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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Air Force										Date: May 2017		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0302015F I E-4B National Airborne Operations Center (NAOC)							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	-	76.760	30.948	35.467	0.000	35.467	13.283	0.000	0.000	0.000	Continuing	Continuing
674777: E-4B Aircraft Modernization	-	76.760	30.948	35.467	0.000	35.467	13.283	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

## Note

FY18 E-4B Recapitalization efforts are executed under PE0604288F Project 646507 BA4.

## 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). Additionally, modifications may enhance the aircraft's operations center facilities, to include but not limited to those necessary for the Senior Leadership Command, Control and Communications System (SL3CS), National Leadership Command Capability (NLCC), Nuclear Command, Control, and Communications (NC3) and other communications necessary for the E-4B fleet to execute its mission. Funds may also be used to explore and develop modifications, upgrades, and future systems required to meet evolving mission requirements. Developmental modifications and studies/projects currently underway or planned for accomplishment under this program include:

- The Advanced Extremely High Frequency (AEHF) Compatible Terminal/ Presidential National Voice Conferencing (PNVC) Program integrates AEHF Compatible Command Post Terminals and PNVC capability onto the E-4B NAOC platform. This integration is necessary to replace the legacy Military Strategic, Tactical and Relay (MILSTAR) terminal, and provide access to protected wideband AEHF satellite networks. PNVC replaces the Survivable Emergency Conferencing Network (SECN), which will not be supported once the AEHF satellite network is in place.
- The Low Frequency Transmit System (LFTS) program replaces the currently installed Very Low Frequency/Low Frequency (VLF/LF) Transmit system, which is no longer sustainable after over 35 years of operation. In order to meet existing Presidential Policy Directive (PPD)-35 requirements and ensure there is assured connectivity between civilian and military leadership and military forces during real world situations, this system must be replaced. The transmit system consists of three primary equipment groups: a Control/Monitor group, a Power Amplifier/Coupler (PA/C) group, and a Trailing Wire Antenna (TWA) group.

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.

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This program element may include necessary civilian pay expenses required to manage, execute, and deliver E-4 weapon system capability								
B. Program Change Summary (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total		
Previous President's Budget		76.760	30.948	20.563	0.000	20.563		
Current President's Budget		76.760	30.948	35.467	0.000	35.467		
Total Adjustments		0.000	0.000	14.904	0.000	14.904		
• 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	14.904	0.000	14.904		
Change Summary Explanation								
FY18 funding increased by a total of \$14.904M, with adjustment to the AEHF/PNVC (\$11.442M) & LFTS (\$21.288M) modernization programs and the transfer of E-4B Recap funds (\$17.827M) to PE0604288F Project 646507 BA4.								
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Title: Advanced Extremely High Frequency (AEHF) Compatible Terminal/Presidential National Voice Capability (PNVC)				24.660	5.233	15.438	0.000	15.438
Description: Integrate AEHF Compatible Terminal/PNVC capability onto the E-4B NAOC platform, to replace the existing MILSTAR/SECN system.								
FY 2016 Accomplishments:								
- Conducted full year of design and development efforts, to include non-recurring engineering, development of parts and labor for a systems integration lab, early prototyping, and some hardware qualification testing.								
- Completed risk reduction studies and awarded development contract.								
- Developed integrated system to install capability onto first aircraft.								
- Conducted a System Requirements Review (SRR) and prepared for Preliminary Design Review (PDR).								
FY 2017 Plans:								
- Conduct PDR and Critical Design Review (CDR).								

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<div>- Continue integration activities to include interface design and development of A-kit wiring harnesses.</div> <div>- Begin planning for prototype install in depot.</div> <div><b>FY 2018 Base Plans:</b></div> <div>- Prepare for Milestone C decision, including determining entrance/exit criteria, update to Acquisition Strategy and draft Capabilities Production Document; continue efforts in preparation of installation and testing of prototype kit onto aircraft.</div> <div><b>FY 2018 OCO Plans:</b></div> <div>N/A</div>						
<div><b>Title:</b> E-4B Low Frequency Transmit System (LFTS)</div> <div><b>Description:</b> Replaces the E-4B's legacy Very Low Frequency/Low Frequency (VLF/LF) Transmit System, which is over 35 years old and is past its useful life. This capability is required to comply with Presidential Policy Directive (PPD)-35 to ensure there is assured connectivity between civilian and military leadership and military forces during all stages of conflict and/or national emergencies.</div> <div><b>FY 2016 Accomplishments:</b></div> <div>- Continued design and development efforts, to include non-recurring engineering, development of parts and labor for a systems integration lab, early prototyping, and some hardware qualification testing.</div> <div>- Conducted PDR.</div> <div>- Conducted CDR and prepared for Material Readiness Review (MRR).</div> <div>- Purchased prototype kit, test equipment, and RDT&amp;E support equipment in preparation for FY18 installation and testing.</div> <div><b>FY 2017 Plans:</b></div> <div>- Continue development efforts which include assembly, delivery and integration testing of prototype kit in preparation for FY18 installation and activities. Prepare for and conduct Milestone C.</div> <div><b>FY 2018 Base Plans:</b></div> <div>- Install prototype kit and conduct last activities leading up to production contract award.</div> <div><b>FY 2018 OCO Plans:</b></div> <div>N/A</div>		51.950	17.794	20.029	0.000	20.029
<div><b>Title:</b> E-4B Recapitalization</div>		0.150	7.921	0.000	0.000	0.000

