

UNCLASSIFIED

PE NUMBER: 0207449F
PE TITLE: C2 Constellation

Exhibit R-2, RDT&E Budget Item Justification								DATE February 2005		
BUDGET ACTIVITY 07 Operational System Development					PE NUMBER AND TITLE 0207449F C2 Constellation					
Cost (\$ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
Total Program Element (PE) Cost	355.333	43.530	41.071	45.409	58.376	58.636	59.535	60.082	Continuing	TBD
5064 Airframe	209.747	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
5065 Sensors	145.586	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
5078 Horizontal Integration	0.000	12.646	10.665	13.705	25.615	25.229	25.702	26.012	Continuing	TBD
5140 Joint Expeditionary Force Experiments	0.000	30.884	30.406	31.704	32.761	33.407	33.833	34.070	Continuing	TBD

In Fiscal Year 2005, project 5064 and project 5065 work transferred to PE 0207450F, E-10 Squadrons, project 5131 and project 5132.

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

The C2 Constellation is the Air Force's capstone concept for achieving persistent air and space operations Battle Management Command and Control (BMC2) interoperability and connectivity and is part of the AF implementation of Joint Vision 2020. Primary effects will be a reduced kill chain timeline executed through Predictive Battlespace Awareness (PBA) and Effects-Based Operations (EBO) enabled by the ConstellationNET network-centric infrastructure. This vision integrates over 120 (systems or nodes) current, developmental, and future manned/unmanned space, air and ground sensors, data links, ground stations, exploitation tools, communication/information dissemination systems and C2/battle management elements to give the warfighter real-time, decision quality information to prosecute the full range of military operations. The C2 Constellation provides the Joint Force commander insight into AF command, control, communications, computers, intelligence, surveillance, and reconnaissance assets. C2 Constellation network-centric capabilities mentioned above (PBA/EBO/NET Operations) will be achieved through an architecture and experimentation-driven operational concept approach. The C2 Constellation network-centric infrastructure uses a standards-based, open systems architecture approach that will capitalize on industry innovations. Capability gaps will be explored across the range of AF CONOPS through the large-scale warfighter Joint Expeditionary Force Experiments (JEFX). These experiments are part of the total AF experimentation effort and combine live-fly forces and simulations into an operationally representative warfighter environment. These experiments provide a vehicle for experimentation with operational concepts and attendant new technologies to evolve and transform our aerospace forces and capabilities.

This program is in Budget Activity 7 - Operational System Development because it provides a vehicle for horizontal integration and allows developers, testers and warfighters to experiment, analyze, and explore operational concepts and new technologies to enhance operational system developments and improve capabilities of the 21st century aerospace force.

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0207449F C2 Constellation

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

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
(U) Previous President's Budget	360.051	44.035	42.250	46.570
(U) Current PBR/President's Budget	355.333	43.530	41.071	45.409
(U) Total Adjustments	-4.718	-0.505		
(U) Congressional Program Reductions		-0.036		
Congressional Rescissions		-0.469		
Congressional Increases				
Reprogrammings	5.916			
SBIR/STTR Transfer	-10.634			

(U) **Significant Program Changes:**

The difference between FY04 and FY05 is due to project 5064 and project 5065 work moved to PE 0207450F, E-10 Squadrons, projects 5131 and 5132.

Exhibit R-2a, RDT&E Project Justification

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BUDGET ACTIVITY					PE NUMBER AND TITLE			PROJECT NUMBER AND TITLE		
07 Operational System Development					0207449F C2 Constellation			5064 Airframe		
Cost (\$ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
5064 Airframe	209.747	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

1. See PE 0207450F, Project 5131 for funding data beginning in FY 2005.

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

This project is established to design, develop, and integrate modifications to a wide-body aircraft to host multiple sensor configurations, and its Battle Management Command and Control (BMC2) suite. The E-10 is a key node of the C2 Constellation (see PE 0207449F) bringing operational command and control to the joint warfighter through the use of advanced sensors, sensor fusion, network-centric warfare and high-speed, wide band communications systems. The E-10 aircraft series will employ both on-board and off-board sensors, communications, data links, and battle management integration software to execute the full range of military operations. The E-10 will interface with multi-Service ground/air/space-based sensors, intelligence and communications assets to shorten the decision cycle for combat operations. The E-10 will enable the detection, designation, and prosecution of time critical targets by providing battlespace situational awareness. The result is weapons-quality target cueing for joint and coalition shooters to engage time sensitive cruise missiles and other fleeting high-priority targets.

The E-10A, equipped with the Multi-Platform Radar Technology Insertion Program (MP-RTIP) radar, will deliver a focused Air Moving Target Indicator (AMTI) capability for Cruise Missile Defense (CMD); an advanced, next-generation Ground Moving Target Indicator (GMTI) and Synthetic Aperture Radar (SAR) imaging capability for surface surveillance; and an open system architecture to facilitate dynamic Battle Management, Command and Control (BMC2) with growth potential for Unmanned Aerial Vehicle (UAV) control, space-based radar interface and Intelligence, Surveillance and Reconnaissance (ISR) management functions--all integrated onto a 767-400ER testbed. The initial spiral of E-10A's Increment 1 will deliver the core capability to perform the focused AMTI and GMTI missions to include data processing and advanced communications links. Future spirals within E-10A Increment 1 are envisioned to incorporate sensor fusion, advanced battle management functions, UAV control, space-based radar integration and laser communications, while future E-10 increments are envisioned to incorporate advanced sensors for air surveillance operations.

Funds in this project will be used to: (1) incrementally fund the purchase of a Boeing 767-400ER aircraft to serve as the testbed for the wide-area surveillance "large sized" variant of the MP-RTIP radar system, (2) design, develop, and execute the transformation of the 'green'/commercial 767-400ER platform into the E-10A testbed for Increment 1 capabilities (3) develop the E-10A Increment 1 BMC2 architectures to include, communications and computing applications, (4) support Weapon Systems Integration activities, and (5) pursue future studies/spiral development to support continuous improvement and implementation of Command & Control, Intelligence, Surveillance, and Reconnaissance (C2ISR) capabilities.

This program is Budget Activity 7 because it provides a vehicle for horizontal integration and allows developers, testers and warfighters to experiment, analyze, and explore operational concepts and new technologies to enhance operational system developments and improve capabilities of the 21st century aerospace force.

