

**UNCLASSIFIED**

PE NUMBER: 0604240F

PE TITLE: B-2 Advanced Technology Bomber

<b>Exhibit R-2, RDT&amp;E Budget Item Justification</b>	DATE <b>February 2007</b>
---------------------------------------------------------	------------------------------

<b>BUDGET ACTIVITY</b> <b>05 System Development and Demonstration (SDD)</b>	<b>PE NUMBER AND TITLE</b> <b>0604240F B-2 Advanced Technology Bomber</b>
--------------------------------------------------------------------------------	------------------------------------------------------------------------------

Cost (\$ in Millions)	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total
Total Program Element (PE) Cost	281.671	241.608	244.019	249.374	188.245	145.352	57.581	19.561	Continuing	TBD
3843 B-2 Advanced Technology Bomber	281.671	241.608	244.019	249.374	188.245	145.352	57.581	19.561	Continuing	TBD

**(U) A. Mission Description and Budget Item Justification**

The B-2A Spirit is the world's most advanced long-range strike asset. The unique combination of range, payload and stealth characteristics allow the B-2 to target and destroy the highest value enemy targets, regardless of location, and return home safely. The array of planned RDT&E projects are necessary to both preserve this strategic advantage as well as increase the flexibility and lethality of this "capital" asset. The Radar Modernization (RMP) and Aft Deck Programs address potential fleet grounding issues.

Avionics upgrades include, but are not limited to, RMP, Link-16 Center Instrument Display (CID)/In-Flight Replanner (IFR), Ultra High Frequency (UHF) Satellite Communication (SATCOM), Extremely High Frequency (EHF) SATCOM and Computers, Mode S/5 Identification Friend or Foe (IFF), and Defensive Management System (DMS) upgrades. RMP changes the operating frequency of the radar to enable the B-2 to legally operate worldwide in the future. Link-16 CID/IFR upgrade allows the B-2 access to theater tactical data links, improving on-board situational awareness while greatly enhancing the ability of the theater commanders to coordinate the B-2 with other assets. UHF SATCOM provides beyond line of sight secure communications to aircrews enabling verbal and data updates to missions. EHF SATCOM and Computers provides a secure, survivable communication and Net Ready infrastructure systems upgrade, preserving the critical ability to guarantee communication in a nuclear environment. EHF SATCOM and Computers will provide a dramatic increase in the B-2 data flow rates, paving the way for integration into the Global Information Grid (GIG). Upgrades include extremely high frequency components and the computer infrastructure upgrades necessary to host new capability on the aircraft. Mode S provides enhanced surveillance functions with commercial Air Traffic Management to allow operations in controlled air space; Mode 5 provides enhanced combat identification of friend or foe functions for military Air Traffic Management. DMS upgrades improve system performance, increase reliability and supportability, counter hardware obsolescence, and update the current analog design with modern digital technology.

Armament upgrades include, but are not limited to, integration of new and/or advanced weapons into the B-2 to destroy a wider array of target sets as well as destroy more targets per sortie. Final testing and integration of the GBU-28 C/B program is underway. The GBU-28 C/B is an improved 5,000 lb "bunker buster" munition that provides greater lethality, thus holding more enemy targets at risk. Universal Armament Interface will provide a commonality among all weapon platforms to interface with all standard armament. Small Diameter Bomb (SDB) and Massive Ordnance Penetrator (MOP) armament efforts will design, develop, integrate, and test the hardware and software required to employ both weapons from the B-2. SDB II will provide all-weather, near-precision accuracy against a wide range of fixed, relocatable, and mobile targets at increased standoff ranges with less collateral damage. The 30K pound MOP will provide the nation with the ability to hold additional hardened and deeply buried targets (HDBT) at risk that are out of reach of the current 5K pound class penetrator munitions. The B-2 is the only penetrating platform capable of carrying the MOP. FY07 Congressional Plus-up for SDB and MOP is insufficient to complete full design, development, test, and integration efforts required for the B-2 fleet. FY07 funds will fund as much effort as possible until additional funds are received in future years.

