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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force **Date:** May 2021

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 0207253F / <i>Compass Call</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	30.687	15.825	91.266	0.000	91.266	-	-	-	-	-	-
674804: <i>Compass Call</i>	-	30.687	15.825	91.266	0.000	91.266	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

COMPASS CALL is the Air Force's wide-area, standoff, Airborne Electronic Attack (AEA) Command and Control Warfare/Information Operations (C2W/IO) weapon system. The employment of this weapon system interrupts adversary's use of the electronic battlespace and is a key active component in the information battlespace and prosecution of Overseas Contingency Operations (OCO). Compass Call's sophisticated electronic attack system is capable of surgical denial and/or disruption of adversary Radio Frequency (RF) communications, radar, and sensor systems.

The COMPASS CALL system was fielded in 1983 and employs an incremental development and fielding strategy that puts capability into the warfighter's hands as soon as practical and ensures each iteration of the weapon system is effective against the highest priority threats such as military and commercial communications, command and control operations, and new/emerging sensors. Due to the rapid advances in electronic attack techniques and technology, Compass Call was designed to be adaptable and must continuously modernize and evolve to keep pace with adversary tactics and emerging technologies. Sustaining that process requires a steady stream of system development funds. Development funding is required to perform trade studies, accomplish system upgrades and associated test activities, and develop and test Quick Reaction Capabilities (QRCs). The EC-130H Baseline 2 (BL2) configuration and the EC-130H mid-Baseline 2 (MBL2) enhancements are the latest in a line of fielded mission system upgrades to the EC-130H. The BL2 configuration and MBL2 enhancements currently fielded have advanced Compass Call's electronic attack capabilities significantly over the two previously fielded baselines.

On 23 March 2016, a Doctrine, Organization, Training, materiel, Leadership & Education, Personnel, Facilities (DOTmLPE) Change Recommendation (DCR) was approved. This requirement drives the re- hosting of Compass Call PME from the EC-130H to a modern, more cost-effective, survivable and operationally suitable commercial derivative aircraft which meets the range, speed, endurance and operating altitude needs of the combatant commands in an Anti-Access/Area Denial (A2AD) environment. As a result, in FY2017, the Compass Call re-host program was initiated to begin the transition to the EC-37B platform. The re-hosted Compass Call platform is based on a commercially-available modified G550 aircraft that already holds Federal Aviation Administration (FAA) Supplemental Type Certificates (STC) for airworthiness. The platform will undergo modifications to host Compass Call's PME and antenna arrays and receive additional STCs and Military Type Certificates (MTC). The EC-37B aircraft utilize PME harvested from the MBL2 EC-130H aircraft and upgraded to the latest Baseline. The EC-37B program is highly concurrent with developmental and procurement activities occurring in parallel.

Transitioning to the re-host effort, the program of record has procured six (6) new commercial derivative aircraft to date. The first five (5) EC-37B aircraft procured in FY2017 - FY2020 will be configured with Baseline 3 (BL3) PME. These aircraft will receive PME from legacy donor EC-130H aircraft, as well as new and updated PME. The sixth EC-37B aircraft procured in FY2021 will be the first Baseline 4 (BL4) configured aircraft.

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In FY2022, the Compass Call program has deferred the planned procurement of the seventh EC-37B aircraft in FY2022 and associated installations and PME kit buys. The funding associated has been realigned within the program and is described below.

The decision to defer procurement of the seventh EC-37B out of FY2022 was critical in order to maintain an aggressive BL4 development and fielding schedule as well as address deferred requirements that cannot be deferred further. These requirements include BL4 development activities, procurement of BL3 and BL4 support equipment for the PME and modified aircraft, procurement of the BL4 CCMCS, execution of change orders, modification of the sixth EC-37B aircraft to a BL4 configuration, and procurement of non-developmental hardware for BL4 integration activities.

EC-37B BL3 updates existing, fielded MBL2 capabilities with the exception of the low band capability while significantly increasing operating altitude and standoff distances through re-host onto a new airframe. EC-37B BL4 adds incremental low-band capability, transitions the software baseline to an agile software framework, implements Open Mission Systems architecture to enable rapid integration of new capabilities offering a multiplicative increase in target capacity and addresses Diminishing Manufacturing Sources (DMS), along with other upgrades discussed in subsequent paragraphs. The realignment of EC-37B BL4 scope to include an incremental upgrade of low band via extension of an existing band was the result of cost constraints and prioritization from the user community. The Air Force determined that based on emerging threat priorities the delivery of a flexible and extensible open mission system architecture capable of rapidly integrating new capabilities delivered more capability to the warfighter than extension of the lower operational frequency range of the EC-37B alone. The open architecture implementation on Compass Call is referred to as SWORD-A (System-Wide Open Reconfigurable Dynamic Architecture).