(U) **B. Accomplishments/Planned Program (\$ in Millions)**

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
(U) Horizontal Integration Efforts (FY04 plan to BTR funds to continue Horizontal Integration efforts, FY05 will transfer activity to Project 5078 in this PE)	7.534			
(U) Incremental funding of a 767-400ER testbed	5.000			

Project 5064

R-1 Shopping List - Item No. 154-4 of 154-27

Exhibit R-2a (PE 0207449F)

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Exhibit R-2a, RDT&E Project Justification

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BUDGET ACTIVITY				PE NUMBER AND TITLE				PROJECT NUMBER AND TITLE			
07 Operational System Development				0207449F C2 Constellation				5064 Airframe			
(U)	Systems engineering associated with the modification of the commercial testbed			22.406							
(U)	BMC2 efforts			15.300							
(U)	Weapons Systems Integration (WSI) efforts			143.635							
(U)	SPO Ops Effort			0.940							
(U)	Sensor Lab/Test Hardware			14.400							
(U)	Conduct Future Studies/Spiral Development--includes concept exploration, program definition/risk reduction, and spiral development efforts supporting continuous improvement and implementation of Command & Control, Intelligence, Surveillance, and Reconnaissance (C2ISR) capabilities enabling the joint air and cruise missile defense architecture, joint decisive operations and the AEF Task Force CONOPS.			0.532							
(U)	Total Cost			209.747			0.000		0.000		0.000
Remark: In FY 2005, activity transferred to PE 0207450F, Project 5131											
(U)	<u>C. Other Program Funding Summary (\$ in Millions)</u>										
		<u>FY 2004</u>	<u>FY 2005</u>	<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>Cost to</u>	<u>Total Cost</u>
		<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	
(U)	AF RDT&E										
(U)	PE 0207449F/Project 5065										
	Sensors	145.586	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
(U)	PE 0207450F/Project 5132										
	MC2A Sensors	0.000	201.020	146.429	183.982	166.973	122.955	45.921	0.000	Continuing	TBD
(U)	PE 0207450F/Project 5131										
	Airframe	0.000	217.986	250.582	205.263	420.642	315.545	248.953	74.784	Continuing	TBD
(U)	APAF										
(U)	PE 0207450F (E-10A										
	Production)	0.000	0.000	0.000	0.000	0.000	69.535	705.502	773.687	Continuing	TBD
(U)	<u>D. Acquisition Strategy</u>										
The E-10A acquisition strategy approved by USD/AT&L on 22 Apr 03, permitted the program to enter the pre-System Development & Demonstration phase.											
The Multi-Platform Radar Technology Insertion Program (MP-RTIP) Acquisition Decision Memorandum (ADM), dated 4 Dec 03, delayed the E-10A Milestone B date from July 2004 to July 2005. This allows for the completion of several trade studies regarding GMTI and elevated sensors for the integrated theater air and missile defense architecture to support cruise missile defense.											

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Exhibit R-3, RDT&E Project Cost Analysis												DATE February 2005		
BUDGET ACTIVITY 07 Operational System Development						PE NUMBER AND TITLE 0207449F C2 Constellation						PROJECT NUMBER AND TITLE 5064 Airframe		
(U) <u>Cost Categories</u> (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract</u> <u>Method &</u> <u>Type</u>	<u>Performing</u> <u>Activity &</u> <u>Location</u>	<u>Total</u> <u>Prior to FY</u> <u>2004</u> <u>Cost</u>	<u>FY 2004</u> <u>Cost</u>	<u>FY 2004</u> <u>Award</u> <u>Date</u>	<u>FY 2005</u> <u>Cost</u>	<u>FY 2005</u> <u>Award</u> <u>Date</u>	<u>FY 2006</u> <u>Cost</u>	<u>FY 2006</u> <u>Award</u> <u>Date</u>	<u>FY 2007</u> <u>Cost</u>	<u>FY 2007</u> <u>Award</u> <u>Date</u>	<u>Cost to</u> <u>Complete</u>	<u>Total Cost</u>	<u>Target</u> <u>Value of</u> <u>Contract</u>
(U) <u>Product Development</u> Weapon System Integration (WSI)	SS/CPAF	Northrop Grumman Systems Corporation; Melbourne, FL	64.500	143.635	May-03							Continuing	TBD	TBD
Systems Engineering	Various	Various	13.316	21.549	Oct-03							Continuing	TBD	TBD
AFOTEC	MIPR	Various	0.000	0.154	Jan-04							Continuing	TBD	TBD
JTF	SS/T&M	Titan Systems Corporation; Melbourne, FL	0.259	0.703	Jan-04							Continuing	TBD	TBD
DARPA	Allotment	Various	8.652	0.000								Continuing	TBD	TBD
BMC2-Winner	C/CPAF	Northrop-Gru mman, Melbourne, FL	0.000	4.800	Sep-04							Continuing	TBD	TBD
BMC2-Competition Team A	C/FFP	The Boeing Company; Seattle, WA	0.500	3.500	Oct-03							Continuing	TBD	TBD
BMC2-Competition Team B	C/FFP	Northrop-Gru mman, Melbourne, FL	0.500	3.500	Oct-03							Continuing	TBD	TBD
BMC2-Competition Team C	C/FFP	Lockheed-Ma rtin; Colorado Springs, CO	0.500	3.500	Oct-03							Continuing	TBD	TBD
767-400ER Testbed	SS/FFP	The Boeing Company; Seattle, WA	20.000	5.000	Oct-03							Continuing	TBD	TBD
Sensor Lab/Test Hardware	SS/CPAF	Northrop Grumman Systems Corporation (MP-RTIP); El Segundo, CA	0.000	14.400	Mar-04							Continuing	TBD	TBD
Horizontal Integration	Various	Various	20.500	7.534								Continuing	TBD	TBD
Project 5064			R-1 Shopping List - Item No. 154-6 of 154-27										Exhibit R-3 (PE 0207449F)	

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Exhibit R-3, RDT&E Project Cost Analysis

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BUDGET ACTIVITY						PE NUMBER AND TITLE			PROJECT NUMBER AND TITLE		
07 Operational System Development						0207449F C2 Constellation			5064 Airframe		
Future Studies/Spiral Development	Various	Various	0.000	0.532	Mar-04				Continuing	TBD	TBD
Subtotal Product Development			128.727	208.807		0.000	0.000	0.000	Continuing	TBD	TBD
Remarks:	Where Various Contract Method & Types take place, earliest date funds will obligated is noted.										
	* Note: Awaiting competition results to determine contract award.										
(U) <u>Management</u>											
Program Office Support	Various	Various	0.668	0.940	Oct-03				Continuing	TBD	TBD
Subtotal Management			0.668	0.940		0.000	0.000	0.000	Continuing	TBD	TBD
Remarks:	Where Various Contract Method & Types take place, earliest date funds will obligated is noted.										
(U) Total Cost			129.395	209.747		0.000	0.000	0.000	Continuing	TBD	TBD
Remark: See PE 0207450F, Project 5131 for activity beginning in FY 2005											

Exhibit R-4, RDT&E Schedule Profile

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PROJECT NUMBER AND TITLE

5064 Airframe

E-10A Schedule



Please refer to PE 0207450F for the E-10A schedule.