## Exhibit R-2, RDT&amp;E Budget Item Justification

DATE

February 2007

## BUDGET ACTIVITY

05 System Development and Demonstration (SDD)

## PE NUMBER AND TITLE

0604240F B-2 Advanced Technology Bomber

Structures improvements include, but are not limited to, Aft Deck upgrade which addresses an interim and long term solution to persistent cracking of aft deck surfaces while preserving the key stealth characteristics that are vital to the survivability of the B-2; windshield redesign provides improved components and windshield manufacturing processes to remedy windshield cracking and electrical conductivity limitations; Proximity Sensor Logic Unit (PSLU) counters obsolescence issues with electronic components, improving safety of maintainers working around various aircraft bay doors.

Engine improvements include, but are not limited to, the Digital Electronic Controller for the F-118 engine. This improvement combines two line replaceable units in the engine that were unsustainable into one sustainable unit, reducing maintenance manhours and increasing aircraft availability rates.

Low Observable (LO) programs include, but are not limited to, improvements to door edge treatments, tile protection system, MAGRAM picture framing, hot structures, tailpipe material maintenance improvements, nozzle bay doors, windshield low observable treatments, advanced topcoat system, RF diagnostics and LO diagnostic tools development such as improvements of the Signature Diagnostic System database and Low Observable Combat Readiness Model. These upgrades decrease maintenance manhours and increase aircraft availability while improving/maintaining LO signature of the B-2 fleet.

Continued baseline B-2 support is essential to the execution of all the RDT&E efforts discussed above. The baseline B-2 support ensures support of the B-2 flight test aircraft, maintains B-2 unique flight test infrastructure, ensures the B-2 training systems keep pace with aircraft system updates and counters obsolescence issues, ensures the Mission Planning System keeps pace with aircraft modifications and mission planning system updates, and provides for other B-2 unique government costs. Likewise, baseline support provides a strategic planning capability to include acquisition planning activities, up to but not including solicitation release, that are needed to prepare for program new start implementation when Congressional authorization is received.

This program is included in budget activity code 05, System Development and Demonstration because of the significant development and testing associated with the maintenance and upgrade of B-2 capabilities.

(U) **B. Program Change Summary (\$ in Millions)**

	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) Previous President's Budget	294.898	224.177	251.513	236.182
(U) Current PBR/President's Budget	281.671	241.608	244.019	249.374
(U) Total Adjustments	-13.227	17.431		
(U) Congressional Program Reductions		-0.053		
Congressional Rescissions	-0.009	-0.916		
Congressional Increases		18.400		
Reprogrammings	-5.014			
SBIR/STTR Transfer	-8.204			

(U) **Significant Program Changes:**

Changes to the FY08 budget are primarily due FY08 POM adjustments to the EHF SATCOM and Computers and Aft Deck programs. Changes to the FY09 budget are primarily due to FY08 POM adjustments to the EHF SATCOM and Computers, AFt Deck, and Mode S/5 IFF programs.

## Exhibit R-2a, RDT&amp;E Project Justification

DATE

February 2007

BUDGET ACTIVITY				PE NUMBER AND TITLE				PROJECT NUMBER AND TITLE			
<b>05 System Development and Demonstration (SDD)</b>				<b>0604240F B-2 Advanced Technology Bomber</b>				<b>3843 B-2 Advanced Technology Bomber</b>			
Cost (\$ in Millions)	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	Cost to Complete	Total	
3843 B-2 Advanced Technology Bomber	281.671	241.608	244.019	249.374	188.245	145.352	57.581	19.561	Continuing	TBD	
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0			

(U) **A. Mission Description and Budget Item Justification**

The B-2A Spirit is the world's most advanced long-range strike asset. The unique combination of range, payload and stealth characteristics allow the B-2 to target and destroy the highest value enemy targets, regardless of location, and return home safely. The array of planned RDT&E projects are necessary to both preserve this strategic advantage as well as increase the flexibility and lethality of this "capital" asset. The Radar Modernization (RMP) and Aft Deck Programs address potential fleet grounding issues.

