Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Air Force										DATE: February 2010	

APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE						
3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*					PE 0603788F: *Global Information Dev/Demo*						

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
Total Program Element	0.000	46.414	32.382	0.000	32.382	39.295	44.272	46.913	48.504	Continuing	Continuing
635319: *Anticipatory OPS Intent and Response*	0.000	10.569	8.031	0.000	8.031	8.889	9.912	8.648	6.354	Continuing	Continuing
635320: *Assured Worldwide Connectivity*	0.000	18.572	8.216	0.000	8.216	12.076	13.064	17.965	22.253	Continuing	Continuing
635321: *Global Battlespace Awareness*	0.000	9.829	9.318	0.000	9.318	10.676	10.800	13.351	12.403	Continuing	Continuing
635322: *Knowledge Management and Computing*	0.000	7.444	6.817	0.000	6.817	7.654	10.496	6.949	7.494	Continuing	Continuing

Note

Note: Prior to FY 2010, efforts in this PE were performed in PE 0603789F, C3I Advanced Development.

A. Mission Description and Budget Item Justification

This program develops and demonstrates Air Force Enterprise-Centric Information technologies for the warfighter. The technologies address the ability to support the global information exchange of correlated and fused information to ensure the Air Force can plan and execute missions in a dynamic, complex environment. The Global Battlespace Awareness project develops, integrates, and demonstrates advanced technologies to achieve comprehensive net-centric operations and total battlespace awareness by using and exploiting information from all sources. The Assured Worldwide Connectivity project provides advanced net-enabled architectures and communications technologies in support of global military operations including a secure information grid for worldwide information exchange of near-real-time multimedia (i.e., voice, data, video, and imagery) information. In addition, this project develops and demonstrates advanced optical networking and communications for Air Force air- and space-based information exchange on and between platforms. These developments implement and enable high capacity secure, assured networks for worldwide information exchange of near-real-time multimedia (i.e., voice, data, video, and imagery). These optical networks will be rapidly deployable, mobile, interoperable, and seamless between Air and Space Operations Centers (AOC) and air- and space- based platforms either en route or in theater. This project also provides the tools and applications leading to the development and integration of cyber deterrence technologies resulting in a strategic capability of cyber dominance within the secure information grid. The Knowledge Management and Computing project develops the technology applications that will provide for a secure, tailored, seamless exchange of information among producers, consumers, and managers of information relevant to a particular community of interest (COI). The project also provides the development of interactive and real-time computing technologies that greatly improve the usability of high performance computing for the exchange,

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2011 Air Force	**DATE:** February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*

utilization, and management of information in the enterprise. The Anticipatory Ops Intent and Response project develops the technologies for dynamic planning and execution with the accuracy, fidelity, and timeliness needed to dominate the battlespace. This project will develop and demonstrate technologies necessary for dynamic decision making to create, plan, and execute complex effects on compressed time scales required for tomorrow's conflicts regardless of the warfighting domain - air, space, or cyber. This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing upgrades and/or new system developments that have military utility and address warfighter needs.

B. Program Change Summary ($ in Millions)

	FY 2009	**FY 2010**	**FY 2011 Base**	**FY 2011 OCO**	**FY 2011 Total**
Previous President's Budget	0.000	39.708	0.000	0.000	0.000
Current President's Budget	0.000	46.414	32.382	0.000	32.382
Total Adjustments	0.000	6.706	32.382	0.000	32.382
• Congressional General Reductions		0.000			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	-0.194			
• Congressional Adds		6.900			
• Congressional Directed Transfers		0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	32.382	0.000	32.382

Congressional Add Details ($ in Millions, and Includes General Reductions)

	FY 2009	**FY 2010**
Project: 635320: *Assured Worldwide Connectivity*		
Congressional Add: *Massively Parallel Optical Interconnects for Battlespace Information Exchange.*	0.000	3.983
Congressional Add: *Cyber Attack and Security Environment.*	0.000	2.888
Congressional Add Subtotals for Project: 635320	0.000	6.871
Congressional Add Totals for all Projects	0.000	6.871

Air Force

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2011 Air Force	**DATE:** February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*

Change Summary Explanation

Note: In FY 2010, Congress added $4.0 million for Cyber Attack and Security Environment and $2.9 million for MPOI for Battlespace Information Exchange. The FY 2010 President's Budget submittal did not reflect FY 2011 through FY 2015 funding. A detailed explanation of changes between the two budget positions is not provided because it cannot be made in a relevant manner.