***Funding and Activity
Transferred to PE 0207450F
in FY 2005***

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Exhibit R-4a, RDT&E Schedule Detail

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07 Operational System Development

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PROJECT NUMBER AND TITLE

5064 Airframe

(U) Schedule ProfileFY 2004FY 2005FY 2006FY 2007

(U) System Requirements Review

2Q

(U) Initial Design Review (IDR)

4Q

Remark: In FY 2005, activity transferred to PE 0207450F, Project 5131

Exhibit R-2a, RDT&E Project Justification

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BUDGET ACTIVITY					PE NUMBER AND TITLE			PROJECT NUMBER AND TITLE		
07 Operational System Development					0207449F C2 Constellation			5065 Sensors		
Cost (\$ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
5065 Sensors	145.586	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

1. See PE 0207450F, Project 5132 for funding data beginning in FY2005.

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

This project is established to develop a family of modular, scalable next generation sensors for multiple platforms to support network centric operations with integrated intelligence, surveillance, and reconnaissance capability.

The Multi-Platform Radar Technology Insertion Program (MP-RTIP) radar, a modular, scalable, two-dimensional active electronically scanned array (2D-AESA) radar, is the sensor capability of the E-10A Increment 1 weapon system to provide cruise missile defense and improved ground moving target indicator (GMTI)/synthetic aperture radar (SAR) imaging. MP-RTIP will deliver a "large sensor" variant for the E-10A aircraft, and a "small sensor" variant for the Global Hawk.

Funds in this project will be used for the development, fabrication, and test of the MP-RTIP family of scaleable radars on the various platforms (E-10A and Global Hawk). The MP-RTIP program continues to support NATO Alliance Ground Surveillance (AGS) conceptual design and early design development activities.

This program is Budget Activity 7 (BA-7) because the MP-RTIP radar program funding was originally categorized as BA-7 to reflect a technology insertion program within the Joint STARS (PE 0207581F) program. The program retained its technology insertion character when MP-RTIP's funding transferred into program element 0207449F and remained in the BA-7 category.

(U) **B. Accomplishments/Planned Program (\$ in Millions)**

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
(U) Continue Multi-Platform RTIP radar design and development for integration on the E-10A and Global Hawk target platforms	143.742			
(U) Continue Test Efforts (examples include: Operator-In-The-Loop [OITL]; Joint Test Force Support; AFOTEC Support, and Independent Verification & Validation IV&V).	1.031			
(U) Continue SPO Operations	0.678			
(U) Continue Future Studies/Spiral Development--includes concept exploration, program definition/risk reduction, sensor technology development and spiral development efforts supporting continuous improvements and implementation of Command & Control, Intelligence, Surveillance, and Reconnaissance (C2ISR) capabilities enabling the joint air and cruise missile defense architecture, joint decisive operations and the AEF Task Force CONOPS.	0.135			
(U) Total Cost	145.586	0.000	0.000	0.000
Remark: In FY 2005, activity transferred to PE 0207450F, Project 5132				

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5065 Sensors

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

	<u>FY 2004</u>	<u>FY 2005</u>	<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>Cost to</u>	<u>Total Cost</u>
	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	
(U) AF RDT&E										
(U) PE 0207449F/Project 5064 Airframe	209.747	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
(U) PE 0207450F/Project 5132 Sensors	0.000	201.020	146.429	183.982	166.973	122.955	45.921	0.000	Continuing	TBD
(U) PE 0207450F/Project 5131 Airframe	0.000	217.986	250.582	205.263	420.642	315.545	248.953	74.784	Continuing	TBD
(U) PE 0305205F/Project 4799 (Global Hawk MP-RTIP Sensor)	30.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
(U) PE 0305220F/Project 5144 (Global Hawk MP-RTIP Sensor)	0.000	33.594	18.000	8.000	0.000	0.000	0.000	0.000	Continuing	TBD
(U) APAF										
(U) PE 0207450F (E-10A Production)	0.000	0.000	0.000	0.000	0.000	69.535	705.502	773.687	Continuing	TBD

(U) **D. Acquisition Strategy**

The MP-RTIP Acquisition Decision Memorandum (ADM), dated 4 Dec 03, approved Global Hawk MP-RTIP entry into SDD and continued platform integration efforts for other platforms. MP-RTIP SDD activities began in FY 2004.

The MP-RTIP program currently plans to provide sensors for seven aircraft (1 test bed and 6 production aircraft) and 12 Global Hawk air vehicles. LRIP quantities for Global Hawk (6 radars) were established at the MP-RTIP Milestone B in FY 2003. LRIP quantities for a widebody aircraft will be addressed at the E-10A Milestone B in FY 2005.

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Exhibit R-3, RDT&E Project Cost Analysis

