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Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Air Force **DATE:** April 2013

APPROPRIATION/BUDGET ACTIVITY 3600: <i>Research, Development, Test & Evaluation, Air Force</i> BA 7: <i>Operational Systems Development</i>	R-1 ITEM NOMENCLATURE PE 0302015F: <i>E-4B National Airborne Operations Center (NAOC)</i>
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COST (\$ in Millions)	All Prior Years	FY 2012	FY 2013 [#]	FY 2014 Base	FY 2014 OCO ^{##}	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
Total Program Element	-	5.101	4.159	18.267	-	18.267	11.138	2.720	1.772	1.805	Continuing	Continuing
674777: <i>E-4B Aircraft Modernization</i>	-	5.101	4.159	18.267	-	18.267	11.138	2.720	1.772	1.805	Continuing	Continuing
Quantity of RDT&E Articles		0	0	0		0	0	0	0	0		

[#] FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

^{##} The FY 2014 OCO Request will be submitted at a later date

Note

In FY 2014, PE 0302015F, E-4B National Airborne Operations Center includes new start efforts.

A. Mission Description and Budget Item Justification

The four aircraft E-4B National Airborne Operations Center (NAOC) fleet satisfies the military need for an airborne operations center with communications capabilities that permit military and civilian leadership to monitor and control military and civil national assets during all phases of nuclear and non-nuclear conflict 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 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), and the related aircraft operations center facilities, equipment, and communications necessary for the E-4B fleet to execute its mission. Additionally, funds may be used to explore 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 Super High Frequency Multiplexor (SHF MUX) effort integrates an upgraded, and logistically supportable, MUX to replace the obsolete legacy solution. The legacy SHF MUX is prone to intermittent disconnects and poor performance. The updated device will allow the E-4B to efficiently combine secure and non-secure digital data streams via satellite.

- The Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) efforts upgrade the air traffic communications systems to improve navigation and instrument approach capabilities. These efforts are necessary to maintain air worthiness certifications for the E-4B platform. CNS/ATM is an incremental program, and this effort will specifically address:

- Automatic Dependent Surveillance - Broadcast Out (ADS-B Out) capability
- Mode 5 Identification Friend or Foe (IFF) capability
- Multi-Mode Receiver for Global Positioning System (GPS) Precision Instrument Approaches
- Updates to the obsolete Flight Management Computer (FMC)

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- The SHF Modernization program updates system to meet immediate needs, and eventual replacement of the SHF System. Upgrade of the current SHF system is required in the near-term to replace the most critically obsolete components to ensure that the system remains operable and logistically supportable until a replacement system is fielded. A replacement to the SHF system is required as secure, survivable communications capability transitions from the Defense Satellite Communications System (DSCS). - The Advanced Extremely High Frequency (AEHF) Compatible Terminal/ Presidential National Voice Conferencing (PNVC) Program integrates externally provided 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 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 will replace the current Very Low Frequency/Low Frequency (VLF/LF) Transmit system that is on the E-4B. The current system has been on the E-4B for over 35 years and is past its useful life. This system must be replaced in order to meet existing National Security Presidential Directive (NSPD)-28 requirements and ensure there is constant and consistent connectivity to National Leaders and Forces in real world situations. The transmit system consists of three primary equipment groups: a Receiver/Transmitter group, a Power Amplifier-Coupler (PA-C) group, and a Trailing Wire Antenna (TWA) group. - The Secure Data Crypto modification replaces various E-4B cryptographic systems currently scheduled to be decertified by the National Security Agency (NSA). This modification ensures the continued transmission and receipt of critical strategic force orders. Funds for this modification will be used to design an engineering solution, develop compatible software, and conduct pre-production studies for integration of NSA approved and Internet Protocol Version 6 (IPv6) compliant secure data cryptographic devices and associated peripherals on the aircraft. Activities also include studies and analysis to support both current program planning, execution, and future program planning. This program is in Budget Activity 7, Operational System Development, these budget activities include development efforts to upgrade systems currently fielded or has approval for full rate production and anticipate production funding in the current or subsequent fiscal year.		

