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

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 0101126F / B-1B Squadrons
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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	-	4.208	2.245	5.830	0.000	5.830	17.932	35.734	0.000	0.000	Continuing	Continuing
675344: <i>B-1B Modernization</i>	-	4.208	2.245	5.830	0.000	5.830	17.932	35.734	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Note

This program, BA 07 PE 0101126F, project 675344, B-1B Global Positioning System (GPS) Military-Code (M-Code), is a new start.

A. Mission Description and Budget Item Justification

The B-1B Lancer is a swing-wing, supersonic, long-range, conventional bomber. It carries the largest payload of both guided and unguided weapons in the United States Air Force inventory. The multi-mission B-1B is the backbone of America's long-range conventional bomber force and can rapidly deliver massive quantities of precision and non-precision weapons against any adversary, anywhere in the world, at any time. The current service life extends beyond 2040.

The B-1B modernization projects alleviate aircraft obsolescence issues due to Diminishing Manufacturing Sources (DMS) while at the same time providing improved capabilities to the B-1B weapon system that require significant hardware and software development and testing.

GLOBAL POSITIONING SYSTEM (GPS) MILITARY-CODE (M-CODE)

This project will integrate a military GPS receiver delivering improved capabilities to allow for accurate and reliable positioning, navigation, and timing for B-1 primary flight instrumentation, navigation, radar, weapon, and communication systems where current receiver performance might be compromised or unavailable. M-Code has a higher-power signal offering better resistance to jamming and interference; advanced security features to prevent unauthorized access or exploitation by adversaries; and improved message formats and signal modulation techniques for faster and more accurate performance.

INTEGRATED BATTLE STATION (IBS) SIMULATOR DEVELOPMENT

B-1B training systems upgrades (both flight and maintenance simulators/trainers) provide required training assets for the aircraft Central Integrated Test System (CITS), Fully Integrated Data Link (FIDL), and Vertical Situational Display Upgrade (VSDU) modernization projects. These upgrades are required to bring the simulators up to the same configuration of the modernized aircraft. The B-1B training system provides the warfighter with a fully integrated, cost effective, high fidelity training capability in flight operations, weapons employment, and maintenance of the B-1B weapon system.

FLIGHT TEST AIRCRAFT UPGRADES

Upgrades to the B-1B flight test aircraft are included in the modernization projects to keep the test flight systems current. RDT&E funded test jets are currently configured with Engineering and Manufacturing Development (EMD) Line Replaceable Units (LRUs) for CITS, FIDL and VSDU. Replacement of the EMD LRUs is required to bring two flight test aircraft to fleet representative configuration. Maintenance and logistic support from the manufacturer is required until the Air Force supply chain is established. Replacement of the LRUs will ensure maximum supportability, maintainability, and reliability for continued and future flight tests.

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GAP & INTEGRATION ANALYSIS

Additionally, program funds cover engineering/planning studies, related engineering efforts, and auxiliary equipment needed for development projects that have not yet fielded. Cost includes Program Management Administrative (PMA) costs and initiatives for anticipated weapon system enhancements, including efforts to improve weapon system operational capabilities, safety, supportability, maintainability, reliability, and total ownership cost. All B-1B development projects support planned requirements for unique identification in their production phases.

The FY2017 funding request was reduced by $-\$0.451$ 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. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	4.353	2.245	2.990	0.000	2.990
Current President's Budget	4.208	2.245	5.830	0.000	5.830
Total Adjustments	-0.145	0.000	2.840	0.000	2.840
• 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	-0.145	0.000			
• Other Adjustments	0.000	0.000	2.840	0.000	2.840

Change Summary Explanation

FY2017: Program increased by \$2.840M for B-1B Modernization of Global Positioning System (GPS) Military Code (M-Code) new start effort.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: B-1B Global Positioning System (GPS) Military-Code (M-Code)	0.000	0.000	5.830	0.000	5.830
Description: Aircraft RDT&E efforts include modernization of the Global Positioning System (GPS) Military Code (M-Code). This effort will integrate a military GPS receiver delivering improved capabilities to allow for accurate and reliable positioning, navigation, and timing for B-1 primary flight instrumentation, navigation, radar, weapon, and communication systems where current receiver performance might be compromised or unavailable. M-Code has a higher-power signal offering better resistance to jamming and interference;					