C. Performance Metrics

Under Development.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010

APPROPRIATION/BUDGET ACTIVITY 3600: Research, Development, Test & Evaluation, Air Force BA 3: Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603788F: Global Information Dev/Demo	PROJECT 635319: Anticipatory OPS Intent and Response

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
635319: Anticipatory OPS Intent and Response	0.000	10.569	8.031	0.000	8.031	8.889	9.912	8.648	6.354	Continuing	Continuing

Note

Note: Prior to FY 2010, these efforts were performed in PE 0603789F, C3I Advanced Technologies, Project 4872.

A. Mission Description and Budget Item Justification

In order to achieve information dominance, the Air Force must be able to monitor, assess, plan and execute (MAPE) missions rapidly across the full spectrum of operations (air, space, and cyberspace) at all levels of war (strategic, operational, and tactical) and during all phases of conflict (pre-conflict, conflict through stability operations). This project develops and integrates decision support technologies that will enhance the commander's ability to anticipate and dominate the future battlespace by more effectively forecasting the evolution of the battlespace and by more rapidly generating options to "virtually checkmate" the adversary. It develops the decision aid technologies and processes to plan the use of various assets and assess their effects in the battlespace. It provides a tailorable information environment to effectively portray complex data sets accurately in real-time.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
MAJOR THRUST: Develop and demonstrate distributed information technologies that are scalable and reconfigurable and provide seamless access to tailored multi-media and multi-spectral data.	0.000	1.694	1.446	0.000	1.446

    FY 2009 Accomplishments:
    In FY 2009: Not Applicable.

    FY 2010 Plans:
    In FY 2010: Continue developing capabilities to allow seamless information sharing for enhanced situational awareness and understanding by the decision maker. Continue the development of an initial capability to plan and measure effectiveness of information operations synchronized with precision munitions to determine successful achievement of command intent in time and location.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635319: *Anticipatory OPS Intent and Response*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Continue campaign of experimentation to quantitatively measure transformational command and control concepts enabled by net centric warfare capabilities. Initiate an investigation of space Command and Control (C2) planning and scheduling technologies to enable enhanced space operations. Start the development of an integrated C2 tasking capability to enable seamless full spectrum options to be reasoned over and recommendations provided to the operator that will meet commander's intent. Develop capability to generate a user-defined operational picture across the air, space, and cyber domains at the strategic, operational, and tactical levels. *FY 2011 Base Plans:* In FY 2011: Complete development of capabilities to allow seamless information sharing for enhanced situational awareness and understanding by the decision maker. Continue the development of an initial capability to plan and measure effectiveness of information operations synchronized with precision munitions to determine successful achievement of command intent in time and location. Continue campaign of experimentation to quantitatively measure transformational command and control concepts enabled by net centric warfare capabilities. Continue the investigation of space C2 planning and scheduling technologies to enable enhanced space operations. Continue development of an integrated C2 tasking capability to enable seamless full spectrum options to be reasoned over and recommendations provide to the operator that will meet commander's intent. Complete the development of the capability to integrate a variety of user-defined operating display technologies to visualize individual data set contexts for better situational awareness across the air, space and cyber domains at the strategic, operational, and tactical levels. Develop and demonstrate enhanced capability to conduct space C2. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
MAJOR THRUST: Develop and demonstrate the integration of planning tools and information-based intelligent agents for adaptive preplanning and decision support tools.	0.000	4.432	3.007	0.000	3.007

