Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force												Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0101127F / *B-2 SQUADRONS*							
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	38.203	29.805	87.810	131.580	-	131.580	81.904	54.923	32.072	32.683	Continuing	Continuing
675345: *B-2 Modernization*	0.000	13.043	73.474	111.909	-	111.909	68.252	41.017	17.894	18.236	Continuing	Continuing
676021: *BASELINE SUPPORT*	0.000	13.607	14.336	19.671	-	19.671	13.652	13.906	14.178	14.447	Continuing	Continuing
676022: *EHF SATCOM and Computer*	38.203	3.155	-	-	-	-	-	-	-	-	-	41.358
MDAP/MAIS Code: 224												

The FY 2015 OCO Request will be submitted at a later date.

Note

Because B-2 EHF Increment 1 changed BPACs twice and was originated in a different Program Element, prior year and total amounts for Project 676022 give a misleading summary of development cost. EHF Increment 1 development funding is $415M, as detailed below:

$275M in PE 0604240F Project 653843 in years FY05 - FY09
$ 98M in PE 0101127F Project 675345 in years FY10 -FY11
$ 39M in PE 0101127F Project 676022 in FY12
$ 3M in PE 0101127F Project 676022 in FY13

$415M total development costs for B-2 EHF Increment 1.

EHF Increment 2 program funding was removed in the FY13 PB.

A. Mission Description and Budget Item Justification

The B-2 Spirit is the world's most advanced long-range strike asset. The unique combination of range, precision, payload, and ability to operate in anti-access area denial environments allow the B-2 to identify, locate, target, and destroy the highest value enemy targets. The B-2 can, with necessary upgrades, accomplish its mission regardless of location, return to base safely, and permit freedom of movement for follow-on forces, including other long range strike platforms. An array of planned RDT&E projects are necessary to preserve a strategic advantage against 21st century threats as well as increase flexibility, lethality, and survivability of this national asset tasked across a broad spectrum of tactical and national strategic objectives. B-2 will achieve these objectives by adapting mature technologies/systems in the fleet to rapidly deliver affordable and relevant combat capability, leveraging other Department of Defense investments and programs utilizing innovative acquisition strategies.

The B-2 has a projected service life through 2058. To ensure the fleet can accomplish its nuclear and conventional mission in highly defended and anti-access environments, periodic modernization efforts must be undertaken to upgrade combat capability as well as improve the viability, supportability, and survivability of the

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force	Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*

weapon system. Recent and ongoing investments in avionics, structures, communications, and weapons upgrades keep the B-2 viable in the immediate future. Current system upgrades include Defensive Management System Modernization, Extremely High Frequency Satellite Communications (SATCOM) and Computers Increments 1, alternative communication solutions such as Common Very Low Frequency Receiver and Adaptable Communications Suite, Massive Ordnance Penetrator integration and modernization of Global Positioning System hardware and signal enhancement, Joint Air-to-Surface Standoff missile-Extended Range integration, Flexible Strike Phase 1, Link-16 Center Instrument Display/In-Flight Replanner, Low Observable Signature and Supportability Modifications, Aircraft Supportability Modifications, Training System Upgrades, Mission Planning System improvements, flight test aircraft upgrades and base of operations support, Advanced Low Detection Data Link studies, other weapons integration and engine improvements, as well as B-2 platform studies and acquisition planning.

B-2 modernization of weapons carriage and armament interfaces, communications, navigation, avionics, and supportability efforts will establish an improved foundation for Moving Target Kill and Non-Traditional Surveillance and Reconnaissance combat capabilities necessary to ensure air superiority in 21st century nuclear and conventional combat environments. Flexible Strike Phase 2 efforts will modify Stores Management hardware and software necessary to accommodate integration of updated conventional and nuclear System 2 weapons into the B-2 fleet. It will provide for mixed carriage of an assortment of weapons on the B-2, providing any combination of weapons in both B-2 weapons bays. B-2 will have the capability to carry a fully loaded conventional Rotary Launcher Assembly along with a fully loaded Smart Bomb Rack Assembly or a Monitor and Control Assembly with Massive Ordnance Penetrator weapon on a single B-2 aircraft, providing unprecedented capability to destroy a wider array of target sets. Other efforts include: the development of a Universal Armament Interface, integrating multi-platform advanced data links with high bandwidth satellite communication links, integration of the Global Positioning System M-Code hardware and software necessary for modernization of Air Traffic Management communications/navigation/ surveillance systems, and enhancement of the Mode 5/S Identification Friend or Foe system with Automatic Dependence Surveillance-Broadcast capability mandated by US and European military and civil aviation agencies to improve situational awareness of controlled and contested airspaces. Finally, improvements are required on the B-2 data/voice/video recorders to comply with Air Force Safety Board mandates to provide specific flight and aircraft data, frequency of update, data precision, and recording duration that do not exist in the B-2 recorders today.

After the above modifications are implemented, the B-2 fleet will be poised to deliver a Moving Target Kill combat capability, forming a foundation to exploit the modularity and improved precision algorithms of Universal Armament Interface. The inherent low observable characteristics of the B-2 will enable accomplishment of a Non-Traditional Surveillance and Reconnaissance mission. Necessary modifications include, but are not limited to, enhancement of current radar modes, high resolution improvements to the synthetic aperture radar, and improved information fusion required to gather, analyze, and communicate enemy movements and combat capabilities to friendly follow-on forces, the National Command Authority, and other operation centers via the Global Information Grid.