Avionics upgrades include, but are not limited to, RMP, Link-16 Center Instrument Display (CID)/In-Flight Replanner (IFR), Ultra High Frequency (UHF) Satellite Communication (SATCOM), Extremely High Frequency (EHF) SATCOM and Computers, Mode S/5 Identification Friend or Foe (IFF), and Defensive Management System (DMS) upgrades. RMP changes the operating frequency of the radar to enable the B-2 to legally operate worldwide in the future. Link-16 CID/IFR upgrade allows the B-2 access to theater tactical data links, improving on-board situational awareness while greatly enhancing the ability of the theater commanders to coordinate the B-2 with other assets. UHF SATCOM provides beyond line of sight secure communications to aircrews enabling verbal and data updates to missions. EHF SATCOM and Computers provides a secure, survivable communication and Net Ready infrastructure systems upgrade, preserving the critical ability to guarantee communication in a nuclear environment. EHF SATCOM and Computers will provide a dramatic increase in the B-2 data flow rates, paving the way for integration into the Global Information Grid (GIG). Upgrades include extremely high frequency components and the computer infrastructure upgrades necessary to host new capability on the aircraft. Mode S provides enhanced surveillance functions with commercial Air Traffic Management to allow operations in controlled air space; Mode 5 provides enhanced combat identification of friend or foe functions for military Air Traffic Management. DMS upgrades improve system performance, increase reliability and supportability, counter hardware obsolescence, and update the current analog design with modern digital technology.

Armament upgrades include, but are not limited to, integration of new and/or advanced weapons into the B-2 to destroy a wider array of target sets as well as destroy more targets per sortie. Final testing and integration of the GBU-28 C/B program is underway. The GBU-28 C/B is an improved 5,000 lb "bunker buster" munition that provides greater lethality, thus holding more enemy targets at risk. Universal Armament Interface will provide a commonality among all weapon platforms to interface with all standard armament. Small Diameter Bomb (SDB) and Massive Ordnance Penetrator (MOP) armament efforts will design, develop, integrate, and test the hardware and software required to employ both weapons from the B-2. SDB II will provide all-weather, near-precision accuracy against a wide range of fixed, relocatable, and mobile targets at increased standoff ranges with less collateral damage. The 30K pound MOP will provide the nation with the ability to hold additional hardened and deeply buried targets (HDBT) at risk that are out of reach of the current 5K pound class penetrator munitions. The B-2 is the only penetrating platform capable of carrying the MOP. FY07 Congressional Plus-up for SDB and MOP is insufficient to complete full design, development, test, and integration efforts required for the B-2 fleet. FY07 funds will fund as much effort as possible until additional funds are received in future years.

**Exhibit R-2a, RDT&E Project Justification**

DATE  
**February 2007**

BUDGET ACTIVITY <b>05 System Development and Demonstration (SDD)</b>	PE NUMBER AND TITLE <b>0604240F B-2 Advanced Technology Bomber</b>	PROJECT NUMBER AND TITLE <b>3843 B-2 Advanced Technology Bomber</b>
-------------------------------------------------------------------------	-----------------------------------------------------------------------	------------------------------------------------------------------------

Structures improvements include, but are not limited to, Aft Deck upgrade which addresses an interim and long term solution to persistent cracking of aft deck surfaces while preserving the key stealth characteristics that are vital to the survivability of the B-2; windshield redesign provides improved components and windshield manufacturing processes to remedy windshield cracking and electrical conductivity limitations; Proximity Sensor Logic Unit (PSLU) counters obsolescence issues with electronic components, improving safety of maintainers working around various aircraft bay doors.

Engine improvements include, but are not limited to, the Digital Electronic Controller for the F-118 engine. This improvement combines two line replaceable units in the engine that were unsustainable into one sustainable unit, reducing maintenance manhours and increasing aircraft availability rates.

Low Observable (LO) programs include, but are not limited to, improvements to door edge treatments, tile protection system, MAGRAM picture framing, hot structures, tailpipe material maintenance improvements, nozzle bay doors, windshield low observable treatments, advanced topcoat system, RF diagnostics and LO diagnostic tools development such as improvements of the Signature Diagnostic System database and Low Observable Combat Readiness Model. These upgrades decrease maintenance manhours and increase aircraft availability while improving/maintaining LO signature of the B-2 fleet.