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BUDGET ACTIVITY						PE NUMBER AND TITLE						PROJECT NUMBER AND TITLE			
07 Operational System Development						0207449F C2 Constellation						5065 Sensors			
(U) <u>Cost Categories</u> (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract</u> <u>Method &</u> <u>Type</u>	<u>Performing</u> <u>Activity &</u> <u>Location</u>	<u>Total</u> <u>Prior to FY</u> <u>2004</u> <u>Cost</u>	<u>FY 2004</u> <u>Cost</u>	<u>FY 2004</u> <u>Award</u> <u>Date</u>	<u>FY 2005</u> <u>Cost</u>	<u>FY 2005</u> <u>Award</u> <u>Date</u>	<u>FY 2006</u> <u>Cost</u>	<u>FY 2006</u> <u>Award</u> <u>Date</u>	<u>FY 2007</u> <u>Cost</u>	<u>FY 2007</u> <u>Award</u> <u>Date</u>	<u>Cost to</u> <u>Complete</u>	<u>Total Cost</u>	<u>Target</u> <u>Value of</u> <u>Contract</u>	
(U) <u>Product Development</u> Multi-Platform Radar Technology Insertion Program (MP-RTIP)	SS/CPAF	Northrop Grumman Systems Corporation; El Segundo, CA	302.259	128.830	Oct-03							Continuing	TBD	TBD	
Systems Engineering associated with MP-RTIP	Various	Various	16.357	14.912	Oct-03							Continuing	TBD	TBD	
DARPA	Allotment	Various	7.748	0.000								Continuing	TBD	TBD	
Future Studies/Spiral Development	Various	Various	0.000	0.135	Mar-04							Continuing	TBD	TBD	
Subtotal Product Development			326.364	143.877		0.000		0.000		0.000		Continuing	TBD	TBD	
Remarks:	For "Various" earliest date funds will be obligated is noted.														
(U) <u>Test & Evaluation</u> OITL	SS/T&M	Hanscom AFB, MA	1.300	0.000								Continuing	TBD	TBD	
JTF Support	SS/T&M	Titan Systems Corporation; Melbourne, FL	0.421	0.556	Jan-04							Continuing	TBD	TBD	
AFOTEC Support	MIPR	Various	0.366	0.000								Continuing	TBD	TBD	
IV&V	MIPR	Various	0.450	0.475	Jan-04							Continuing	TBD	TBD	
Subtotal Test & Evaluation			2.537	1.031		0.000		0.000		0.000		Continuing	TBD	TBD	
Remarks:															
(U) <u>Management</u> Program Office Support	Various	Various	1.358	0.678	Oct-03							Continuing	TBD	TBD	
Subtotal Management			1.358	0.678		0.000		0.000		0.000		Continuing	TBD	TBD	
Remarks:	For "Various" earliest date funds will be obligated is noted.														
(U) Total Cost			330.259	145.586		0.000		0.000		0.000		Continuing	TBD	TBD	
Remarks: FY 2002 and prior funds are reflected in JSTARS/PE 0207581F FY 2003 and FY2004 funds are reflected in C2 Constellation/PE 0207449F FY 2005 funding activity transfers to PE 0207450F, Project 5132															

Exhibit R-4, RDT&E Schedule Profile

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BUDGET ACTIVITY

07 Operational System Development

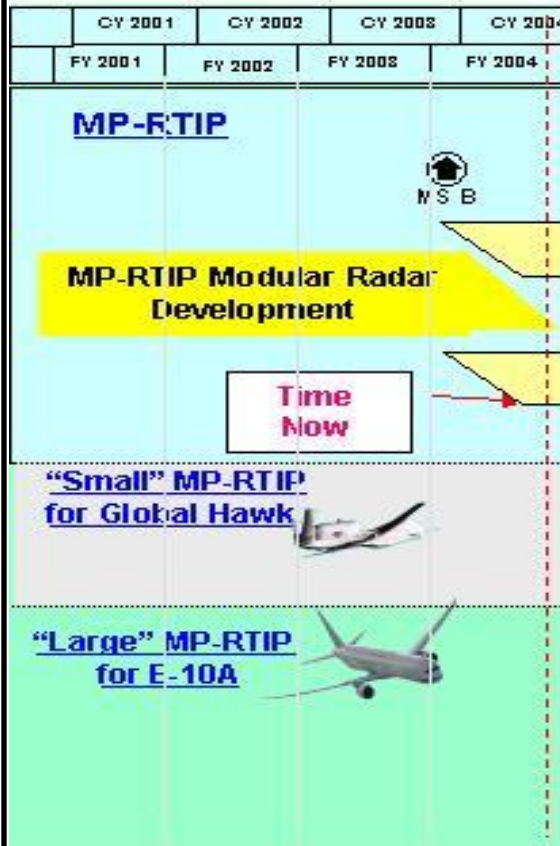
PE NUMBER AND TITLE

0207449F C2 Constellation

PROJECT NUMBER AND TITLE

5065 Sensors

MP-RTIP Schedule



Please refer to PE 0207450F for the MP-RTIP schedule.

***Funding and Activity
Transferred to PE 0207450F
in FY 2005***

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Exhibit R-4a, RDT&E Schedule Detail

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PROJECT NUMBER AND TITLE

5065 Sensors

(U) Schedule ProfileFY 2004FY 2005FY 2006FY 2007

(U) MILESTONE B

1Q

(U) FINAL DESIGN REVIEW (FDR)

3Q

Remark: In FY 2005, activity transferred to PE 0207450F, Project 5132

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BUDGET ACTIVITY					PE NUMBER AND TITLE			PROJECT NUMBER AND TITLE		
07 Operational System Development					0207449F C2 Constellation			5078 Horizontal Integration		
Cost (\$ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
5078 Horizontal Integration	0.000	12.646	10.665	13.705	25.615	25.229	25.702	26.012	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

In FY04, Horizontal Integration efforts were done in project 5064, Airframe.

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

Project 5078, Horizontal Integration, is established to develop an integrated capability to support network centric operations. Project 5078 defines the C2 Constellation (C2C) through six thrust areas: first, Operational Requirements and Planning documentation will be created/updated; second, Systems Engineering Policy & Guidance, Education and Architecture will be developed to further refine the C2C and provide baseline data for more detailed analysis; third, operators and systems engineers will perform analyses to validate and prioritize the major issues facing the C2C and develop net-centric roadmaps; fourth, various Modeling & Simulation and experimentation methods will be used to test both non-materiel and materiel solutions; fifth, Joint Integration/applicability will be researched and applied; and sixth, Horizontal Integration Initiatives will be built and transitioned to the warfighter as the final step in the C2C systems engineering process. Program specifics are:

(1) Operational Requirements documents (e.g., Program Management Directive, Concept of Employment, Initial Capability Document and C2C Architecture) will be published/revised. A FYDP Implementation plan identifying the most significant C2C net-centric integration issues will continue to be developed.

(2) Systems Engineering and Architecture Development is the 'glue' which will hold C2C elements together, and close the seams in the C4ISR architecture. C2C system and technical architectures, cross program requirements allocation, key cost drivers, risk assessments and corresponding risk mitigation strategies will be examined.

(3) Operators and System Engineers Analysis for Net-centric capability across Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) programs will continue. The resulting Net-centric Strategic Plan will impact C4ISR program roadmaps and feed directly into the C2ISR and C4ISR Net-centric Flight Plans. Provides Air Staff with issue development, data collection, data analysis, mapping of capabilities to system functions, and supports the ability to develop trade space recommendations through use of a Capability Evolution Methodology assessment tool.