In FY13, Defensive Management System Modernization transfered to PE 65931F, project 653844.

This program is in Budget Activity 7, Operational System Development, because this budget activity includes developmental 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force					Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*		R-1 Program Element (Number/Name) PE 0101127F / *B-2 SQUADRONS*			
B. Program Change Summary ($ in Millions)	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO**	**FY 2015 Total**
Previous President's Budget	35.970	100.194	128.597	-	128.597
Current President's Budget	29.805	87.810	131.580	-	131.580
Total Adjustments	-6.165	-12.384	2.983	-	2.983
• Congressional General Reductions	-0.048	-			
• Congressional Directed Reductions	-	-12.384			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-5.015	-			
• SBIR/STTR Transfer	-1.102	-			
• Other Adjustments	-	-	2.983	-	2.983

Change Summary Explanation

FY2013 reduction of -$1.102M for Small Business Innovative Research (SBIR) and -$5.015M for higher Air Force priorities.
FY2014 change: -$12.384M Common VLF Receiver Increment 1 contract delay

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / *B-2 SQUADRONS*	Project (Number/Name) 675345 / *B-2 Modernization*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
675345: *B-2 Modernization*	-	13.043	73.474	111.909	-	111.909	68.252	41.017	17.894	18.236	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

The B-2 is currently undergoing modernization of avionics/communications systems, engines, armament systems, low observable components, core training system components, aircraft supportability improvements, support equipment development, as well as studying future Integrated Strike Warfare and Advanced Tactical Data Link integration requirements.

Low Observable Signature and Supportability Modifications (LOSSM) and Aircraft Supportability Modifications (ASM) directly address B-2 aircraft availability, the primary stated B-2 user requirement. Given the extremely small fleet size (20 aircraft), mission accomplishment is particularly sensitive to the availability of this high-demand strategic asset. LOSSM projects increase aircraft availability, decrease low observable (LO) maintenance, and maintain and improve the combat-ready LO signature for the B-2 fleet ensuring survivable combat operations. LOSSM projects improve materials, structures, and diagnostic tools necessary to evaluate LO materials and systems in the B-2 fleet. LOSSM structure improvement projects include, but are not limited to, advanced high frequency materials placement, windshield bounce patch and tape improvements, composite plies, advanced signature reduction, and radome improvements. Material improvements include, but are not limited to, tailpipe and inlet coatings, pre-cured gap fillers, and other advanced LO materials development. Diagnostic tool efforts include, but are not limited to, improved radar frequency diagnostics, signature diagnostic system database upgrades, Tier One Material Inspection System improvements, Portable Laser Removal Tool development, Integrated Collections And Reporting System, Mobile Diagnostics Laboratory, Ground Air Radar System development, and other low observable special test equipment and information systems upgrades.

The Air Force will also study multiple structural, avionics, and engine modifications that could improve the performance of the aircraft and engines as well as reduce maintenance manhours and the logistics footprint of the fleet. Focus of the studies will be on non-mission capable (maintenance) drivers, safety issues, and obsolescence issues through modernization of key components in the airframe, avionics, and engines resulting in improved aircraft availability of a high demand/low density fleet. Potential structural and avionics modifications include, but are not limited to, B-2 Common Processor, Proximity Sensor Logic Unit, Generator Control Unit, Rudder Access Panel and Elevon Drain Hole upgrades, Cockpit Voice and Flight Data Recorder, Radomes, Audio Control Display Unit, Center Instrument Display improvements, Aft Deck Doublers, Center Instrument Display connection to the aircraft Digital Video Recorder, Multi-function Information Distribution System Power Transfer, Global Positioning System Splitter Cable, Airborne Integrated Terminal Crypto, and upgraded cryptological functionality of all B-2 communications systems as necessary. Engine improvements include, but are not limited to, the F118 engine Service Life Extension Program, Extended Mission Oil Tank, and the Next Generation Engine Core upgrade. Stage 1 and 3 engine fan blade improvements will reduce engine changes while increasing aircraft availability and reducing maintenance costs. Engine upgrades are necessary to maintain commonality with the F110 engine core and reduce maintenance and repair costs of divergent engine configurations.

Modern communications are key enablers for the B-2 in the Anti-Access/Area Denial battlespace, and directly enhance lethality and force multiplication. The Common Very Low Frequency (VLF) Receiver effort develops and integrates a receive-only very low bandwidth VLF receiver and antenna subsystem to provide a secure,

survivable strategic nuclear communication capability for the B-2. The receiver will be adaptable for use by other Department of Defense platforms. Secure, survivable two-way communications in an Anti-Access/Area Denial environment remains a requirement for the B-2, and the Air Force will study requirements and potential efforts which might address those requirements. The Adaptable Communications Suite provides a non-integrated communications system that allows B-2 to receive a complete integrated mission, time sensitive targeting information, intelligence updates, and positive command and control procedures while en route to a combat theater. Link-16 Center Instrument Display/In-Flight Replanner upgrade allows B-2 access to theater tactical data links, improving on-board situational awareness while greatly enhancing the ability of theater commanders to coordinate B-2 with other assets. Mode 5/S Identification Friend or Foe with Automatic Dependence Surveillance-Broadcast will provide improved situational awareness of controlled and contested airspaces in the United States and Europe.