			FY 2011 Base	FY 2011 OCO	FY 2011 Total
	FY 2009	FY 2010			

Exhibit R-2A, **RDT&E Project Justification:** PB 2011 Air Force — **DATE:** February 2010

APPROPRIATION/BUDGET ACTIVITY
3600: *Research, Development, Test & Evaluation, Air Force*
BA 3: *Advanced Technology Development (ATD)*

R-1 ITEM NOMENCLATURE
PE 0603788F: *Global Information Dev/Demo*

PROJECT
635319: *Anticipatory OPS Intent and Response*

B. Accomplishments/Planned Program ($ in Millions)

FY 2009 Accomplishments:
In FY 2009: Not Applicable.

FY 2010 Plans:
In FY 2010: Continue development of capabilities to be more agile within a net centric enabled environment. Continue development of timely option generation, selection, and coordination capabilities that account for uncertainty and missing and erroneous information and supports intuitive decision making processes. Continue to develop dynamic workflow and workload management capabilities to manage the command and control enterprise. Initiate development of a capability to assess adverse events that could potentially impact air and space mobility operations and suggest courses of action (COAs) that could be initiated to continue operations. Investigate methods to evaluate mobility COAs covering planning through assessment that anticipates multiple constraints and provides prioritized feasible recommendations that meets commander's intent. Develop capability to assess the impact of cyber on air and space C2 operations and suggest COAs to be initiated to continue operations in the face of cyber threats.

FY 2011 Base Plans:
In FY 2011: Continue development of capabilities to be more agile within a net centric enabled environment. Continue development of timely option generation selection and coordination capabilities that account for uncertainty and missing and erroneous information, and supports intuitive decision making processes. Continue to develop dynamic workflow and workload management capabilities to manage the command and control enterprise. Complete development of a capability to assess adverse events that could potentially impact air and space mobility operations and suggest COAs that could be initiated to continue operations. Continue the investigation of methods to evaluate mobility COAs covering planning through assessment that anticipates multiple constraints and provides prioritized feasible recommendations that meets commander's intent.   Continue development of capability to assess the impact of cyber on air and space C2 operations and suggest COAs to be initiated to continue operations in the face of cyber threats.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635319: *Anticipatory OPS Intent and Response*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 OCO Plans: In FY 2011 OCO: N/A					
MAJOR THRUST: Develop and demonstrate an effects-based approach for the next generation of planning and assessment techniques that enable decision makers to determine operational effects. *FY 2009 Accomplishments:* In FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Initiate the development and demonstrate real-time information technologies that enable a decision maker to comprehend his or her current situational awareness by assessing an operation's progress against desired effects (reflective) and identifying key indicators and observables to assist in anticipating future success or failure of a campaign (predictive). Continue investigating the methods to enable a decision support environment that enables the decision maker to anticipate and shape all aspects of the future battlespace. Continue development of predictive battlespace planning tools with the ability to reason over models of the "enemy as a system." Evaluate competing approaches for the analysis of cascading effects in real-time for diverse courses of action. Initiate design of a tool suite for rapidly wargaming proposed actions against an intelligent adversary. Develop and demonstrate capability to enable integrated traditional and cyber effects based assessment for air and space operations centers. Develop capability to integrate kinetic and non-kinetic assets in an integrated tasking order to achieve desired commander's effects. *FY 2011 Base Plans:* In FY 2011: Continue the development and demonstration of real-time information technologies that enable a decision maker to comprehend their current situational awareness by assessing an operation's progress against desired effects (reflective) and identifying key indicators and observables to assist in anticipating future success or failure of a campaign (predictive). Complete investigating and evaluating methods to enable a decision support environment that enables the decision maker	0.000	4.443	3.578	0.000	3.578

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635319: *Anticipatory OPS Intent and Response*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
to anticipate and shape all aspects of the future battlespace. Continue development of predictive battlespace planning tools with the ability to reason over models of the "enemy as a system." Demonstrate a suite of interacting tools/services that assist analysts in estimating the cascading effects of proposed actions in near real-time for diverse COAs. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
Accomplishments/Planned Programs Subtotals	0.000	10.569	8.031	0.000	8.031

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• PE Not Provided (11746): *Activity Not Provided*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

D. Acquisition Strategy

Not applicable.