(4) M&S and Experimentation will leverage existing government/industry development and simulation sites to allow 'virtual' assessments of the C2 Constellation. Facility network architecture management, new or improved communications linkages between the various government and industry simulation sites, with the required accreditation and encryption systems will be developed. A series of experiments, exercises and simulations will provide alternatives and targets of opportunity for further engineering improvements and integration.

(5) Numerous C4ISR Joint Interoperability/Integration issues exist due to the dozens of non-Air Force programs/nodes contained within the C2 Constellation enterprise. Focuses on supporting several major venues including: JBMC2 Roadmap, JFCOM Board of Directors and the Multi - Service Working Group.

(6) Horizontal Integration Initiatives will capitalize on near-term opportunities to eliminate known horizontal integration deficiencies in the seamless C4ISR network vision. These initiatives will become integral to weapon systems' configuration controlled baselines.

Exhibit R-2a, RDT&E Project Justification

DATE

February 2005

BUDGET ACTIVITY

07 Operational System Development

PE NUMBER AND TITLE

0207449F C2 Constellation

PROJECT NUMBER AND TITLE

5078 Horizontal Integration

This program is in Budget Activity 7 - Operational System Development because it provides horizontal integration and provides developers, testers and warfighters a way to experiment, analyze, and explore operational concepts and new technologies to enhance operational system developments and improve capabilities of the 21st century aerospace force.

(U) **B. Accomplishments/Planned Program (\$ in Millions)**

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
(U) Operational Requirements/Planning documents creation/update	0.000	0.818	0.920	0.990
(U) Systems Engineering Policy/Guidance and Architecture & Architecture Education Development	0.000	6.157	4.075	6.045
(U) Operational Analysis supporting Net-Centric Integration;	0.000	2.071	1.906	2.671
(U) M&S Infrastructure and Operational Experimentation	0.000	2.000	2.000	2.000
(U) Joint Interoperability/Integration Efforts	0.000	0.600	0.764	0.800
(U) Horizontal Integration Initiative focused on warfighting capability development	0.000	1.000	1.000	1.199
(U) Total Cost	0.000	12.646	10.665	13.705

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

	<u>FY 2004</u>	<u>FY 2005</u>	<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>Cost to</u>	<u>Total Cost</u>
	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	
(U) Not applicable										

(U) **D. Acquisition Strategy**

This project uses full and open competition for one or more operational requirements document creation, systems engineering & architecture development, modeling & simulation and experimentation, joint interoperability/integration, and horizontal integration approaches.

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Exhibit R-3, RDT&E Project Cost Analysis

DATE

February 2005

BUDGET ACTIVITY					PE NUMBER AND TITLE						PROJECT NUMBER AND TITLE				
07 Operational System Development					0207449F C2 Constellation						5078 Horizontal Integration				
(U) Cost Categories (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	Contract Method & Type	Performing Activity & Location	Total Prior to FY 2004 Cost	FY 2004 Cost	FY 2004 Award Date	FY 2005 Cost	FY 2005 Award Date	FY 2006 Cost	FY 2006 Award Date	FY 2007 Cost	FY 2007 Award Date	Cost to Complete	Total Cost	Target Value of Contract	
(U) Product Development															
Systems Engineer, Operation Integration Analysis, M&S, and Experimentation	C/CPAF	Lockheed Martin, ESC Hanscom AFB, MA				2.816	Nov-04	0.823	Nov-05	3.020	Nov-06	Continuing	TBD	TBD	
Horizontal Integration	C/CPAF	ACS Defense, ESC Hanscom AFB, MA				0.600	Apr-05	0.600	Apr-06	0.650	Apr-07	Continuing	TBD	TBD	
Experimentation	SPO Managed	ESC/SR, ESC Hanscom AFB, MA				0.250	Dec-04	0.250	Dec-05	0.250	Dec-06	Continuing	TBD	TBD	
System Engineering and Experimentation	C/T&M	MIT/LL, ESC Hanscom AFB, MA				1.200	Dec-04	1.200	Dec-05	1.500	Dec-06	Continuing	TBD	TBD	
System Engineering	FFRDC	MITRE, ESC Hanscom AFB, MA				2.676	Dec-04	2.676	Dec-05	2.676	Dec-06	Continuing	TBD	TBD	
Operational Integration Analysis	MIPR	AF/XI				1.000	Dec-04	1.000	Oct-05	1.199	Oct-06	Continuing	TBD	TBD	
Operational Requirements Planning Documents, System Engineering, Operation Integration Analysis, and Joint Interoperability Integration efforts	MIPR	AFC2ISRC/ CX				2.564	Oct-04	2.564	Oct-05	2.000	Oct-06	Continuing	TBD	TBD	
Various	Various	ESC Hanscom AFB, MA				0.912	Dec-04	0.912	Dec-05	1.770	Dec-06	Continuing	TBD	TBD	
Subtotal Product Development			0.000	0.000		12.018		10.025		13.065		Continuing	TBD	TBD	
Remarks:															
(U) Support															
Subtotal Support			0.000	0.000		0.000		0.000		0.000		0.000	0.000	0.000	
Remarks:															
(U) Test & Evaluation															
T&E	PO	605th Test Squadron				0.300	Nov-04	0.300	Nov-05	0.300	Nov-06	Continuing	TBD	TBD	
Subtotal Test & Evaluation			0.000	0.000		0.300		0.300		0.300		Continuing	TBD	TBD	
Remarks:															
(U) Management															
Program Management Support	FFRDC	MITRE, ESC				0.328	Dec-04	0.340	Dec-05	0.340	Dec-05	Continuing	TBD	TBD	
Project 5078			R-1 Shopping List - Item No. 154-17 of 154-27										Exhibit R-3 (PE 0207449F)		

R-1 Shopping List - Item No. 154-17 of 154-27

Exhibit R-3 (PE 0207449F)

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Exhibit R-3, RDT&E Project Cost Analysis

DATE

February 2005

BUDGET ACTIVITY

07 Operational System Development

PE NUMBER AND TITLE

0207449F C2 Constellation

PROJECT NUMBER AND TITLE

5078 Horizontal Integration

	Hanscom AFB, MA								
Subtotal Management		0.000	0.000	0.328	0.340	0.340	Continuing	TBD	TBD
Remarks:									
(U) Total Cost		0.000	0.000	12.646	10.665	13.705	Continuing	TBD	TBD