B-2 Armament upgrades integrate new and/or advanced weapons on the B-2 to destroy a wider array of target sets, to include moving target sets, and hardened, deeply buried targets, as well as destroy more targets per sortie. Integration of the 30K pound Massive Ordnance Penetrator (MOP) provides the nation with the ability to hold additional hardened, deeply buried targets at risk that are currently unachievable with 5K pound penetrator munitions. The B-2 is the only anti-access area denial penetrating platform capable of carrying the MOP, a capability which meets Urgent Operational Need requirements. The MOP integration project designs, develops, integrates, and tests hardware, software, and support equipment required for carriage, jettison, and release of two MOP weapons from the B-2. The MOP integration effort also includes modernization of the Global Positioning Signal (GPS) antenna enabling an enhanced GPS signal to be routed into the weapon bays to allow Monitor and Control Equipment (MACE) weapons, Smart Bomb Rack Assembly (SBRA) weapons, and Rotary Launch Assembly (RLA) weapons to acquire and track GPS satellites prior to weapons release, maintaining unjammed delivery accuracy in a jamming environment. The MOP Quick Reaction Capability effort includes dual fuze control and single Smart Bomb Rack Controller per bay weapon control and monitor. The Flexible Strike Phase 1 program will recombine and rehost the current B-2 stores management software onto a new integrated processor; Flexible Strike Phase 2 will update other Operational Flight Plans and hardware to enable simultaneous configuration of multiple weapons carriage capabilities, providing B-2 with maximum strategic nuclear and conventional strike flexibility. Planned weapons integration efforts also include integration of currently fielded weapons and upgraded weapons such as, but not limited to, GBU-28 E/B Selective Availability Anti-Spoofing Module (SAASM) with impact angle control, GBU-28D/B SAASM with impact angle control, Hard Target Void Sensing Fuse, extended range Joint Air-to-Surface Standoff Missile, JDAM-5000, GBU 56, Long Range Standoff Missile, and Small Diameter Bomb II. The B-2 Weapons System Tester and its associated Test Program Sets (TPS), to include but not limited to, the Common Organizational Level Tester (COLT), MUSTANG, and B-2 Armament Tester, will be continually upgraded for increased reliability and performance to support current and new B-2 weapon suspension and release systems.

Peculiar support equipment development activities include design, development, test, and procurement of new peculiar support equipment, to include but not limited to, special test equipment for newly emerging test and support requirements of legacy B-2 capabilities and/or functionality. Development of new peculiar support equipment will support test and sustainment activities at the B-2 Weapon System Support Center Ground Test Facility, Program Depot Maintenance facility, Test Range facilities, and AFGSC operating locations.

The B-2 Training System upgrades include updates to training device hardware and components, simulation software, courseware and academic materials, instructional system design architectures, engineering drawings, and system documentation that is not driven by a funded aircraft modification. Improvements include, but are not limited to, threat systems parametrics and order of battle information, radar display emulation improvements, improved aero fidelity of key pilot procedures, courseware improvements, and upgrades to display systems, subsystems, and simulation and computational processors. Other upgrades include, but are not limited to, conventional and nuclear guided weapons delivery training, expanded crypto keyfill capability in simulators, upgraded capability to train weapons as powered up upon completion of initial conditions, as well as upgrades to the electronic combat environment threat database tools to include threat laydown, threat parametrics, and Integrated Air

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 675345 / *B-2 Modernization*

Defense System. Upgrades also include the current Defensive Management System (DMS) simulation, improved DMS alternative/ emergency procedures courseware, and upgraded Mission Generation System, Suppressor tool, and simulation and computational processors as necessary. Enhancements are provided to the B-2 family of trainers to include the Weapon System Trainers, Mission Trainer, Cockpit Procedures Trainers, Computerized Maintenance Training System, Weapon System Training Aids, Weapons Load Trainer, Crew Escape System Maintenance Trainer, Flight Control System Trainer, instructor-operator station, and Training System Support Center.

The Integrated Strike Warfare Airborne Network effort models and simulates combat effects and performance constraints in an environment that can demonstrate, integrate, generate, and validate four generic waveform models which will be used on the B-2 platform. Additionally, this effort establishes a viable end-to-end distributed modeling and simulation network.

