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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2017 Air Force **Date:** February 2016

<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>
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	24.963	76.760	30.948	0.000	30.948	20.563	15.843	34.687	133.762	Continuing	Continuing
674777: <i>E-4B Aircraft Modernization</i>	-	24.963	76.760	30.948	0.000	30.948	20.563	15.843	34.687	133.762	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**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 Element's (PE'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 necessary for the Senior Leadership Command, Control and Communications System (SL3CS), National Leadership Command Capability (NLCC), Nuclear Command and Control 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, future systems and recapitalization efforts 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.
  
- E-4B recapitalization includes those activities related the replacement of the current 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.

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The FY2017 funding request was reduced by \$4.0 million to account for the availability of prior year execution balances.

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 2015</b>	<b>FY 2016</b>	<b>FY 2017 Base</b>	<b>FY 2017 OCO</b>	<b>FY 2017 Total</b>
Previous President's Budget	25.852	80.360	26.535	0.000	26.535
Current President's Budget	24.963	76.760	30.948	0.000	30.948
Total Adjustments	-0.889	-3.600	4.413	0.000	4.413
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-3.600			
• 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	-0.889	0.000			
• Other Adjustments	0.000	0.000	4.413	0.000	4.413

**Change Summary Explanation**

FY16 funding was decreased due to -\$3.6M Congressional mark against Low Frequency Transmit System (LFTS) for excess funding.

FY17 funding was increased by \$4.413 for E-4B Recapitalization.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017 Base</b>	<b>FY 2017 OCO</b>	<b>FY 2017 Total</b>
<b>Title:</b> Advanced Extremely High Frequency (AEHF) Compatible Terminal/Presidential National Voice Capability (PNVC)	1.679	24.810	5.233	0.000	5.233
<b>Description:</b> Integrate AEHF Compatible Terminal/PNVC capability onto the E-4B NAOC Platform, to replace the existing MILSTAR/SECN system.					
<b>FY 2015 Accomplishments:</b> - Continued E-4B Program Office engineering activities necessary for the integration of the AEHF Terminal/PNVC capability onto an airborne platform.					

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017 Base</b>	<b>FY 2017 OCO</b>	<b>FY 2017 Total</b>
<p>- Activities addressed hands on modifications to the terminal in order to produce a proof of concept prototype of the initial integrated solution.</p> <p><b>FY 2016 Plans:</b></p> <ul style="list-style-type: none"> <li>- Conduct 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.</li> <li>- Complete risk reduction studies and award development contract.</li> <li>- Develop integrated system to install capability onto first aircraft</li> <li>- Conduct a System Requirements Review (SRR) and prepare for Preliminary Design Review (PDR).</li> </ul> <p><b>FY 2017 Base Plans:</b></p> <ul style="list-style-type: none"> <li>- Conduct PDR and Critical Design Review (CDR).</li> <li>- Continue integration activities to include interface design and development of A-kit wiring harnesses</li> <li>- Begin planning for prototype install in depot.</li> </ul> <p><b>FY 2017 OCO Plans:</b> N/A</p>						
<p><b>Title:</b> Low Frequency Transmit System (LFTS)</p> <p><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 emergency.</p> <p><b>FY 2015 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>- Continued with 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.</li> <li>- Conducted a SRR.</li> </ul> <p><b>FY 2016 Plans:</b></p> <ul style="list-style-type: none"> <li>- Continue with 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.</li> <li>- Conduct PDR.</li> <li>- Prepare for CDR and Material Readiness Review (MRR)</li> </ul>		23.284	51.800	17.794	0.000	17.794

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>- Purchase prototype kit, test equipment, and RDT&amp;E support equipment in preparation for FY17 installation and testing.</p> <p><b>FY 2017 Base Plans:</b> - Efforts will involve prototype installation and program test activities.</p> <p><b>FY 2017 OCO Plans:</b> N/A</p>					
<p><b>Title:</b> E-4B Recapitalization</p> <p><b>Description:</b> Recapitalization efforts include those activities related the replacement of the current 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 2015 Accomplishments:</b> N/A</p> <p><b>FY 2016 Plans:</b> - Initiate requirements development - Conduct analysis, concept generation, and acquisition strategy development to prepare for MDD</p> <p><b>FY 2017 Base Plans:</b> - Continue requirements development - Obtain an MDD - Prepare for and conduct an analysis of alternatives - Stand up a program office - Continue concept generation and acquisition strategy development</p> <p><b>FY 2017 OCO Plans:</b> N/A</p>	0.000	0.150	7.921	0.000	7.921
<b>Accomplishments/Planned Programs Subtotals</b>	24.963	76.760	30.948	0.000	30.948

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

<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017</u> <u>Base</u>	<u>FY 2017</u> <u>OCO</u>	<u>FY 2017</u> <u>Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF: BA05: Line Item # E00400: <i>E-4B Nat Airborne Ops Center (NAOC)</i>	17.091	19.237	53.348	0.000	53.348	32.810	40.266	41.086	41.844	Continuing	Continuing
• APAF: BA05: Line Item # 833140: <i>Worldwide Joint Strategic Communication</i>	0.692	0.700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-
• APAF: BA06: Line Item # 000999: <i>Initial Spares/Repair Parts</i>	3.426	0.000	5.338	0.000	5.338	3.549	4.298	0.335	0.342	Continuing	Continuing

**Remarks**

**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.

Management Strategy: Program management for all aircraft modifications is executed by 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 a initial risk reduction study contract followed by a development contract. Production installations and sustainment are typically accomplished with a separate contract.