Exhibit R-4, RDT&E Schedule Profile

DATE

February 2005

BUDGET ACTIVITY

07 Operational System Development

PE NUMBER AND TITLE

0207449F C2 Constellation

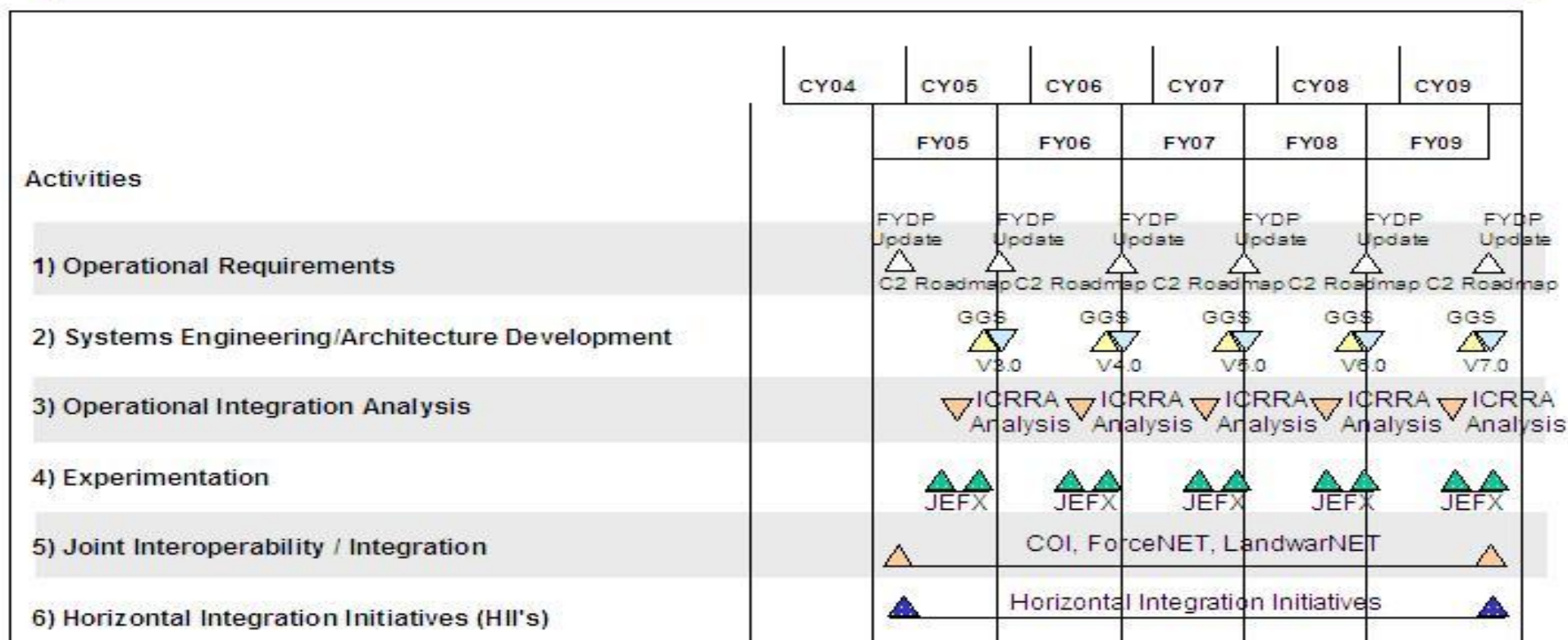
PROJECT NUMBER AND TITLE

5078 Horizontal Integration



U.S. AIR FORCE

C2C Schedule



Integrity - Service - Excellence

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Exhibit R-4a, RDT&E Schedule Detail

DATE

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BUDGET ACTIVITY

07 Operational System Development

PE NUMBER AND TITLE

0207449F C2 Constellation

PROJECT NUMBER AND TITLE

5078 Horizontal Integration(U) **Schedule Profile**FY 2004FY 2005FY 2006FY 2007

(U) Operational Requirements Documents

3-4Q

3-4Q

3-4Q

(U) Systems Engineering & Architecture

4Q

4Q

4Q

(U) Operational Integration Analysis

2-3Q

2-3Q

2-3Q

(U) M&S Infrastructure and Experimentation

2-3Q

2-3Q

2-3Q

(U) Joint Interoperability/Integration

1-4Q

1-4Q

1-4Q

(U) Horizontal Integration Initiatives

1-4Q

1-4Q

1-4Q

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Exhibit R-2a, RDT&E Project Justification

DATE

February 2005

BUDGET ACTIVITY 07 Operational System Development					PE NUMBER AND TITLE 0207449F C2 Constellation			PROJECT NUMBER AND TITLE 5140 Joint Expeditionary Force Experiments		
Cost (\$ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
5140 Joint Expeditionary Force Experiments	0.000	30.884	30.406	31.704	32.761	33.407	33.833	34.070	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

In FY05, work transferred in from PE 0207028F, Joint Expeditionary Force Experiments, project 4373.

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

The Joint Expeditionary Force Experiments (JEFX) and Advanced Process Technology Experiments (APTIX) are large-scale warfighter experiments that address emerging operational challenges and are part of the total Air Force (AF) experimentation effort. JEFX and APTIX explore significant capability gaps across the range of AF CONOPS and address critical lessons learned from recent operations. They combine live-fly forces and simulations into an operationally representative warfighter environment. JEFX, spirally conducted, and APTIX provide a multi-dimensional, multi-national, multi-service environment for an end-to-end process of exploration, assessment, and transition of capabilities that will provide joint and coalition warfighters with solutions to gaps identified in the Integrated Capability Review and Risk Assessment (I-CRRA) process and through lessons learned in recent and current operations. They are part of a broader effort to implement the Joint Vision 2020, demonstrate emerging Air Force capabilities to deploy and employ decisive aerospace power for the Joint Force Commander, and are important enablers of innovation and transformation. JEFX occurs on even years and APTIX on odd years.