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C. Accomplishments/Planned Programs (\$ in Millions)									FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
<p><b>Description:</b> Recapitalization efforts include those activities related the replacement of the current E-4B NAOC fleet. Efforts will involve early acquisition activities, to include but not limited to, preparation for a Materiel Development Decision (MDD), an Analysis of Alternatives (AoA), development of initial requirements/acquisition strategy, risk reduction activities, and other efforts necessary to initiate a recapitalization program.</p> <p><b>FY 2016 Accomplishments:</b> - Initiated requirements development.</p> <p><b>FY 2017 Plans:</b> - Initiate requirements development. - Conduct pre-AoA risk reduction activities to include E-4B Sustainment Study and Concept of Operations (CONOPS) development. - Continue concept generation and acquisition strategy development.</p> <p><b>FY 2018 Base Plans:</b> Effort moved to PE 0604288F, NAOC Recap Development.</p> <p><b>FY 2018 OCO Plans:</b> N/A</p>													
Accomplishments/Planned Programs Subtotals									76.760	30.948	35.467	0.000	35.467
D. Other Program Funding Summary (\$ in Millions)													
Line Item	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost		
• RDT&E: PE0604288F BA04: National Airborne Operations Center (NAOC) Recap	0.000	0.000	7.850	0.000	7.850	9.813	19.696	101.772	136.513	Continuing	Continuing		
• APAF: BA05: Line Item # E00400: E-4B Nat Airborne Ops Center (NAOC)	22.071	53.348	30.493	0.000	30.493	57.551	52.462	24.304	7.960	Continuing	Continuing		
• APAF: BA05: Line Item # 833140: Worldwide Joint Strategic Communication	0.700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	11.975		

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<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 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>						
<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>FY 2018</u> <u>Base</u>	<u>FY 2018</u> <u>OCO</u>	<u>FY 2018</u> <u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF: BA06: Line Item # 000999: <i>Initial Spares/Repair Parts</i>	0.000	5.338	1.072	0.000	1.072	1.070	0.335	0.342	0.349	Continuing	Continuing
<b>Remarks</b>											
<b>E. Acquisition Strategy</b> 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.  Management Strategy: Program management for all aircraft modifications is executed by The Commercial Derivative Aircraft program office at Tinker AFB. The Program Executive Officer (PEO) for Mobility provides management oversight.  Contracting Strategy: 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.											
<b>F. Performance Metrics</b> 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.											

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Air Force												Date: May 2017			
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				
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AEHF Compatible Terminal-Risk Study 2	C/CPFF	Raytheon : Largo, FL	-	0.810	Oct 2015	0.000		0.000		0.000		0.000	Continuing	Continuing	2.489
AEHF/PNVC Integration	C/CPFF	Raytheon : Largo, FL	-	23.781	Dec 2016	5.233	Aug 2017	15.438	Nov 2017	0.000		15.438	Continuing	Continuing	44.471
LFTS Development	SS/CPIF	Boeing : OKC, OK	-	51.750	Dec 2015	17.794	Dec 2016	20.029	Nov 2017	0.000		20.029	Continuing	Continuing	103.857
E-4B Recapitalization	TBD	TBD : TBD	-	0.150	Nov 2016	7.921	Apr 2017	0.000		0.000		0.000	Continuing	Continuing	-
Subtotal			-	76.491		30.948		35.467		0.000		35.467	-	-	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	-
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	-
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA (Travel, Support)	Various	Various : TBD	-	0.269		0.000		0.000		0.000		0.000	Continuing	Continuing	-
Subtotal			-	0.269		0.000		0.000		0.000		0.000	-	-	-
			Prior Years	FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	76.760		30.948		35.467		0.000		35.467	-	-	-

**UNCLASSIFIED**

Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Air Force							Date: May 2017			
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			
	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	Cost To Complete	Total Cost	Target Value of Contract	
Remarks FY18 E-4B Recapitalization efforts include those activities related to the replacement of the E-4B NAOC fleet, and are executed under PE0604288F Project 646507 BA4.										

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Exhibit R-4, RDT&amp;E Schedule Profile: FY 2018 Air Force

Date: May 2017

## 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 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
AEHF Compatible Terminal/PNVC Risk Reduction																												
AEHF Compatible Terminal/PNVC Integration																												
AEHF Compatible Terminal/PNVC Milestone Decision B																												
AEHF Compatible Terminal/PNVC PDR																												
AEHF Compatible Terminal/PNVC CDR																												
AEHF Compatible Terminal/PNVC Integration DT																												
AEHF Compatible Terminal/PNVC Milestone Decision C																												
LFTS Modification Design and Development																												
LFTS Modification PDR																												
LFTS Modification CDR																												
LFTS Modification Integration and Testing																												
LFTS Modification Milestone Decision C																												



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> FY 2018 Air Force			<b>Date:</b> May 2017
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>	<b>Project (Number/Name)</b> 674777 / <i>E-4B Aircraft Modernization</i>	

**Schedule Details**

<b>Events</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
AEHF Compatible Terminal/PNVC Risk Reduction	1	2016	4	2016
AEHF Compatible Terminal/PNVC Integration	1	2017	4	2020
AEHF Compatible Terminal/PNVC Milestone Decision B	1	2017	1	2017
AEHF Compatible Terminal/PNVC PDR	1	2018	1	2018
AEHF Compatible Terminal/PNVC CDR	1	2018	1	2018
AEHF Compatible Terminal/PNVC Integration DT	3	2019	3	2019
AEHF Compatible Terminal/PNVC Milestone Decision C	1	2019	1	2019
LFTS Modification Design and Development	1	2016	2	2017
LFTS Modification PDR	1	2016	1	2016
LFTS Modification CDR	2	2016	2	2016
LFTS Modification Integration and Testing	1	2017	3	2019
LFTS Modification Milestone Decision C	3	2017	3	2017