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-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010

APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635320: *Assured Worldwide Connectivity*

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
635320: *Assured Worldwide Connectivity*	0.000	18.572	8.216	0.000	8.216	12.076	13.064	17.965	22.253	Continuing	Continuing

Note

Note: Prior to FY 2010, these efforts were performed in PE 0603789F, C3I Advanced Technologies, Project 4216.

A. Mission Description and Budget Item Justification

The Air Force requires advanced net-enabled architectures and communications technologies in support of global kinetic and non-kinetic military operations including a secure information grid for worldwide information delivery and exchange of near-real-time information including voice, data, video, and imagery. This secure environment will be rapidly deployable, mobile, interoperable, and seamless between Air and Space Operations Centers (AOC) and aircraft, either en route or in theater. This project provides secure information transmission capabilities for a persistent, global, survivable communications backbone network accessible for warfighters operating in all domains; it provides self-healing, self-configuration, anti-jam communication networking capabilities; and it provides enterprise networking capabilities for agile, policy-based network management. In addition, this project develops and demonstrates advanced optical networking and communications for Air Force air- and space-based information exchange on and between platforms including development of highly integrated multi-gigabit optical and radio frequency networks, all optical data routers, optical backbone interface circuits for on board information exchange, and integrated electronic, adaptive optic systems for atmospheric mitigation. The Air Force also requires the ability to deliver sovereign options in cyberspace through the development and integration of cyber attack, cyber defense, and cyber support technologies for a strategic capability of cyber dominance. This project develops the ability to deliver: 1) Cyber attack capabilities: access, stealth and persistence, cyber intelligence, and weapons delivery, 2) Cyber defense capabilities: attack detection, attack attribution, and response automation, and 3) Cyber support capability: situational awareness and war gaming.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total

MAJOR THRUST: Develop and demonstrate secure wideband assured networking between weapon platforms, ground facilities, and Special Operations teams.
 	
  FY 2009 Accomplishments:
   In FY 2009: Not Applicable.
	0.000	1.426	0.313	0.000	0.313

| Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force | DATE: February 2010 | | | |

| APPROPRIATION/BUDGET ACTIVITY
3600: *Research, Development, Test & Evaluation, Air Force*
BA 3: *Advanced Technology Development (ATD)* | R-1 ITEM NOMENCLATURE
PE 0603788F: *Global Information Dev/Demo* | PROJECT
635320: *Assured Worldwide Connectivity* |

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total

FY 2010 Plans:
  In FY 2010: Continue development of small form-factor networking and reachback capability. Initiate design and demonstration of soldier interface, perform initial flight test.
 	
FY 2011 Base Plans:
  In FY 2011: Complete development of small form-factor networking and reachback capability.
 	
FY 2011 OCO Plans:
  In FY 2011 OCO: N/A					

MAJOR THRUST: Proactively defend cyberspace through cyber situational awareness, detecting, and defeating cyber threats, and surviving through adaptation and self-generation.
 	
FY 2009 Accomplishments:
  In FY 2009: Not Applicable.
 	
FY 2010 Plans:
  In FY 2010: Demonstrate a fleet of 1,000 cooperative, positively controlled, trusted agents that can defend mission critical information system assets and collect actionable CybINT for cyber situation awareness. Continue assured end-to-end Quality of Service (QoS) and Quality of Assurance (QoA) integration to the information system enterprise during malicious and non-malicious faults. Develop capability to geo-locate red, blue, and non-combatant IP addresses and devices globally and locally to achieve better situational awareness to efficiently position cyber defenses. Initiate development of a complete situational awareness capability of cyber network assets, both red and blue forces, to include both virtual and physical cyber assets.
 	