This program is in Budget Activity 7 - Operational System Development because it provides horizontal integration, developers, testers, and warfighters to experiment, analyze, and explore operational concepts and new technologies to enhance operational system developments and improve capabilities of the 21st century aerospace force

(U) **B. Accomplishments/Planned Program (\$ in Millions)**

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
(U) Spiral develop systems architecture, systems engineering, and integration of initiatives into a cohesive system of systems, the integration of systems and process is the major reason JEFX is an experiment and not simply a demonstration or exercise		5.124	3.583	5.160
(U) Plan, design, coordinate, assess and report the APTIX and JEFX experiments, provide expertise to support SPO functions of initiative selection, acquisition, program management, communications and systems planning		6.725	4.914	7.000
(U) Develop initiatives to introduce new technologies and operational capabilities into the Aerospace Expeditionary Force (AEF) Concept of Operations (CONOPS) and develop and install Command and Control (C2) center upgrades		6.861	5.731	7.164
(U) Implement architectural configuration, conduct M&S, install and the test the communications infrastructure and execute the experiment		2.174	16.178	2.380
(U) Transition the integration of new intoxicative and legacy systems into an integrated C2ISR baseline		10.000	0.000	10.000
(U) Total Cost	0.000	30.884	30.406	31.704

Project 5140

R-1 Shopping List - Item No. 154-21 of 154-27

Exhibit R-2a (PE 0207449F)

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Exhibit R-2a, RDT&E Project Justification

DATE

February 2005

BUDGET ACTIVITY

07 Operational System Development

PE NUMBER AND TITLE

0207449F C2 Constellation

PROJECT NUMBER AND TITLE

5140 Joint Expeditionary Force
Experiments(U) C. Other Program Funding Summary (\$ in Millions)

<u>FY 2004</u>	<u>FY 2005</u>	<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>Cost to</u>	<u>Total Cost</u>
<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	

(U) Not applicable

(U) D. Acquisition Strategy

JEFX supports evolutionary acquisition of multiple programs by providing a venue to experiment new and emerging technologies to be integrated into other systems-or-record.

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Exhibit R-3, RDT&E Project Cost Analysis												DATE February 2005		
BUDGET ACTIVITY 07 Operational System Development						PE NUMBER AND TITLE 0207449F C2 Constellation						PROJECT NUMBER AND TITLE 5140 Joint Expeditionary Force Experiments		
(U) <u>Cost Categories</u> (Tailor to WBS, or System/Item Requirements) (\$ in Millions)	<u>Contract</u> <u>Method &</u> <u>Type</u>	<u>Performing</u> <u>Activity &</u> <u>Location</u>	<u>Total</u> <u>Prior to FY</u> <u>2004</u> <u>Cost</u>	<u>FY 2004</u> <u>Cost</u>	<u>FY 2004</u> <u>Award</u> <u>Date</u>	<u>FY 2005</u> <u>Cost</u>	<u>FY 2005</u> <u>Award</u> <u>Date</u>	<u>FY 2006</u> <u>Cost</u>	<u>FY 2006</u> <u>Award</u> <u>Date</u>	<u>FY 2007</u> <u>Cost</u>	<u>FY 2007</u> <u>Award</u> <u>Date</u>	<u>Cost to</u> <u>Complete</u>	<u>Total Cost</u>	<u>Target</u> <u>Value of</u> <u>Contract</u>
(U) <u>Product Development</u> Experimentation	FFRDC	MITRE, ESC Hanscom AFB, MA				2.324	Dec-04	1.882	Dec-05	2.360	Dec-06	Continuing	TBD	TBD
Experimentation	C/CPAF	Lockheed Martin, ESC Hanscom AFB, MA				1.800	Dec-04	3.000	Dec-05	1.800	Dec-06	Continuing	TBD	TBD
Experimentation	C/IDIQ	ACS Defense, ESC Hanscom AFB, MA				1.575	Apr-05	0.951	Apr-06	1.575	Apr-07	Continuing	TBD	TBD
Experimentation	C/T&M	Northrop Grumman, ESC Hanscom AFB, MA				0.200	Dec-04	0.275	Dec-05	0.200	Dec-06	Continuing	TBD	TBD
Experimentation	C/T&M	Logicon, ESC Hanscom AFB, MA				0.500	Dec-04	0.290	Dec-05	0.500	Dec-06	Continuing	TBD	TBD
Experimentation	MIPR	GSA				1.706	Dec-04	0.806	Dec-05	1.706	Dec-06	Continuing	TBD	TBD
Experimentation	MIPR	ASC/RAB										Continuing	TBD	TBD
Experimentation	MIPR	AFRL				0.500	Dec-04			0.500	Dec-06	Continuing	TBD	TBD
Experimentation	C/T&M	General Dynamics, ESC Hanscom AFB, MA				0.450	Dec-04	0.290	Oct-05	0.450	Oct-06	Continuing	TBD	TBD
Various	Various	ESC				0.180	Dec-04			0.180	Dec-06	Continuing	TBD	TBD
Various	MIPR	Various				4.589	Dec-04	1.513	Dec-05	5.043	Dec-06	Continuing	TBD	TBD
Various	C/T&M	CITPAD, ESC Hanscom AFB, MA										Continuing	TBD	TBD
Experimentation	MIPR	L3 Comm				1.000	Dec-04	1.050	Dec-05	1.050	Dec-06	Continuing	TBD	TBD
Experimentation	C/GSA	Sverdrup				0.175	Oct-04	0.175	Oct-05	0.175	Oct-06	Continuing	TBD	TBD
Experimentation	C/GSA	Northrop Grumman				0.250	Oct-04	0.250	Oct-05	0.250	Oct-06	Continuing	TBD	TBD
Project 5140				R-1 Shopping List - Item No. 154-23 of 154-27								Exhibit R-3 (PE 0207449F)		