Continued baseline B-2 support is essential to the execution of all the RDT&E efforts discussed above. The baseline B-2 support ensures support of the B-2 flight test aircraft, maintains B-2 unique flight test infrastructure, ensures the B-2 training systems keep pace with aircraft system updates and counters obsolescence issues, ensures the Mission Planning System keeps pace with aircraft modifications and mission planning system updates, and provides for other B-2 unique government costs. Likewise, baseline support provides a strategic planning capability to include acquisition planning activities, up to but not including solicitation release, that are needed to prepare for program new start implementation when Congressional authorization is received.

This program is included in budget activity code 05, System Development and Demonstration because of the significant development and testing associated with the maintenance and upgrade of B-2 capabilities.

(U) <b><u>B. Accomplishments/Planned Program (\$ in Millions)</u></b>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) Continue B-2 baseline support to include developmental flight test aircraft modification and base of operations; Mission Planning support; trainer support, long range planning, studies, and program integration activities; and other government costs.	15.190	10.096	14.911	17.676
(U) Continue development of EHF SATCOM and Computers, Aft Deck, Low Observable improvements, airframe structures and other avionics improvements.	73.465	92.417	150.756	204.180
(U) Continue development of RMP including continuing System Development and Demonstration (SDD) and design and fabrication of new and modified components for test aircraft and six developmental units.	193.016	114.161	68.163	14.876
(U) Begin development of Mode S/5 IFF, PSLU, SDB, and MOP		24.934	10.189	12.642
(U) Total Cost	281.671	241.608	244.019	249.374

**Exhibit R-2a, RDT&E Project Justification**

DATE  
**February 2007**

BUDGET ACTIVITY <b>05 System Development and Demonstration (SDD)</b>	PE NUMBER AND TITLE <b>0604240F B-2 Advanced Technology Bomber</b>	PROJECT NUMBER AND TITLE <b>3843 B-2 Advanced Technology Bomber</b>
-------------------------------------------------------------------------	-----------------------------------------------------------------------	------------------------------------------------------------------------

**(U) C. Other Program Funding Summary (\$ in Millions)**

	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>FY 2012</u>	<u>FY 2013</u>	<u>Cost to Complete</u>	<u>Total Cost</u>
	<u>Actual</u>	<u>Estimate</u>								
(U) A/C Proc, AF, Combat A/C/BA07/B-2A	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(U) A/C Proc, AF, Post Prod Support/BA07	6.856	7.665	0.000	0.000	0.000	0.000	1.192	2.926	Continuing	TBD
(U) A/C Proc, AF, Modifications/BA05/B-2A	39.400	180.696	311.537	117.439	82.304	148.225	185.664	131.684	Continuing	TBD
(U) A/C Prod, AF, ICS	26.979	11.666	34.780	37.139	31.314	22.023	13.355	8.855	Continuing	TBD
(U) A/C Proc, AF, Cmn Spt Eq/BA07/Items<\$2M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	TBD
(U) A/C Proc, AF, A/C Initial Spares/BA06/B-2A	6.544	2.083	4.676	1.063	0.000	2.073	12.303	6.672	Continuing	TBD
(U) Proc (Other), AF/BA 02,03, 04/B-2A	7.508	8.055	4.233	4.388	0.000	0.000	0.000	0.000	0.000	TBD
(U) Military Construction/BA01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	TBD

**(U) 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 (CPAF) 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.

**UNCLASSIFIED**

**Exhibit R-3, RDT&E Project Cost Analysis**

DATE  
**February 2007**

<b>BUDGET ACTIVITY</b> <b>05 System Development and Demonstration (SDD)</b>	<b>PE NUMBER AND TITLE</b> <b>0604240F B-2 Advanced Technology Bomber</b>	<b>PROJECT NUMBER AND TITLE</b> <b>3843 B-2 Advanced Technology Bomber</b>
--------------------------------------------------------------------------------	------------------------------------------------------------------------------	-------------------------------------------------------------------------------