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
<p>advanced security features to prevent unauthorized access or exploitation by adversaries; and improved message formats and signal modulation technique for faster and more accurate performance. This is a New Start effort in FY2017.</p> <p>FY 2015 Accomplishments: N/A</p> <p>FY 2016 Plans: N/A</p> <p>FY 2017 Base Plans: Conduct acquisition planning, risk assessments, and other pre-EMD activities. Begin Engineering and Manufacturing Development efforts.</p> <p>FY 2017 OCO Plans: N/A</p>					
<p>Title: B-1B IBS Simulator Development</p> <p>Description: B-1B Integrated Battle Station (IBS) simulator development is the upgrade to existing training systems (both flight and maintenance) to simulate IBS configuration. IBS is the combined production phase of Central Integrated Test Systems (CITS), Fully Integrated Data Link (FIDL), and Vertical Situation Display Upgrade (VSDU) development efforts.</p> <p>FY 2015 Accomplishments: Simulator and training upgrades completed software and hardware development with integration and testing to support fielding of CITS, FIDL, and VSDU. Development activities concluded.</p> <p>FY 2016 Plans: N/A</p> <p>FY 2017 Base Plans: N/A</p> <p>FY 2017 OCO Plans: N/A</p>	0.832	0.000	0.000	0.000	0.000
<p>Title: B-1B Flight Test Upgrades</p>	3.376	0.000	0.000	0.000	0.000

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
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<p>Description: B-1B Flight Test Upgrades modifies the two flight test aircraft at Edwards AFB to the production IBS configuration; the EMD Line Replacement Units (LRUs) that are currently on the aircraft will be removed and replaced with production units.</p> <p>FY 2015 Accomplishments: Flight Test Upgrades funded the engineering technical support and analysis for CITS, FIDL, and VSDU EMD LRUs on the RDT&E funded test jets. Flight Test Upgrades completed installation of CITS, FIDL and VSDU production kits to include wiring modifications to fully integrate the production LRUs on both Test Aircraft.</p> <p>FY 2016 Plans: N/A</p> <p>FY 2017 Base Plans: N/A</p> <p>FY 2017 OCO Plans: N/A</p>					
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<p>Title: Gap & Integration Analysis</p> <p>Description: Funds will be used for studies to facilitate new capabilities and enhancements to improve operational aircraft safety, supportability, maintainability, reliability and total ownership cost. Conduct engineering studies that will involve a gap and integration analysis for replacing existing Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT (1)) with the MIDS-Joint Tactical Radio System Terminal (MIDS-JTRS); upgrade of the current Global Positioning System/Inertial Navigation System (INS) with the required new military M-Code standard and Radio Crypto Compliance to replace two legacy radios with Air Radio Communication (ARC-210 RT-2036) radio with embedded programmable crypto to meet National Security Agency crypto modernization requirements.</p> <p>FY 2015 Accomplishments: N/A</p> <p>FY 2016 Plans: Engineering studies will be conducted to include a gap and integration analysis for replacing existing Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT (1)) with the MIDS-Joint Tactical Radio System Terminal (MIDS-JTRS); upgrade of the current Global Positioning System/Inertial</p>	0.000	2.245	0.000	0.000	0.000
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Navigation System (INS) with the required new Military M-Code standard and Radio Crypto Compliance to replace two legacy radios to meet National Security Agency crypto modernization requirements. FY 2017 Base Plans: N/A FY 2017 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	4.208	2.245	5.830	0.000	5.830

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF: BA05: Line Item # B01B00: <i>Training Support to Units, Mods PE 0809731F</i>	0.427	0.434	0.438	0.000	0.438	0.447	0.454	0.462	0.471	-	-
• APAF: BA05: Line Item # B01B00: <i>Bomber Tactical Data Link Mods PE 0207446F</i>	0.223	1.011	1.380	0.000	1.380	0.535	0.794	0.000	0.000	-	-
• APAF: BA05: Line Item # B01B00: <i>B-1B Squadrons, Mods</i>	206.919	112.674	114.501	0.000	114.501	96.809	92.153	35.089	69.243	-	-
• APAF: BA05: Line Item # B01B00 S...: <i>B-1B Squadrons, Spares</i>	13.093	16.543	7.429	0.000	7.429	4.494	3.442	0.000	0.000	-	-