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Exhibit R-3, RDT&E Project Cost Analysis										DATE February 2005			
BUDGET ACTIVITY 07 Operational System Development					PE NUMBER AND TITLE 0207449F C2 Constellation				PROJECT NUMBER AND TITLE 5140 Joint Expeditionary Force Experiments				
Experimentation	MIPR	505CCW Hurlburt Field, FL			0.000	Feb-05	8.025	Feb-06	0.000	Feb-07	Continuing	TBD	TBD
Experimentation	C/GSA	Alion, AFC2ISRC Langley AFB, VA			1.675	Dec-04	1.850	Nov-05	1.850	Nov-06	Continuing	TBD	TBD
Experimentation	C/GSA	Lockheed Martin, AFC2ISRC Langley AFB, VA			0.500	Dec-04	0.500	Nov-05	0.500	Nov-05	Continuing	TBD	TBD
Experimentation	C/GSA	SAIC, AFC2ISRC Langley AFB, VA			1.058	Dec-04	1.058	Nov-05	1.058	Nov-05	Continuing	TBD	TBD
Experimentation	C/GSA	L3 Comm, AFC2ISRC Langley AFB, VA			1.207	Dec-04	1.207	Nov-05	1.207	Nov-06	Continuing	TBD	TBD
Experimentation	C/GSA	Northrop Grumman, AFC2ISRC Langley AFB, VA			0.300	Dec-04	0.300	Nov-05	0.300	Nov-05	Continuing	TBD	TBD
Experimentation	C/GSA	Zel Tech, AFC2ISRC Langley AFB, VA			0.220	Dec-04	0.220	Nov-05	0.220	Nov-06	Continuing	TBD	TBD
Various	MIPR	Various			10.575	Feb-05	6.364	Jan-06	10.580	Oct-06	Continuing	TBD	TBD
Subtotal Product Development			0.000	0.000	30.784		30.006		31.504		Continuing	TBD	TBD
(U) <u>Support</u>													
Subtotal Support			0.000	0.000	0.000		0.000		0.000		0.000	0.000	0.000
Remarks:													
(U) <u>Test & Evaluation</u>													
T&E	PO	46th Test Squadron			0.100	Dec-04	0.400	Dec-05	0.200	Dec-06	Continuing	TBD	TBD
Subtotal Test & Evaluation			0.000	0.000	0.100		0.400		0.200		Continuing	TBD	TBD
Remarks:													
(U) <u>Management</u>													
Subtotal Management			0.000	0.000	0.000		0.000		0.000		0.000	0.000	0.000
Project 5140													
R-1 Shopping List - Item No. 154-24 of 154-27													
Exhibit R-3 (PE 0207449F)													

R-1 Shopping List - Item No. 154-24 of 154-27

Exhibit R-3 (PE 0207449F)

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Exhibit R-3, RDT&E Project Cost Analysis										DATE February 2005		
BUDGET ACTIVITY 07 Operational System Development					PE NUMBER AND TITLE 0207449F C2 Constellation			PROJECT NUMBER AND TITLE 5140 Joint Expeditionary Force Experiments				
Remarks: (U) Total Cost					0.000	0.000	30.884	30.406	31.704	Continuing	TBD	TBD

Exhibit R-4, RDT&E Schedule Profile

DATE

February 2005

BUDGET ACTIVITY

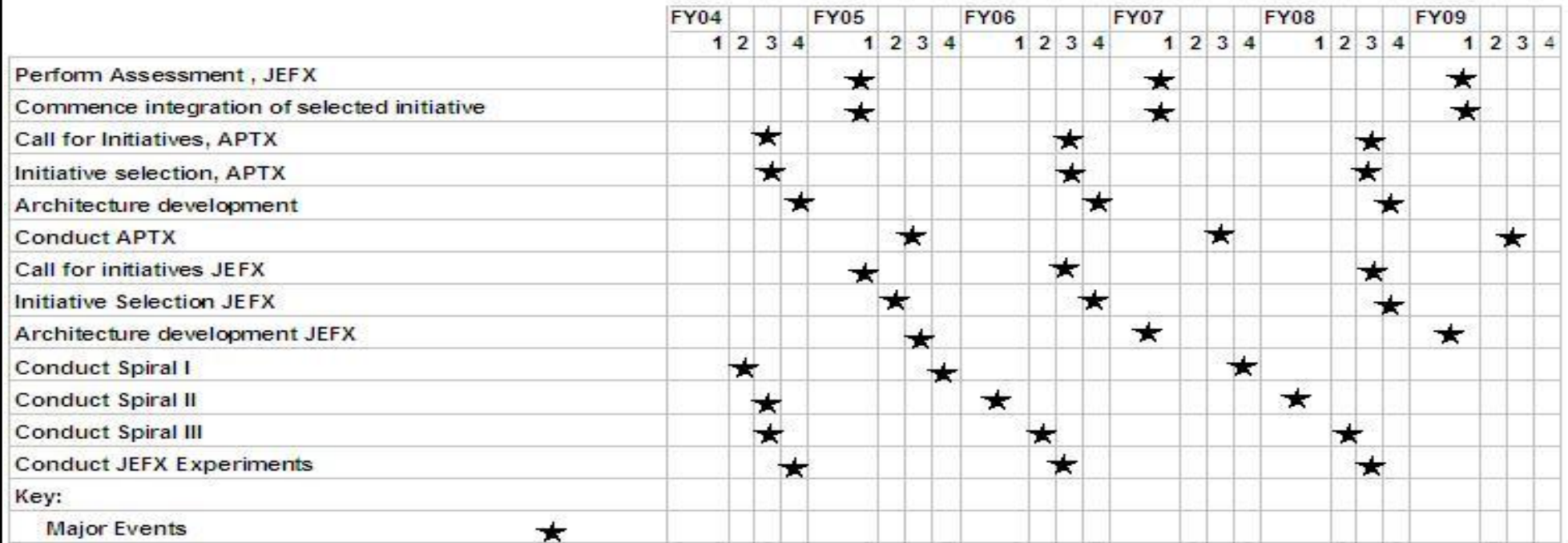
07 Operational System Development

PE NUMBER AND TITLE

0207449F C2 Constellation

PROJECT NUMBER AND TITLE

5140 Joint Expeditionary Force Experiments



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Exhibit R-4a, RDT&E Schedule Detail

DATE

February 2005

BUDGET ACTIVITY

07 Operational System Development

PE NUMBER AND TITLE

0207449F C2 Constellation

PROJECT NUMBER AND TITLE

5140 Joint Expeditionary Force
Experiments(U) **Schedule Profile**FY 2004FY 2005FY 2006FY 2007

(U) JEFX 04/06 Assessment

1Q

4Q

1Q

(U) Integration of Initiatives

1Q

4Q

1Q

(U) APTX 05/07 Integration

2Q

2Q

(U) APTX Initiative Selection

2Q

2Q

(U) Architecture Development

3Q

3Q

(U) APTX 05/07

2Q

2Q

(U) JEFX 06/08 Call for Initiatives

3Q

3Q

(U) JEFX 06/08 Selection

3Q

3Q

(U) JEFX 06/08 Architecture Developed

3Q

3Q

(U) Conduct Spiral 1

2Q

1Q

(U) Conduct Spiral 2

3Q

2Q

(U) Conduct Spiral 3

3Q

2Q

(U) Conduct JEFX Experiments

4Q

3Q