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B. Program Change Summary (\$ in Millions)		FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget		4.845	4.159	0.677	-	0.677
Current President's Budget		5.101	4.159	18.267	-	18.267
Total Adjustments		0.256	0.000	17.590	-	17.590
• Congressional General Reductions		-	0.000			
• Congressional Directed Reductions		-	0.000			
• Congressional Rescissions		0.000	0.000			
• Congressional Adds		-	0.000			
• Congressional Directed Transfers		-	0.000			
• Reprogrammings		0.256	0.000			
• SBIR/STTR Transfer		0.000	0.000			
• Other Adjustments		0.000	0.000	17.590	-	17.590
Change Summary Explanation FY14 \$17.590M increase due to design and engineering work required to start up LFTS Replacement effort.						
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2012	FY 2013	FY 2014
Title: SHF MUX				0.068	0.000	0.000
Description: Develops, installs, and tests a more capable and logistically supportable SHF MUX.						
FY 2012 Accomplishments: FY12 funds supported design, prototype and initial install of a E-4B specific SHF MUX replacement kit.						
FY 2013 Plans: Program FY13 activities executed under P-1 Line Item EOO400 E-4.						
FY 2014 Plans: No FY14 RDT&E activities planned for SHF MUX.						
Title: CNS/ATM				0.300	0.000	0.000
Description: Develops, installs, and tests a tailored E-4B installation kit to modernize applicable CNS/ATM systems to meet domestic and foreign air traffic management requirements.						
FY 2012 Accomplishments: Successful prototype, kit build, initial install and testing complete.						
FY 2013 Plans:						

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2012	FY 2013	FY 2014
Program FY13 activities executed under P-1 Line Item EOO400 E-4.				
FY 2014 Plans: No FY14 RDT&E activities planned for CNS/ATM.				
Title: SHF Modernization Description: Develops, installs, and tests E-4B prototype installation kit for replacement of critically obsolete components of legacy SHF System. FY 2012 Accomplishments: Successfully installed capability on the first aircraft of the E-4B NAOC fleet. FY 2013 Plans: Program FY13 activities executed under P-1 Line Item EOO400 E-4. FY 2014 Plans: No FY14 RDT&E activities planned for SHF Modernization.		3.177	0.000	0.000
Title: AEHF Compatible Terminal/PNVC Description: Integrate AEHF Compatible Terminal/PNVC capability onto the E-4B NAOC Platform, to replace the existing MILSTAR SECN system. FY 2012 Accomplishments: No FY12 RDT&E activities planned for AEHF Compatible Terminal/PNVC. FY 2013 Plans: Supports communication with Family of Advanced Beyond Line-of-Sight Terminals (FAB-T) program office to coordinate on terminal delivery schedule and technical expectations. Terminal delivery anticipated in FY16, and FY13 funds support significant engineering planning activities required to integrate the FAB-T capability onto the E-4B NAOC. FY 2014 Plans: Continues E-4B Program Office engineering activities necesasry for the integration of the AEHF Terminal/PNVC Capability onto an airborne platform. Specifically, activities will address technical issues associated with a change in antenna location from the kit design, a modified power amplifier to accomodate the change in antenna location and fire supression system required to install the capability on the platform.		0.000	3.859	0.677
Title: Low Frequency Transmit System (LFTS)		0.000	0.000	17.290

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2012	FY 2013	FY 2014
Description: NAOC's legacy (VLF/LF) system was built in the late 1970's timeframe, and faces extreme obsolescence issues. The LFTS program will replace the obsolete system, with a modern airborne LF transmit system. This system must be replaced in order to meet existing NSPD-28 requirements. FY 2012 Accomplishments: No FY12 RDT&E activities planned for LFTS. FY 2013 Plans: No FY13 RDT&E activities planned for LFTS. FY 2014 Plans: Supports program startup activities (development of acquisition lifecycle documentation, source selection, etc.), early engineering (refined solution analysis, legacy system removal, etc.), development, prototyping, testing, and evaluation activities. This effort is a new start in FY 2014.				
Title: Secure Data Crypto Description: Produce tailored E-4B kit to integrate updated National Security Agency (NSA) developed crypto solution. FY 2012 Accomplishments: Kit purchase on contract, with anticipated delivery in late FY13 timeframe. FY 2013 Plans: Program FY13 activities executed under P-1 Line Item EOO400 E-4. FY 2014 Plans: No FY14 RDT&E activities planned for Secure Data Crypto.		1.000	0.000	0.000
Title: Program Management Administration Description: Supports activities required to field and install new and developing capabilities. These include, but are not limited to: travel, studies, analysis, planning, etc. FY 2012 Accomplishments: Funding was for program support activities required to support the fielding and installation of new and developing capabilities. This included operational testing, technical interchange meetings and events incident to fielding both hardware and software products. FY 2013 Plans:		0.300	0.300	0.300

