrades and Quick Reaction Capability (QRC) developments are acquired through the 645 AESG in accordance with the BIG SAFARI Program Management Directive (PMD) and Class Justification and Approval (J&A) document for acquisition of supplies and services using an "other than full and open competition" criteria. The supplies and services procured by 645 AESG satisfy National Security requirements (FAR 6.302-6) through the use of their standing J&A or address Unusual and Compelling Urgency requirements (FAR 6.302-2) through an individually prepared J&A supported by the BIG SAFARI Life Cycle Management Plan (LCMP) across the full spectrum of system life cycle management from developmental engineering to system retirement ("cradle to grave") support. Due to the ever changing threat and rapidly evolving electromagnetic combat environment encountered during our prolonged commitment to Overseas Contingency Operations (OCO), the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging Combatant Command (CCMD) and/or Intelligence Community (IC) requirements to better meet the war fighting objectives.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>	Project (Number/Name) 674754 / <i>RC-135 Systems</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Product Development	SS/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Operational Systems Development	SS/ Various	L3Harris Technologies : Greenville, TX	-	14.223	Dec 2018	11.787	Dec 2019	14.711	Dec 2020	-		14.711	Continuing	Continuing	-
Subtotal			-	14.223		11.787		14.711		-		14.711	Continuing	Continuing	N/A

Remarks
All activity is based around the Programmed Depot Maintenance (PDM) airframe and missions systems schedule which includes multiple contracts and organizations with overlapping and continuous periods of performance. Due to the rapidly changing threat environment encountered during our prolonged commitment to Overseas Contingency Operations (OCO), the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging Combatant Command (CCMD) and/or Intelligence Community (IC) requirements.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	14.223	11.787	14.711	-	14.711	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>	Project (Number/Name) 674754 / <i>RC-135 Systems</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	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				
Baseline Spiral Development																																
RIVET JOINT Baseline 12 Integration, Test and Fielding																																
RIVET JOINT Baseline 13 Integration, Test and Fielding																																
RIVET JOINT Baseline 14 Development																																
RIVET JOINT Baseline 14 Integration, Test and Fielding																																
RIVET JOINT Baseline 15 Development																																
RIVET JOINT Baseline 15 Integration, Test and Fielding																																
COMBAT SENT Baseline 6 Development																																
COMBAT SENT Baseline 6 Integration, Test and Fielding																																
COBRA BALL Baseline 6 Integration, Test and Fielding																																
COBRA BALL Baseline 7 Development																																
COBRA BALL Baseline 7 Integration, Test and Fielding																																
Ground Systems Baseline 13 Development, Integration, Test and Fielding																																
Ground Systems Baseline 14 Development, Integration, Test and Fielding																																
Ground Systems Baseline 15 Development, Integration, Test and Fielding																																

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Baseline Spiral Development</i>				
RIVET JOINT Baseline 12 Integration, Test and Fielding	1	2019	2	2020
RIVET JOINT Baseline 13 Integration, Test and Fielding	1	2019	2	2023
RIVET JOINT Baseline 14 Development	1	2020	2	2022
RIVET JOINT Baseline 14 Integration, Test and Fielding	2	2022	4	2025
RIVET JOINT Baseline 15 Development	4	2021	4	2023
RIVET JOINT Baseline 15 Integration, Test and Fielding	4	2023	4	2025
COMBAT SENT Baseline 6 Development	1	2019	2	2020
COMBAT SENT Baseline 6 Integration, Test and Fielding	2	2020	4	2023
COBRA BALL Baseline 6 Integration, Test and Fielding	1	2019	3	2020
COBRA BALL Baseline 7 Development	1	2019	3	2020
COBRA BALL Baseline 7 Integration, Test and Fielding	3	2020	4	2023
Ground Systems Baseline 13 Development, Integration, Test and Fielding	1	2019	4	2020
Ground Systems Baseline 14 Development, Integration, Test and Fielding	2	2022	4	2023
Ground Systems Baseline 15 Development, Integration, Test and Fielding	3	2023	4	2025

Note

Ground systems include the RIVET JOINT Mission Crew Training Systems (MCTS), Ground Data Processing System (GDPS), Modular Processing System (MPS), Airborne Capabilities Extension Systems (ACES) and Operational Flight Trainers (OFT). Baseline upgrades are determined by the aircraft programmed depot maintenance schedule. Hardware, firmware or software enhancements to the ground systems are set up to match the aircraft baseline upgrades. Typically, baseline configuration changes and enhancements are incorporated first into the MCTSs and OFTs, and then integrated into GDPS, MPS, and ACES. Delivery of the enhancements to the MCTSs and OFTs are planned to arrive concurrently, if not slightly prior, to the delivery of the first aircraft with an upgraded cockpit or mission system in a given baseline configuration to allow for aircrew and ground personnel training and qualification.