(U) <u>Cost Categories</u> (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract Method &amp; Type</u>	<u>Performing Activity &amp; Location</u>	<u>Total Prior to FY 2006 Cost</u>	<u>FY 2006</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2009</u>	<u>Cost to Complete</u>	<u>Total Cost</u>	<u>Target Value of Contract</u>
				<u>Cost</u>	<u>Award Date</u>									
(U) <u>Product Development</u>														
Air Vehicle	Multiple	Various		258.666	Oct-05	228.740	Oct-06	227.622	Oct-07	220.824	Oct-08	Continuing	TBD	
Aircrew Training	Multiple	Various		6.930	May-06	1.700	Jan-07	0.808	Jan-08	8.294	Jan-09	Continuing	TBD	
Mission Planning	Multiple	Various		1.935	Mar-06	0.626	Mar-07	1.510	Mar-08	3.504	Mar-09	Continuing	TBD	
Engines	Multiple	Various		0.000	N/A	0.000	N/A	0.000	N/A	0.000	N/A		0.000	
Subtotal Product Development			0.000	267.531		231.066		229.940		232.622		Continuing	TBD	0.000
Remarks:														
(U) <u>Support</u>														
Other Govt Costs	N/A	Various		11.591	Oct-05	7.189	Oct-06	10.714	Oct-07	13.283	Oct-08	Continuing	TBD	
Subtotal Support			0.000	11.591		7.189		10.714		13.283		Continuing	TBD	0.000
Remarks:														
(U) <u>Test &amp; Evaluation</u>														
Govt Test	N/A	AFFTC		2.549	Oct-05	2.653	Oct-06	3.365	Oct-07	3.469	Oct-08	Continuing	TBD	
Subtotal Test & Evaluation			0.000	2.549		2.653		3.365		3.469		Continuing	TBD	0.000
Remarks:														
(U) <u>Management</u>														
Cancelled Year Invoices	N/A	Various		0.000		0.700	May-07						0.700	
Subtotal Management			0.000	0.000		0.700		0.000		0.000		0.000	0.700	0.000
Remarks:														
(U) Total Cost			0.000	281.671		241.608		244.019		249.374		Continuing	TBD	0.000
Award dates listed are the first incremental funding opportunity associated with cost categories														

Exhibit R-4, RDT&E Schedule Profile

DATE  
February 2007

BUDGET ACTIVITY  
05 System Development and Demonstration (SDD)