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2012	FY 2013	FY 2014
Supports program activities required to support fielding and installation of new and developing capabilities.			
FY 2014 Plans: Supports Program activities required for fielding and installation of new and developing capabilities.			
Title: Nuclear Command, Control, & Communications (NC3) Blue Team Studies Description: Federally Funded Research and Development Centers (FFRDC) support for actions items stemming from multiple recent NC3 study determinations. Specifics of the deliverables and study topics are classified.	0.256	0.000	0.000
FY 2012 Accomplishments: FFRDC support for actions items stemming from multiple recent NC3 study determinations.			
Accomplishments/Planned Programs Subtotals	5.101	4.159	18.267

D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
• APAF: BA05: Line Item # E00400: <i>E-4B Nat Airborne Ops Center (NAOC)</i>	57.116	46.941	13.618		13.618	25.859	38.376	36.737	37.093	Continuing	Continuing
• APAF: BA05: Line Item # 833140: <i>Worldwide Joint Strategic Communication</i>	0.663	0.675	0.686		0.686	0.699	0.712	0.725	0.738	Continuing	Continuing
Remarks											
E. Acquisition Strategy Implementation of modifications will be contracted under the sole source Product Support Integration (PSI) with Boeing - Wichita.											
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 2014 Air Force												DATE: April 2013			
APPROPRIATION/BUDGET ACTIVITY						R-1 ITEM NOMENCLATURE				PROJECT					
3600: Research, Development, Test & Evaluation, Air Force BA 7: Operational Systems Development						PE 0302015F: E-4B National Airborne Operations Center (NAOC)				674777: E-4B Aircraft Modernization					
Product Development (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Secure Data Crypto	SS/CPIF	Boeing, Wichita Development & Modification Center:Wichita, KS	-	0.950	Feb 2012	0.000		0.000		-		0.000	0.000	0.950	0.950
SHF MUX Upgrade Development and Integration	SS/CPIF	Boeing, Wichita Development & Modification Center:Wichita, KS	-	0.065	Jan 2012	0.000		0.000		-		0.000	0.000	0.065	1.289
CNS/ATM Development and Integration	SS/CPIF	Boeing, Wichita Development & Modification Center:Wichita, KS	-	0.285	Feb 2012	0.000		0.000		-		0.000	0.000	0.285	13.890
SHF Modernization Development and Integration	SS/CPIF	Boeing, Wichita Development & Modification Center:Wichita, KS	-	2.968	Mar 2012	0.000		0.000		-		0.000	0.000	2.968	11.177
Nuclear Command, Control, & Communications (NC3) Blue Team Studies	MIPR	MITRE:Bedford, MA	-	0.256	May 2012	0.000		0.000		-		0.000	Continuing	Continuing	
AEHF Compatible Terminal/PNVC	SS/CPIF	Boeing, Wichita Development & Modification Center:Wichita, KS	-	0.000		3.264	Mar 2013	0.677	May 2014	-		0.677	Continuing	Continuing	TBD
LFTS Replacement	TBD	TBD:TBD, NA	-	0.000		0.000		15.853	May 2014	-		15.853	Continuing	Continuing	TBD
Subtotal			0.000	4.524		3.264		16.530		0.000		16.530			
Support (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All 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			0.000	0.000		0.000		0.000		0.000		0.000	0.000	0.000	0.000

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Test and Evaluation (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
E-4B Post-Modification Testing	SS/CPIF	Boeing Wichita Development & Modification Center:Wichita, KS	-	0.277	Jan 2012	0.745	Mar 2013	0.685	Jun 2014	-		0.685	Continuing	Continuing	TBD
Subtotal			0.000	0.277		0.745		0.685		0.000		0.685			
Management Services (\$ in Millions)				FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
E-4B Non-Contract PMA Costs	Various	N/A:N/A, OK	-	0.300	Oct 2011	0.150	Oct 2012	1.052	Dec 2013	-		1.052	Continuing	Continuing	TBD
Subtotal			0.000	0.300		0.150		1.052		0.000		1.052			
			All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	5.101		4.159		18.267		0.000		18.267			
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2014 Air Force