FY 2011 Base Plans:
  In FY 2011: Continue development of a comprehensive situational awareness and understanding capability of cyber network assets, both red and blue forces, to include both virtual and physical cyber
	0.000	4.270	3.333	0.000	3.333

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635320: *Assured Worldwide Connectivity*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
assets. Continue assured end-to-end QoA and QoA integration to the information system enterprise during malicious and non-malicious faults. Develop capability to automatically discover large-scale network topologies to enhance cyber situation assessment and map the discovered topologies to mission essential functions. Initiate the development of technologies that provides knowledge of the adversary to strengthen the quality of threat assessments. Initiate the development of a cross-domain voice-over-IP (VOIP) capability to enhance the utility of voice transmissions within a mobile tactical environment. Develop cyber testbed capability for in-house investigations of cyber defense policies and offensive cyber techniques with the ability to conform to command intent for cyber indications and warning and rules of engagement. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
MAJOR THRUST: Develop and demonstrate offensive cyber operations capabilities in a series of Experimental Cyber Craft technology demonstrations. *FY 2009 Accomplishments:* In FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Continue to analyze development of additional offensive cyber operations capabilities, integrated kinetic and cyber operations planning and execution capabilities, and cyber command and control (Cyber C2) operations functions. Complete selected offensive cyber capabilities to access, remain stealthy, gather intelligence, and affect adversary information and information systems. Finalize technology demonstration plans.	0.000	3.321	2.492	0.000	2.492

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635320: *Assured Worldwide Connectivity*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total

FY 2011 Base Plans:
  In FY 2011: Continue to analyze development of additional offensive cyber operations capabilities, integrated kinetic and cyber operations planning and execution capabilities, and Cyber C2 operations functions.
 	
FY 2011 OCO Plans:
  FY 2011 OCO: Not Applicable.					

MAJOR THRUST: Develop and demonstrate intelligent networking transport and management technology to provide assured, seamless, battlespace connectivity to the Air Force.
 	
FY 2009 Accomplishments:
  In FY 2009: Not Applicable.
 	
FY 2010 Plans:
  In FY 2010: Initiate advanced demonstration of high capacity assured access (anti-jam) communications for global spectrum dominance. Develop QoS-enabled information management and dissemination combined with network policy language for efficient, prioritized information exchange.
 	
FY 2011 Base Plans:
  In FY 2011: Continue to develop advanced demonstration of high capacity assured access (anti-jam) communications for global spectrum dominance. Continue development of QoS-enabled information management and dissemination combined with network policy language for efficient, prioritized information exchange in airborne networks.
 	
FY 2011 OCO Plans:
  In FY 2011 OCO: N/A
	0.000	0.230	0.828	0.000	0.828

MAJOR THRUST: Integrate and demonstrate a resilient and self-regenerating information enterprise that dynamically recognizes, characterizes, and understands novel cyber attacks.	0.000	1.171	0.574	0.000	0.574

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635320: *Assured Worldwide Connectivity*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: In FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Begin integration of technologies to introduce synthetic diversity into friendly information systems. Initiate integration of anti-tamper software protection technology with enterprise information systems. *FY 2011 Base Plans:* In FY 2011: Continue integration technologies to recognize, characterize, and understand attacks and anomalies, aid in the creation of synthetically diverse, functionally equivalent software, and continuously monitor, reconfigure, and self optimize. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
MAJOR THRUST: Integrate technology to demonstrate an effects-based strategic approach to cyber defense that focuses on avoiding, deferring, and minimizing the threat. *FY 2009 Accomplishments:* In FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Not Applicable. *FY 2011 Base Plans:* In FY 2011: Develop technologies to simulate a diverse set of active machines to thwart an adversary by transferring the attack to specialized nodes for analysis. Initiate development of capability	0.000	0.000	0.676	0.000	0.676

Air Force

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635320: *Assured Worldwide Connectivity*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
to automatically generate secure system/network configuration based on policy, architectural specifications, and operational requirements. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					

MAJOR THRUST: Develop and demonstrate flight ready systems consisting of high capacity radio frequency (RF) and optical components and architectures for next generation communications.
 	