Remarks
 (U) Program Element 0809731F, Training Support to Units, Mods
 (U) Program Element 0207446F, Bomber Tactical Data Link, Mods

E. Acquisition Strategy
 The Global Positioning (GPS) System Military Code (M-Code) acquisition strategy will consist of three years EMD and three years production. The EMD portion is anticipated to consist of two Cost Plus Fixed Fee (CPFF) sole source contracts, one for the integration of the GPS receiver card into the Line Replaceable Units (LRUs) and one for the integration of the LRU into the Aircraft.

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The acquisition strategy for gap and integration analysis is anticipated be one Cost Plus Fixed Fee (CPFF) and one Firm Fixed Price (FFP) sole source contract to Boeing.

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 3600 / 7	R-1 Program Element (Number/Name) PE 0101126F / B-1B Squadrons	Project (Number/Name) 675344 / B-1B Modernization
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Product Development (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
B-1B Global Positioning System (GPS) Military Code (M-Code)	SS/CPFF	Boeing/Honeywell : OKC, OK	-	0.000		0.000		5.805	Mar 2017	0.000		5.805	Continuing	Continuing	-
B-1B IBS Simulator Development (CITS FIDL VSDU)	C/FPIF	AAI : Goose Creek, SC	-	0.711	Nov 2015	0.000		0.000		0.000		0.000	0.000	0.711	-
B-1B Flight Test Aircraft Upgrades	SS/CPFF	Boeing : OKC, OK	-	3.040	Nov 2015	0.000		0.000		0.000		0.000	0.000	3.040	-
Subtotal			-	3.751		0.000		5.805		0.000		5.805	-	-	-

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Gap And Integration Analysis	SS/ Various	Boeing : OKC, OK	-	0.323	Mar 2016	2.220	Mar 2016	0.000		0.000		0.000	0.000	2.543	-
Subtotal			-	0.323		2.220		0.000		0.000		0.000	0.000	2.543	-

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Subtotal			-	-		-		-		-		-	-	-	-

Management Services (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
A AS	Various	Various : Various	-	0.098		0.000		0.000		0.000		0.000	Continuing	Continuing	-
PMA	Various	Various : Various	-	0.036	Oct 2014	0.025	Jan 2016	0.025	Mar 2017	0.000		0.025	Continuing	Continuing	-
Subtotal			-	0.134		0.025		0.025		0.000		0.025	-	-	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2017 Air Force **Date:** February 2016

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	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

Self Contained Attitude Indicator (SCAI) Contract Award (January)																												
Self Contained Attitude Indicator (SCAI) PDR/ CDR (Sep)																												
Self Contained Attitude Indicator (SCAI) Flight Test																												
Self Contained Attitude Indicator (SCAI) MS C Decision																												
Global Positioning System (GPS) Military Code (M-Code) Contract Award																												
GPS M-Code EMD																												
Simulator Upgrades for CITS/FIDL/VSDU Contract Activities Conclude																												
Flight Test Aircraft Upgrades Deliveries																												
Flight Test Aircraft Upgrades Installs																												
Gap Analysis and Integration Contract Award																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force **Date:** February 2016

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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Self Contained Attitude Indicator (SCAI) Contract Award (January)	2	2015	2	2015
Self Contained Attitude Indicator (SCAI) PDR/CDR (Sep)	4	2015	4	2015
Self Contained Attitude Indicator (SCAI) Flight Test	3	2016	3	2016
Self Contained Attitude Indicator (SCAI) MS C Decision	3	2016	3	2016
Global Positioning System (GPS) Military Code (M-Code) Contract Award	2	2017	2	2017
GPS M-Code EMD	2	2017	4	2019
Simulator Upgrades for CITS/FIDL/VSDU Contract Activities Conclude	2	2016	2	2016
Flight Test Aircraft Upgrades Deliveries	2	2016	4	2016
Flight Test Aircraft Upgrades Installs	2	2016	4	2016
Gap Analysis and Integration Contract Award	3	2016	3	2016