DATE: April 2013

APPROPRIATION/BUDGET ACTIVITY

3600: Research, Development, Test & Evaluation, Air Force
BA 7: Operational Systems Development

R-1 ITEM NOMENCLATURE

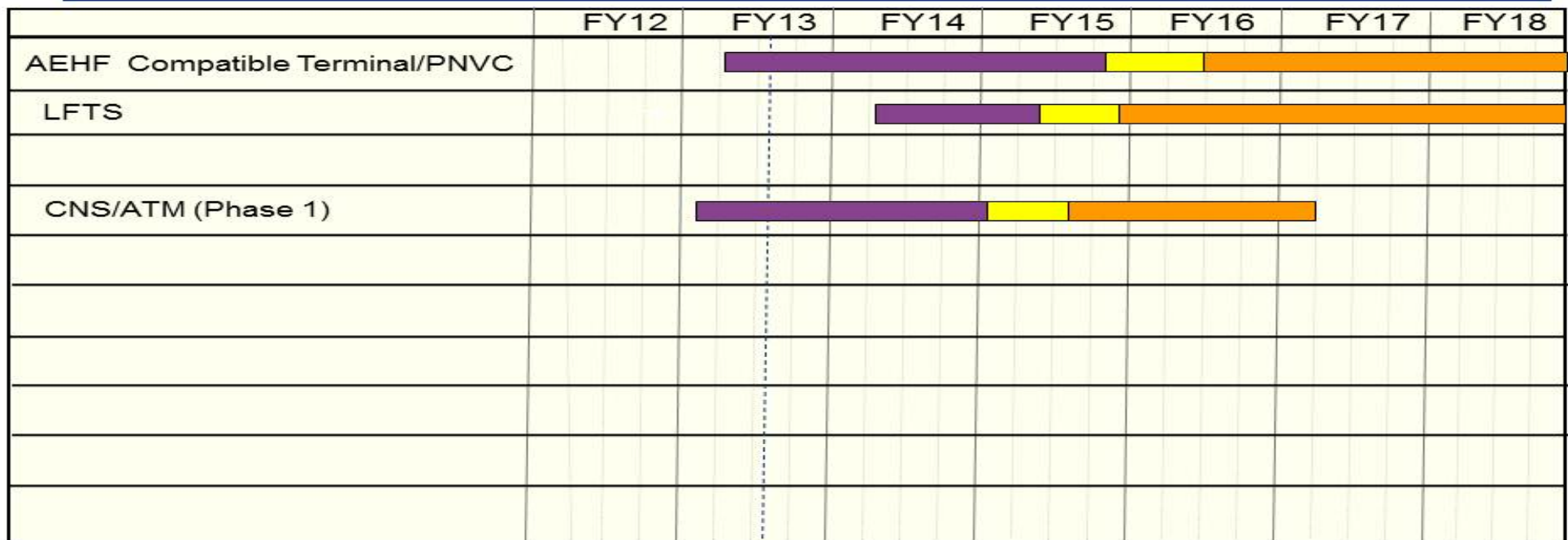
PE 0302015F: E-4B National Airborne
Operations Center (NAOC)

PROJECT

674777: E-4B Aircraft Modernization



E-4B NAOC Modification Schedule



[Blue box] Concept activities
[Orange box] Production / fielding

Time now
[Purple box] Design / development
[Green box] Operations / sustainment

[Yellow box] Integration / test
△◇ Key events

FY14 Staffer Brief

* Average procurement lead time ~ 6 months ¹

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Exhibit R-4A, RDT&E Schedule Details: PB 2014 Air Force			DATE: April 2013
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
AEHF Compatible Terminal/PNVC Design and Development	1	2013	4	2014
AEHF Compatible Terminal/PNVC Production and Integration	3	2013	2	2015
LFTS Modification Design and Development	1	2014	4	2015
LFTS Modification Production and Integration	1	2015	4	2018
CNS/ATM Phase 1 (Phase I)	1	2013	2	2017