FY2022 RDT&E efforts will concentrate on BL4 development and test activities while performing limited work on BL5 initiatives for PME upgrades and integration. Activities encompassed within PME upgrade may include, but not limited to, aircraft system integration, assembly, test and checkout; mission system upgrades, external communications upgrades, software development, systems engineering, test and evaluation, flight test, training systems, training events, support equipment, and program management administration (PMA) costs.

Specific mission system developmental activities of interest include studies and analyses for future capabilities; maturation of higher Technology Readiness Level (TRL) technologies for future insertion; QRC application development for integration onto the Compass Call Software Defined Radio (SDR) capability; low band developmental test; power expansion; transmit and receive development; Size, Weight, Power and Cooling (SWAP-C) reductions; implementation of Obsolescence and DMS/Vanishing Vendor Items (VVI) that drive developmental redesign of impacted hardware; transition of Compass Call PME to open architecture compliant standards; and continued migration of the Compass Call Operating System (CCOS) to an agile software construct.

Due to the rapidly changing threat environment encountered during Compass Call's prolonged commitment to overseas operations, the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Orion capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY20 \$0.000M and in FY21 \$0.000M is forecasted for civilian pay expenses in this program element.

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This program is in Budget Activity (BA) 07, Operational System Development because this BA 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.

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. Program Change Summary (\$ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	31.888	15.854	15.900	0.000	15.900
Current President's Budget	30.687	15.825	91.266	0.000	91.266
Total Adjustments	-1.201	-0.029	75.366	0.000	75.366
• Congressional General Reductions	0.000	-0.029			
• 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	-1.168	0.000			
• Other Adjustments	-0.033	0.000	75.366	0.000	75.366

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 674804: *Compass Call*

Congressional Add: *EC-37B Compass Call Re-host Congressional Add*

Congressional Add Subtotals for Project: 674804

Congressional Add Totals for all Projects

	FY 2020	FY 2021
	15.414	-
	15.414	-
	15.414	-

Change Summary Explanation

FY2020: SBIR assessment of \$582k against baseline budget and \$586k assessed against Congressional Add budget

FY2020: Upward Adjustment (UPAD) of \$33k to cover current for cancelled bills

FY2021: Unspecified Congressional cut of \$29k

FY2022: Adjustment for inflation of \$763K

FY2022: Realigned \$20.353M from Procurement for PME development in order to maintain an aggressive BL4 development and fielding schedule

FY2022: Realigned \$55.776M from Procurement for PME development and test in order to maintain an aggressive BL4 development and fielding schedule

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: Baseline Upgrade Development</p> <p>Description: Supports development of new PME baseline (BL), other subsystem, and platform upgrades in order to ensure COMPASS CALL capabilities remain ahead of emerging adversary tactics and technologies.</p> <p>FY 2021 Plans: Continuing efforts for BL development on upgraded platform and associated developmental simulator activities and address anomalies, as required. Specific efforts may include but are not limited to the following:</p> <ul style="list-style-type: none"> • Low Band antenna design • Advanced Military & Commercial Communications Offensive capabilities • Emerging and Modern Target Technique • Platform integration for future capabilities • Updates to PME infrastructure • Platform upgrades and associated non-recurring engineering • Studies and analysis for current/future baseline development planning • Open Mission System Architecture • Software Defined Receiver/Transmit • QRCs • PME Integration and Testing • Testing activities <p>FY 2022 Plans: Will continue efforts for PME development, integration, and test on an upgraded platform and associated simulators, address PME anomalies, as required, and begin future baseline development activities. Specific efforts may include but are not limited to the following:</p> <ul style="list-style-type: none"> • NRE to extend existing frequency coverage to Low Band range • Advanced Military & Commercial Communications Offensive capabilities • Emerging and Modern Targets • Platform integration for future capabilities • Updates to PME infrastructure • Platform upgrades and associated non-recurring engineering • Studies and analysis for current/future baseline development planning • Open Mission System Architecture for rapid capability integration • Training system/simulator upgrades 	15.273	15.825	91.266