FY 2009 Accomplishments:
  In FY 2009: Not Applicable.
 	
FY 2010 Plans:
  In FY 2010: Complete the design of higher throughput RF waveform data link for operation under adverse weather conditions. Begin fabrication of several flight test ready RF waveform data link systems.
 	
FY 2011 Base Plans:
  In FY 2011: Effort moves to 0602788F, Project 5315.
 	
FY 2011 OCO Plans:
  In FY 2011 OCO: N/A
	0.000	1.283	0.000	0.000	0.000

Accomplishments/Planned Programs Subtotals	0.000	11.701	8.216	0.000	8.216

	FY 2009	FY 2010
Congressional Add: Massively Parallel Optical Interconnects for Battlespace Information Exchange.	0.000	3.983

Exhibit R-2A, **RDT&E Project Justification:** PB 2011 Air Force		**DATE:** February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635320: *Assured Worldwide Connectivity*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
FY 2009 Accomplishments: In FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Conduct Congressionally-directed effort for Massively Parallel Optical Interconnects for Battlespace Information Exchange.		
Congressional Add: Cyber Attack and Security Environment. *FY 2009 Accomplishments:* In FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Conduct Congressionally-directed effort for Cyber Attack and Security Environment.	0.000	2.888
Congressional Adds Subtotals	0.000	6.871

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• PE Not Provided (12059):	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Activity Not Provided

D. Acquisition Strategy

 Not applicable.

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-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010

APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635321: *Global Battlespace Awareness*

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
635321: *Global Battlespace Awareness*	0.000	9.829	9.318	0.000	9.318	10.676	10.800	13.351	12.403	Continuing	Continuing

Note

Note: Prior to FY 2010, these efforts were performed in PE 0603789F, C3I Advanced Technologies, Project 4072.

A. Mission Description and Budget Item Justification

In order to achieve information dominance, the Air Force must be able to monitor, assess, plan, and execute (MAPE) missions rapidly across the full spectrum of operations (air, space, and cyberspace) at all levels of war (strategic, operational, and tactical) and during all phases of conflict (pre-conflict, conflict through stability operations). This project develops, integrates, and demonstrates advanced technologies to achieve comprehensive net-centric operations and Predictive Battlespace Awareness using information from all sources. Technology development includes: tasking information collectors (intelligence, surveillance, and reconnaissance platforms, national intelligence sources, etc.); correlating and geo-registering the collected data; exploiting the data to extract information of military significance; fusing information from multiple sources to create a digital n-dimensional representation of the battlespace; assessing the situation; predicting adversary courses of action (COA); and archiving the results for ready use by decision makers. This is a dynamic, complex process that involves technologies for information exploitation, fusion, processing, storage, and retrieval, as well as technologies for machine reasoning, pattern recognition, and timeline analysis.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
MAJOR THRUST: Demonstrate advanced signal and data exploitation technologies for detection, tracking, identification, and targeting of time-critical targets, and information extraction. *FY 2009 Accomplishments:* In FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Initiate the development of a set of algorithms that can automatically develop, reason, dynamically update various sub-sets of the existing intelligence preparation of the battlespace	0.000	2.961	3.400	0.000	3.400

Air Force

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010		
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635321: *Global Battlespace Awareness*		