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. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: B-2 Common Very Low Frequency Receiver (CVR)	7.197	13.035	45.460
Description: Provides secure, survivable, receive-only strategic nuclear communication for the B-2. ***FY 2013 Accomplishments:*** Began Common VLF Receiver development effort, conducted Milestone B, and entered Engineering and Manufacturing Development phase. ***FY 2014 Plans:*** Continue Engineering and Manufacturing Development efforts and conduct System Functional Review. ***FY 2015 Plans:*** Continue Engineering and Manufacturing Development efforts and conduct System Preliminary Design Review and System Critical Design Review.			
Title: B-2 Flex Strike Phase 1	1.358	58.500	64.519
Description: Recombine the currently separate Stores Management Operational Flight Programs and rehost the software onto the new integrated processor unit made available by the B-2 EHF Increment 1 program. ***FY 2013 Accomplishments:*** Continued requirements maturation and risk reduction efforts, and prepared for the Milestone B decision and entry into Engineering and Manufacturing Development ***FY 2014 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 675345 / *B-2 Modernization*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Continue requirements maturation efforts and Conduct System Preliminary Design Review. Conduct Milestone B and enter Engineering and Manufacturing Development phase. Conduct System Critical Design Review. ***FY 2015 Plans:*** Continue Engineering and Manufacturing Development efforts; conduct software/hardware integration testing and begin flight test.			
Title: Low Observable Signature and Supportability Mods ***Description:*** B-2 Modernization includes, but is not limited to, Low Observable Signature and Supportability Modifications, Aircraft Supportability Modifications, Massive Ordnance Penetrator with accuracy improvements, Joint Air-to-Surface Standoff Missile-Extended Range integration, armament tester improvements, Training System core upgrades, Adaptable Communication Suite improvements, Link 16 Center Instrument Display/Inflight Replanner, Integrated Strike Warfare/Advanced Tactical Data Link modeling and simulation, Mode S/5 Identification Friend or Foe with Automatic Dependence Surveillance-Broadcast capability improvements, Moving Target Kill and Non-Traditional Surveillance and Reconnaissance capability improvements, information fusion upgrades, Special Test Equipment development, and future weapons integration efforts. ***FY 2013 Accomplishments:*** Continued development of on-going Low Observable Signature and Supportability Modifications, Training System core upgrades, Adaptable Communications Suite improvements, Massive Ordnance Penetrator integration, Aircraft Supportability Modifications, and other weapons integration improvements. ***FY 2014 Plans:*** Continue development of on-going Low Observable Signature and Supportability Modifications, Training System core upgrades, Adaptable Communications Suite improvements, Aircraft Supportability Modifications, and other weapons integration improvements. ***FY 2015 Plans:*** Continue development of on-going Low Observable Signature and Supportability Modifications, Training System core upgrades, Adaptable Communications Suite improvements, Aircraft Supportability Modifications, and other weapons integration improvements.	4.488	1.939	1.930
Accomplishments/Planned Programs Subtotals	13.043	73.474	111.909

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• APAF: BA05: Line Item #B00200: *B-2 CVR Inc 1 Mod Funding*	-	-	-	-	-	19.190	18.758	9.407	9.582	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 675345 / *B-2 Modernization*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• APAF: BA05: Line Item # B00200: *B-2 Training Support Modification, PE 0809731F*	4.003	2.006	6.415	-	6.415	6.575	7.715	7.862	8.009	Continuing	Continuing
• APAF: BA07: Line Item #B00200: *B-2 Post Production Support, B-2A ICS for CVR Inc 1: PE 0101127F*	-	-	-	-	-	-	0.010	0.132	0.134	Continuing	Continuing
• APAF: BA06: Line Item #B00200: *B-2 Squadrons, A/C Initial Spares for CVR Inc 1*	-	-	-	-	-	-	2.054	2.595	2.664	Continuing	Continuing
• APAF:BA07: Line Item #B00200: *B-2 Depot Activation for CVR Inc 1, PE0101127F*	-	-	-	-	-	3.476	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

Key elements of the overall acquisition strategy include: use of sole source contract with a prime/integrating contractor (Northrop Grumman), employ the program office as the system integrator when practical, leverage mature technology and systems development investments by other Department of Defense organizations, encourage prime contractor competition of subsystems and key components to reduce risk and cost, use of cost plus incentive fee (CPIF) development contracts, and combine developmental upgrades with software sustainment blocks to minimize the number of software releases, aircraft downtime, and differences in fielded configurations.

E. 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.

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 675345 / *B-2 Modernization*