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> • Software Defined Receiver/Transmit • Containerized agile software development/implementation • QRCs • PME Integration and Testing • Hardware prototyping and integration analysis • Testing activities <p>FY 2021 to FY 2022 Increase/Decrease Statement: Funding increase from FY2021 to FY2022 includes a \$20.353M & \$55.776M realignment from Procurement to RDT&E. This funding increase will fund BL3 integration, test activities, BL4 development activities. BL4 development has ramped up through FY2021 and the Compass Call program must fund BL4 development material, associated prototyping, and software updates.</p>				
Accomplishments/Planned Programs Subtotals		15.273	15.825	91.266
		FY 2020	FY 2021	
Congressional Add: EC-37B Compass Call Re-host Congressional Add		15.414	-	
<p>FY 2020 Accomplishments: EC-37B COMPASS CALL Re-host Congressional Add to accelerate BL4</p> <ul style="list-style-type: none"> • Low Band antenna design and test • Advanced Military and Commercial Communications Offensive capabilities • Emerging and Modern Targets • Platform integration for future capabilities • BL4 Preliminary Design Review (PDR) and critical design activities • Updates to BL4 PME infrastructure • Platform upgrades and associated non-recurring engineering • Studies and analysis for current/future baseline development planning • Open Mission System Architecture • Software Defined Receiver/Transmit • BL Integration and Testing 				
Congressional Adds Subtotals		15.414	-	

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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 04 Line item CALL00: <i>Compass Call Aircraft</i>	114.095	159.867	0.000	-	0.000	-	-	-	-	-	-
• APAF 05 Line item CALL00: <i>Compass Call Mods</i>	110.539	169.683	195.098	-	195.098	-	-	-	-	-	-
• APAF 06 Line item CALL00: <i>Compass Call Mod Spares</i>	10.805	10.984	65.624	-	65.624	-	-	-	-	-	-

Remarks

E. Acquisition Strategy

COMPASS CALL maintains operational relevancy through an incremental upgrade strategy in which a new "Baseline" mission system configuration fields approximately every 3-4 years. Due to the re-hosting of PME onto the BL3 and BL4 EC-37B, this has temporarily lengthened the planned upgrade schedule. BL5 is planned to return to this upgrade cycle for major hardware updates. Urgent upgrades between Baselines are accomplished via QRCs. These efforts are accomplished by the 645th Aeronautical Systems Group (645 AESG) in accordance with their Acquisition Strategy, Program Management Directive (PMD), Class Justification and Approval (J&A) document for acquisition of supplies and services using other than full and open competition criteria, and Life Cycle Management Plan (LCMP) and cover the full spectrum of system life cycle management ("cradle to grave" support concept). Due to the rapidly changing threat environment encountered during Compass Call's prolonged commitment to OCO, the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging Combatant Commander requirements.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force **Date:** May 2021

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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Baseline Upgrade Development Primary Mission Equipment	SS/CPFF	BAE Systems : Nashua, NH	-	30.155	Jan 2020	14.961	Dec 2020	80.046	Oct 2021	-		80.046	-	-	-
Subtotal			-	30.155		14.961		80.046		-		80.046	-	-	N/A

Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Test and Evaluation	SS/CPAF	Not specified. : TBD	-	0.318	Oct 2020	0.614	Sep 2021	9.086	Nov 2021	-		9.086	-	-	-
Subtotal			-	0.318		0.614		9.086		-		9.086	-	-	N/A

Management Services (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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			
Program Management Administration (PMA)	Various	AFLCMC : WPAFB, OH	-	0.214	Apr 2020	0.250	Apr 2021	2.134	Apr 2022	-		2.134	-	-	-
Subtotal			-	0.214		0.250		2.134		-		2.134	-	-	N/A

			Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	30.687	15.825	91.266	-	91.266	-	-	N/A

Remarks
The 1.884M increase in PMA costs is based on the projected program management needs associated with BL3 testing and BL4 development activities.

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Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force **Date:** May 2021

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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
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

<i>Compass Call</i>	
Baseline 3 Development	
Baseline 3 Integration and Test	
Baseline 4 Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force **Date:** May 2021

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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Compass Call</i>				
Baseline 3 Development	1	2020	1	2021
Baseline 3 Integration and Test	3	2020	4	2022
Baseline 4 Development	1	2020	4	2022