PE NUMBER AND TITLE  
0604240F B-2 Advanced Technology Bomber

PROJECT NUMBER AND TITLE  
3843 B-2 Advanced Technology Bomber

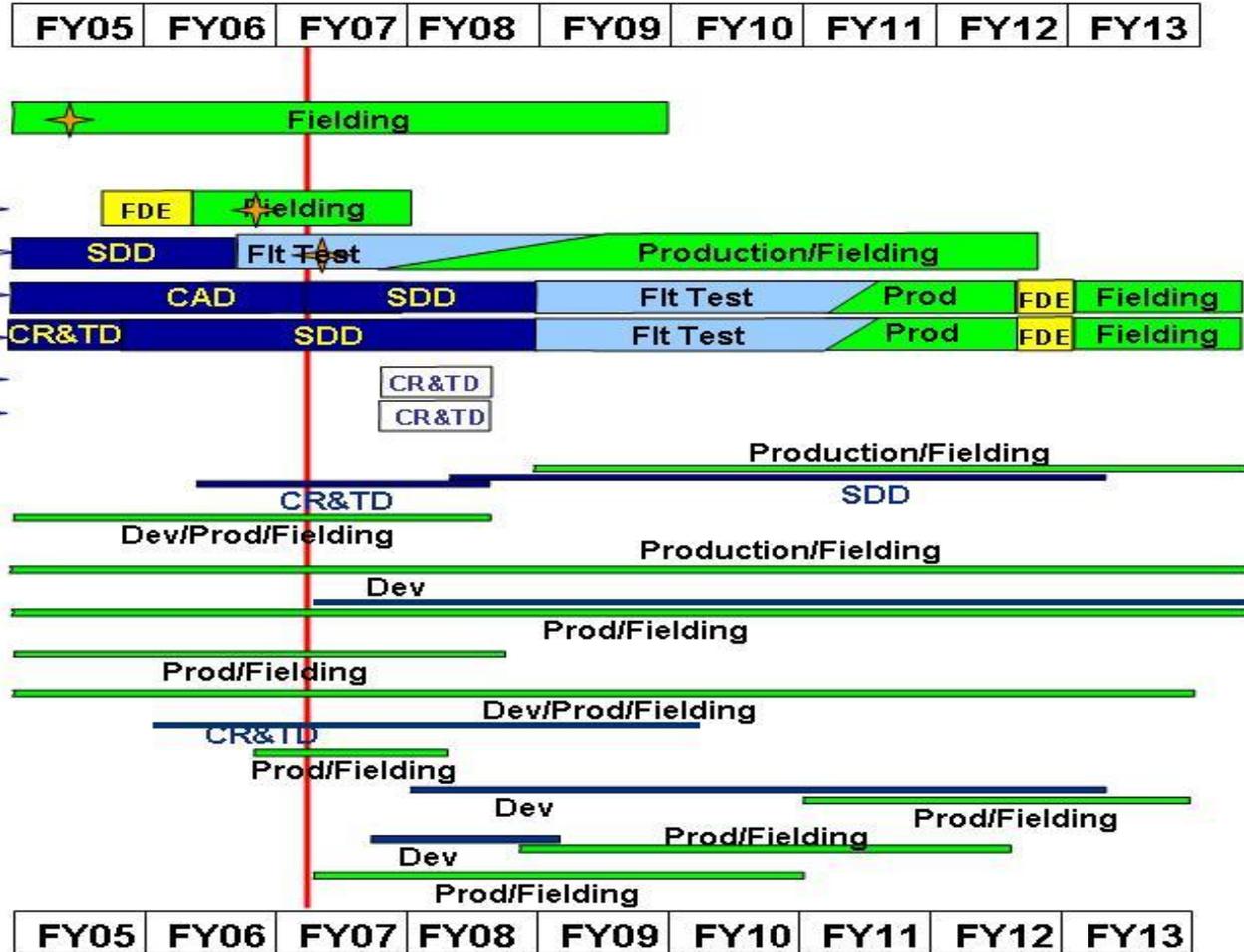
# B-2 Detailed Schedule

**AIRCRAFT MODS**

- EGBU-28 UHF SATCOM IFC P3
- SBRA/JDAM-82
- LINK-16/CID/IFR IFC P4
- RADAR FREQUENCY MOD IFC P5
- EHF SATCOM IFC P6
- CLASSIFIED PROGRAMS IFC P6
- Massive Ordnance Penetrator
- Small Diameter Bomb

**AIRCRAFT MAINTAINABILITY**

- AFT DECK LONG TERM SOLUTION
- AFT DECK REPAIR KITS
- ALTERNATE HIGH FREQ MATERIAL
- TRAINERS UPGRADES
- DIGITAL ENGINE CONTROL
- SUPPORTABILITY MODIFICATIONS
- WINDSHIELD TAPE ALTERNATIVE
- OGADS
- MODE S/MODE 5 IFF
- PROXIMITY SENSOR LOGIC UNIT
- ENGINE FAN BLADES SAFETY MOD



★ Initial Operational Capability

As of: 11 Jan 07

<b>Exhibit R-4a, RDT&amp;E Schedule Detail</b>	DATE <b>February 2007</b>
------------------------------------------------	------------------------------

<b>BUDGET ACTIVITY</b> <b>05 System Development and Demonstration (SDD)</b>	<b>PE NUMBER AND TITLE</b> <b>0604240F B-2 Advanced Technology Bomber</b>	<b>PROJECT NUMBER AND TITLE</b> <b>3843 B-2 Advanced Technology Bomber</b>
--------------------------------------------------------------------------------	------------------------------------------------------------------------------	-------------------------------------------------------------------------------

<b>(U) <u>Schedule Profile</u></b>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
(U) EHF Increment 1 Milestone B		2Q		
(U) EHF SDD Contract Award		3Q		
(U) RMP Flight Test Begins	3Q			
(U) RMP Milestone C		3Q		
(U) Aft Deck CR&TD Contract Award	2Q			
(U) Mode S/5 Contract Award		3Q		
(U) Proximity Sensor Logic Unit Contract Award		3Q		
(U) Aft Deck Milestone B Decision			1Q	
(U) Aft Deck SDD Contract Award			1Q	
(U) RMP Development Completes				4Q
(U) EHF Flight Test Begins				1Q