B-2 FY-2015 PB Modernization Detailed Schedule

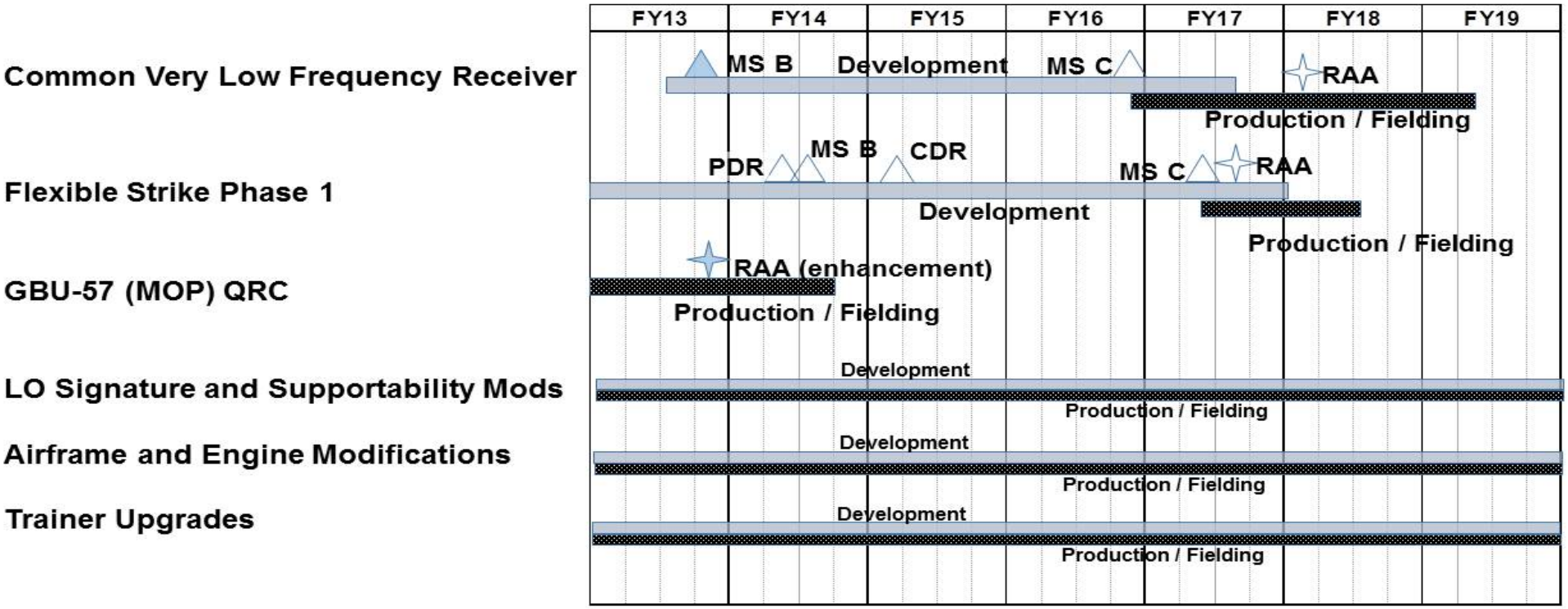

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / *B-2 SQUADRONS*	Project (Number/Name) 676021 / *BASELINE SUPPORT*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
676021: *BASELINE SUPPORT*	-	13.607	14.336	19.671	-	19.671	13.652	13.906	14.178	14.447	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

Baseline Support maintains and upgrades the B-2 unique flight test aircraft as well as hardware/software and test equipment to support developmental systems integration and flight test, reducing the need for additional operational aircraft and accelerating deployment of advanced operational capabilities to the warfighter. Baseline Support also ensures the Mission Planning System keeps pace with aircraft modifications and improves the mission planning core system. Baseline Support provides for other B-2 unique government costs and includes assorted studies of aircraft performance and cost trades as well as acquisition planning activities, up to and including proposal preparation, for future capabilities such as, but not limited to, Advanced Tactical Data Link efforts, Moving Target Kill capability, High Resolution Synthetic Aperture Radar, Enhanced Radar Modes, F118 Service Life Extension, F118 Extended Mission Oil Tank Upgrades, Next Generation Engine Core upgrade, Universal Armament Interface, System 2 Nuclear Interface, Global Positioning System/M Code Receivers, Joint Precision Approach and Landing System upgrades, Radar Processor Modernization, Mode 5/S Identification Friend or Foe, Automatic Dependence Surveillance Broadcast, Flight Data and Voice Recorder upgrade, Communications/ Navigation/Surveillance-Air Traffic Management, Information Fusion, and integration of currently fielded or new weapons including, but not limited to, GBU E/B Selective Availability and Anti Spoofing Module (SAASM) with impact angle control, GBU D/B SAASM with impact angle control, Hard Target Void Sending Fuze, Joint Air-to-Surface Standoff Missile Extended Range, Joint Direct Attack Munition-5000, and GBU-56.

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. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Baseline Support Acquisition Planning	2.877	0.456	4.238
Description: Baseline Support provides for other B-2 unique government costs and includes acquisition planning activities for future capabilities, long range planning, studies, and program integration activities.			
FY 2013 Accomplishments: Continued Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, and program integration activities.			
FY 2014 Plans: Continue Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, and program integration activities.			
FY 2015 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 676021 / *BASELINE SUPPORT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Continue Baseline Support activities including acquisition planning for future capabilities, long range planning, studies, program integration activities and refine requirements and study affordable options to satisfy B-2 communications requirements in an A2/AD environment			
Title: Baseline Support Flight Test ***Description:*** Baseline Support Flight Test maintains and upgrades the B-2 unique flight test aircraft as well as hardware/software and test equipment, to support developmental systems integration and flight test, reducing the need for additional operational aircraft and accelerating deployment of advanced operational capabilities to the warfighter. ***FY 2013 Accomplishments:*** Continued B-2 Flight Test activities, maintaining and upgrading the B-2 unique flight test aircraft as well as hardware/software and test equipment, to support developmental systems integration and flight test. ***FY 2014 Plans:*** Continue B-2 Flight Test activities, maintaining and upgrading the B-2 unique flight test aircraft as well as hardware/software and test equipment, to support developmental systems integration and flight test. ***FY 2015 Plans:*** Continue B-2 Flight Test activities, maintaining and upgrading the B-2 unique flight test aircraft as well as hardware/software and test equipment, to support developmental systems integration and flight test.	8.728	11.111	13.176
Title: Baseline Support Mission Planning ***Description:*** Baseline Support Mission Planning System improvements ensure the mission planning system keeps pace with aircraft modifications and improves mission planning core systems. ***FY 2013 Accomplishments:*** Continued B-2 Mission Planning activities, keeping pace with aircraft modifications and improving mission planning core systems. ***FY 2014 Plans:*** Continue B-2 Mission Planning activities, keeping pace with aircraft modifications and improving mission planning core systems, to include beginning the transition from the current AFMSS mission planning to the Joint Mission Planning System (JMPS). ***FY 2015 Plans:*** Continue B-2 Mission Planning activities, keeping pace with aircraft modifications and improving mission planning core systems, to include continuation of the transition from the current AFMSS mission planning to the Joint Mission Planning System (JMPS).	2.002	2.769	2.257
Accomplishments/Planned Programs Subtotals	13.607	14.336	19.671