**F. Performance Metrics**

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: PB 2017 Air Force												Date: February 2016				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)							
3600 / 7				PE 0302015F / E-4B National Airborne Operations Center (NAOC)					674777 / E-4B Aircraft Modernization							
<b>Product Development (\$ in Millions)</b>				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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 : TBD	-	1.679	Aug 2015	0.810	Oct 2015	0.000		0.000		0.000	Continuing	Continuing	2.489	
AEHF Compatible Terminal Development	C/CPFF	TBD : TBD	-	0.000		23.800	Mar 2016	5.033	Jul 2017	0.000		5.033	Continuing	Continuing	32.000	
LFTS Replacement	SS/CPIF	Boeing, OKC : OKC, OK	-	23.284	Mar 2015	51.600	Apr 2016	17.594	Oct 2016	0.000		17.594	Continuing	Continuing	124.000	
E-4B Recapitalization	TBD	TBD : TBD	-	0.000		0.150	Sep 2016	7.921	Apr 2017	0.000		7.921	Continuing	Continuing	TBD	
<b>Subtotal</b>			-	24.963		76.360		30.548		0.000		30.548	-	-	-	
<b>Support (\$ in Millions)</b>				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	
<b>Subtotal</b>			-	-		-		-		-		-	-	-	-	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	
<b>Subtotal</b>			-	-		-		-		-		-	-	-	-	
<b>Management Services (\$ in Millions)</b>				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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	-	0.000		0.400	Dec 2015	0.400	Dec 2016	0.000		0.400	Continuing	Continuing	TBD	
<b>Subtotal</b>			-	0.000		0.400		0.400		0.000		0.400	-	-	-	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2017 Air Force</b>								<b>Date:</b> February 2016		
<b>Appropriation/Budget Activity</b> 3600 / 7				<b>R-1 Program Element (Number/Name)</b> PE 0302015F / E-4B National Airborne Operations Center (NAOC)			<b>Project (Number/Name)</b> 674777 / E-4B Aircraft Modernization			
	<b>Prior Years</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017 Base</b>	<b>FY 2017 OCO</b>	<b>FY 2017 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>	-	24.963	76.760	30.948	0.000	30.948	-	-	-	

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2017 Air Force		<b>Date:</b> February 2016
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0302015F / E-4B National Airborne Operations Center (NAOC)	<b>Project (Number/Name)</b> 674777 / E-4B Aircraft Modernization

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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 MDD			██																									
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 Milestone Decision C													██															
AEHF Compatible Terminal/PNVC Production													████████████████████															
AEHF Compatible Terminal/PNVC IOC																	██											
LFTS Modification Design and Development	████████████████████																											
LFTS Milestone Decision B		██																										
LFTS Modification PDR					██																							
LFTS Modification CDR					██																							
LFTS Modification Integration and Testing									████████████████████																			
LFTS Modification Milestone Decision C									██																			
LFTS Production									████████████████████																			
LFTS Modification IOC													██															
LFTS Modification FOC																					██							
E-4B Recapitalization					████████████████████																							

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2017 Air Force		<b>Date:</b> February 2016
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0302015F / E-4B National Airborne Operations Center (NAOC)	<b>Project (Number/Name)</b> 674777 / E-4B Aircraft Modernization

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AEHF Compatible Terminal/PNVC Risk Reduction	1	2015	2	2016
AEHF Compatible Terminal/PNVC MDD	3	2015	3	2015
AEHF Compatible Terminal/PNVC Integration	2	2016	1	2019
AEHF Compatible Terminal/PNVC Milestone Decision B	2	2016	2	2016
AEHF Compatible Terminal/PNVC PDR	1	2017	1	2017
AEHF Compatible Terminal/PNVC CDR	3	2017	3	2017
AEHF Compatible Terminal/PNVC Milestone Decision C	2	2018	2	2018
AEHF Compatible Terminal/PNVC Production	2	2018	4	2021
AEHF Compatible Terminal/PNVC IOC	1	2020	1	2020
LFTS Modification Design and Development	1	2015	4	2016
LFTS Milestone Decision B	2	2015	2	2015
LFTS Modification PDR	1	2016	1	2016
LFTS Modification CDR	3	2016	3	2016
LFTS Modification Integration and Testing	1	2017	1	2018
LFTS Modification Milestone Decision C	1	2017	1	2017
LFTS Production	1	2017	1	2021
LFTS Modification IOC	1	2019	1	2019
LFTS Modification FOC	1	2021	1	2021
E-4B Recapitalization	4	2016	4	2021

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