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 676021 / *BASELINE SUPPORT*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Key elements of the overall acquisition strategy include: use of sole source contract with a prime/integrating contractor (Northrop Grumman); use of cost plus award fee/ incentive fee (CPAF/IF) development contracts; and the combination of developmental upgrades with software sustainment blocks to minimize the number of software releases, aircraft downtime, and differences in fielded configurations.

E. 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.

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 676021 / *BASELINE SUPPORT*

B-2 FY-2015 PB Baseline Support Detailed Schedule

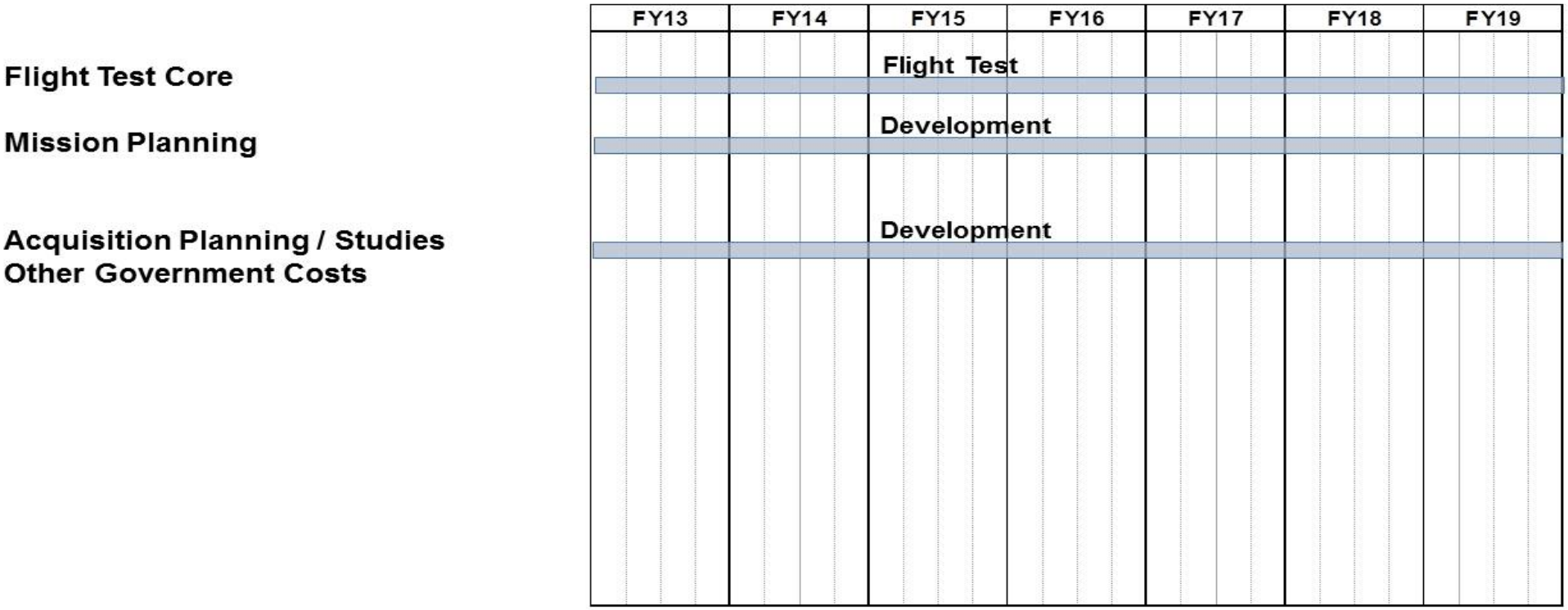

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force												Date: March 2014
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101127F / *B-2 SQUADRONS*				Project (Number/Name) 676022 / *EHF SATCOM and Computer*			
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
676022: *EHF SATCOM and Computer*	38.203	3.155	-	-	-	-	-	-	-	-	-	41.358
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

The FY 2015 OCO Request will be submitted at a later date.

Note

Because B-2 EHF Increment 1 changed BPACs twice and was originated in a different Program Element, prior year and total amounts for Project 676022 give a misleading summary of development cost. EHF Increment 1 development funding is $415M, as detailed below:

$275M in PE 0604240F Project 653843 in years FY05 - FY09
$ 98M in PE 0101127F Project 675345 in years FY10 -FY11
$ 39M in PE 0101127F Project 676022 in FY12
$ 3M in PE 0101127F Project 676022 in FY13

$415M total development costs for B-2 EHF Increment 1.

EHF Increment 2 program funding was removed in the FY13 PB.

A. Mission Description and Budget Item Justification

Originally the first of three increments to replace the Ultra High Frequency communication system with Extremely High Frequency (EHF) Satellite Communications System (SATCOM), B-2 EHF Increment 1 is a high-speed computing upgrade that provides upgraded flight management computer processors, increased data storage, re-hosted Flight Management Operational Flight Program, and a high bandwidth data bus to prevent degradation of existing capabilities resulting from future upgrades. Additionally, the new Integrated Processing Units and Disk Drive Unit architectures establish a high-speed fiber optic structure network while maintaining connectivity to legacy interfaces. This upgrade provides the required processing growth path to future B-2 upgrades such as, but not limited to, future communications capabilities, Defensive Management System Modernization, Flexible Strike, B61-12 and other weapons integration efforts.

Four kits were developed with Research Development Test and Evaluation (RDT&E) funds for three aircraft installs, which includes two Force Development Evaluation installs and one Developmental/Operational Test aircraft install. The fourth development kit will be refurbished and utilized as a production install via procurement funding. Procurement funding will purchase the remaining 16 kits/installs for a total of 20 aircraft. Modification of the training system will be accomplished at the operational base and other locations as required. This effort also includes updating the aircrew and maintenance trainers and academics/courseware. The Production and Deployment phase acquisition strategy is based on a two lot buy: Low Rate Initial Production (LRIP) in FY2012 and Full Rate Production (FRP) in FY2013. Funds on the Support Equipment line are for upgrades to related support equipment.

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 676022 / *EHF SATCOM and Computer*

EHF Increment 2 was deferred in the FY13 President's Budget. The Air Force will pursue an alternative strategic communications method, the Common Very Low Frequency Receiver, to satisfy the immediate user need date. However, secure, survivable two-way communication remains a requirement for the warfighter.

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. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: B-2 EHF SATCOM and Computers Increment 1	3.155	-	-
Description: EHF Increment 1 provides upgraded flight management computer processors, increased data storage, rehosted Flight Management Operational Flight Program and a high bandwidth data bus. Additionally, the Increment 1 Integrated Processing Unit and Disk Drive Unit architectures establish a high speed fiber optic structure network as well as maintain connectivity to legacy interfaces. Increment 1 provides a processing growth path to future B-2 upgrades. ***FY 2013 Accomplishments:*** Completed EHF SATCOM and Computers Increment 1 System Development and Demonstration phase, completed IOT&E, and began Full Rate Production.			
Accomplishments/Planned Programs Subtotals	3.155	-	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
• APAF: BA05: Line Item # B00200: *EHF Inc I Kits and Installs B-2A: PE 0101127F, B-2 Squadrons, Modifications*	51.998	7.469	8.189	-	8.189	-	-	-	-	-	-
• APAF: BA07: Line Item # B00200: *EHF Inc 1 Interim Contract Support B-2A ICS: PE 0101127F, Post Prod Support*	0.480	0.489	-	-	-	-	-	-	-	-	-
• APAF: BA06: Line Item # B00200: *EHF Inc 1 Initial Spares PE 0101127F, B-2 Squadrons A/C Initial Spares*	6.029	3.078	0.421	-	0.421	0.767	0.201	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 676022 / *EHF SATCOM and Computer*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost

Remarks

In FY12, funding for Extremely High Frequency (EHF) SATCOM and Computers transferred from project 675345 PE 0101127F, B-2 Squadrons to project 676022 PE 0101127F, B-2 Squadrons.

D. Acquisition Strategy

Key elements of the overall acquisition strategy include: use of sole source contract with a prime/integrating contractor (Northrop Grumman), leverage mature technology and system development investments by other Department of Defense organizations, encourage prime contractor to conduct competitions at the subsystem/key component level to reduce risk and cost, use cost plus incentive fee (CPIF) development contracts, and combine developmental upgrades with software sustainment blocks to minimize the number of software releases, aircraft downtime, and differences in fielded configurations

E. 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / *B-2 SQUADRONS*	Project (Number/Name) 676022 / *EHF SATCOM and Computer*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2013 Cost	FY 2013 Award Date	FY 2014 Cost	FY 2014 Award Date	FY 2015 Base Cost	FY 2015 Base Award Date	FY 2015 OCO Cost	FY 2015 OCO Award Date	FY 2015 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Vehicle - EHF Increment 1	SS/CPAF	Northrop Grumman : Palmdale, CA	30.733	2.554	Oct 2012	-		-		-		-	-	33.287	-
		Subtotal	30.733	2.554		-		-		-		-	-	33.287	-

Remarks

EHF Increment 1 is primarily delivery orders with Northrop-Grumman as the prime contractor and lead integrator.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2013 Cost	FY 2013 Award Date	FY 2014 Cost	FY 2014 Award Date	FY 2015 Base Cost	FY 2015 Base Award Date	FY 2015 OCO Cost	FY 2015 OCO Award Date	FY 2015 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2013 Cost	FY 2013 Award Date	FY 2014 Cost	FY 2014 Award Date	FY 2015 Base Cost	FY 2015 Base Award Date	FY 2015 OCO Cost	FY 2015 OCO Award Date	FY 2015 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Test	PO	AFFTC : ,	2.599	0.414	Oct 2012	-		-		-		-	-	3.013	-
		Subtotal	2.599	0.414		-		-		-		-	-	3.013	-

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2013 Cost	FY 2013 Award Date	FY 2014 Cost	FY 2014 Award Date	FY 2015 Base Cost	FY 2015 Base Award Date	FY 2015 OCO Cost	FY 2015 OCO Award Date	FY 2015 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA	Various	Various : ,	4.871	0.187	Oct 2012	-		-		-		-	-	5.058	-
		Subtotal	4.871	0.187		-		-		-		-	-	5.058	-

	Prior Years	FY 2013 Cost	FY 2013 Award Date	FY 2014 Cost	FY 2014 Award Date	FY 2015 Base Cost	FY 2015 Base Award Date	FY 2015 OCO Cost	FY 2015 OCO Award Date	FY 2015 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	38.203	3.155		-		-		-		-	-	41.358	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101127F / *B-2 SQUADRONS*	Project (Number/Name) 676022 / *EHF SATCOM and Computer*	

	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award dates listed are the first incremental funding opportunity associated with each cost category.

Exhibit R-4, RDT&E Schedule Profile: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 676022 / *EHF SATCOM and Computer*

B-2 FY-2015 PB EHF SATCOM and Computer Detailed Schedule

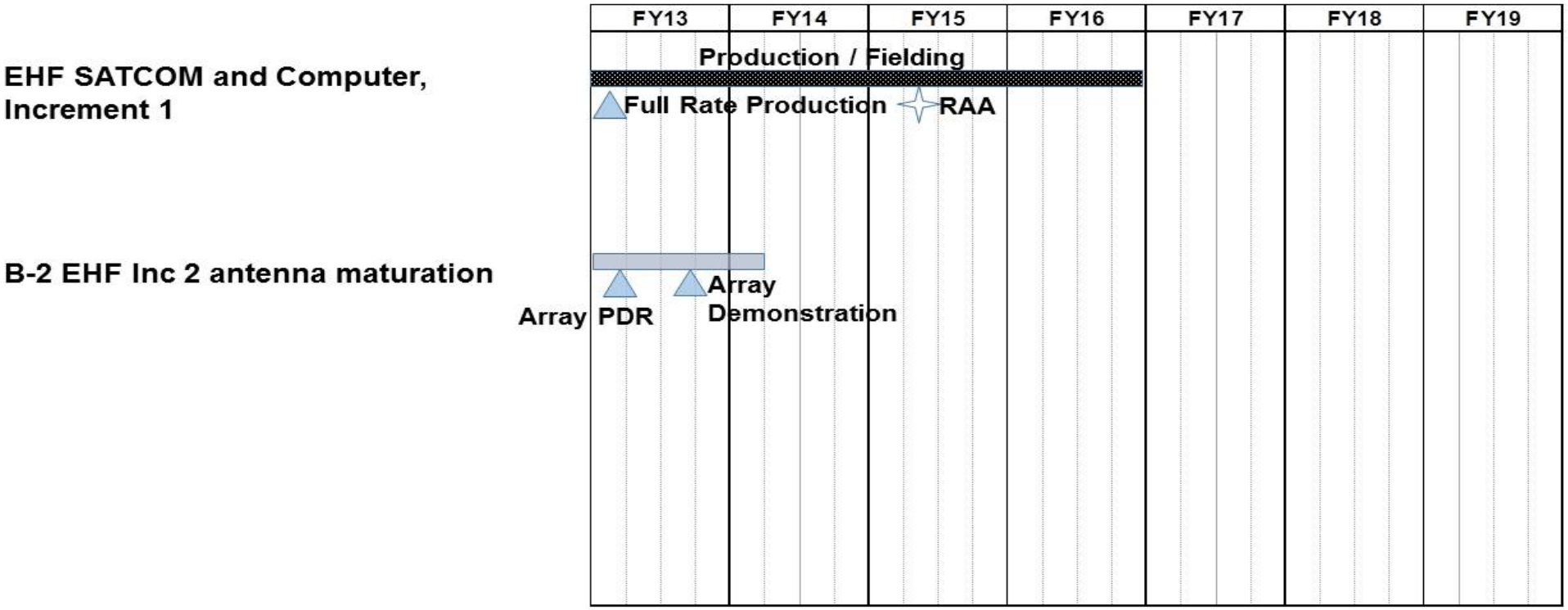

Exhibit R-4A, RDT&E Schedule Details: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0101127F / *B-2 SQUADRONS*	**Project (Number/Name)** 676022 / *EHF SATCOM and Computer*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
EHF Increment 1 FRP Contract Award	1	2013	1	2013
EHF Increment 2 Array Preliminary Design Review	3	2013	3	2013
EHF Increment 2 Array Demonstration	3	2013	3	2013
EHF Increment 1 Required Assets Available	2	2015	2	2015