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
products (e.g., named areas, target areas, COA, units, infrastructure areas, lines of communication). Initiate development of techniques for analyzing and assessing activities to support situation assessment. Complete demonstration of integrated intelligence data and analysis products to produce anticipatory ground to space awareness picture. Complete development of multi-sensor exploitation tools to enable characterization and assessment of adversary satellites. Expand previous signal processing developments to a range of progressive RF threats and hardware including communications systems and radar. Initiate research and demonstrate the performance gains with active distributed sensing and processing and identify the limitations for further research. Missions include detection, discrimination, location, tracking, and targeting of advanced Low Probability of Intercept enemy threats. *FY 2011 Base Plans:* In FY 2011: Continue development of a set of algorithms that can automatically develop, reason, dynamically update various sub-sets of the existing intelligence preparation of the battlespace products (e.g., named areas, target areas, COA, units, infrastructure areas, lines of communication). Continue development of techniques for analyzing and assessing activities to support situation assessment. Complete development of methodologies and processing of collecting intelligence data from a collection of ever present stand-in multi-sensor sensor ad-hoc networks. Develop technologies to overcome the limitations previously identified. Finish development of spatial, temporal, and frequency (to name a few available degrees of freedom) diverse signal processing methods that exploit the new added degrees of freedom (spatial) to combat harsh RF environments (including multi-path, multi-waveform diverse environments, low probability of intercept threats, and short on time threats). Initiate the development of a set of algorithms that can automatically track space objects in support of Space Situational Awareness (SSA). Initiate development to enhance signal processing techniques to fit into existing Intelligence, Surveillance, and Reconnaissance (ISR) infrastructures. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010

APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635321: *Global Battlespace Awareness*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total

MAJOR THRUST: Develop and demonstrate advanced data handling, event visualization technologies, and distributed data fusion to enable a more effective utilization of data available.
 	
FY 2009 Accomplishments:
  FY 2009: Not Applicable.
 	
FY 2010 Plans:
  In FY 2010: Finalize evaluation and support toolsets for advanced fusion algorithms and provide community accepted measures of performance across all efforts. Develop capability to integrate a variety of user definable display technologies to visualize individual data set contexts for better situational awareness.
 	
FY 2011 Base Plans:
  In FY 2011: Initiate development to mature and integrate models for adversarial behavior and provide support for situation analysis utilizing a service oriented architecture. Develop techniques to adaptively optimize the use of the received data. Develop and demonstrate the capability to conduct distributed fusion to enhance situational awareness of the battlespace. Develop and demonstrate robust support applications to enhance multi-intelligence collection requirements.
 	
FY 2011 OCO Plans:
  In FY 2011 OCO: N/A
	0.000	0.643	1.667	0.000	1.667

MAJOR THRUST: Develop and demonstrate capabilities for reasoning and learning, text understanding, link and group discovery, and advanced analysis for situational awareness and understanding. *FY 2009 Accomplishments:* FY 2009: Not Applicable.	0.000	2.206	1.515	0.000	1.515

			FY 2011	FY 2011	FY 2011
	FY 2009	FY 2010	Base	OCO	Total

Exhibit R-2A, **RDT&E Project Justification:** PB 2011 Air Force | **DATE:** February 2010

APPROPRIATION/BUDGET ACTIVITY
3600: *Research, Development, Test & Evaluation, Air Force*
BA 3: *Advanced Technology Development (ATD)*

R-1 ITEM NOMENCLATURE
PE 0603788F: *Global Information Dev/Demo*

PROJECT
635321: *Global Battlespace Awareness*

B. Accomplishments/Planned Program ($ in Millions)

FY 2010 Plans:
In FY 2010: Initiate development of a text extraction capability that enables users to fine-tune the extractor, based on their specialized knowledge of the domain, to achieve higher performance. Initiate development of techniques for abnormality detection in evidence of connections and paths of different types to find unusual circumstances. Initiate development of tools and services for advanced behavioral modeling techniques and advanced capabilities for analysis that integrate situation understanding, situation monitoring, and event anticipation.

FY 2011 Base Plans:
In FY 2011: Continue development of a text extraction capability that enables users to fine-tune the extractor, based on their specialized knowledge of the domain, to achieve higher performance. Continue development of tools and services for advanced behavioral modeling techniques and advanced capabilities for analysis that integrate situation understanding, situation monitoring, and event anticipation.

FY 2011 OCO Plans:
In FY 2011 OCO: N/A

| MAJOR THRUST: Develop models to provide detailed understanding of the adversary's probable intent and future strategy in order to identify adversary COAs, and determine the most likely COA. | 0.000 | 3.376 | 2.130 | 0.000 | 2.130 |

FY 2009 Accomplishments:
FY 2009: Not Applicable.

FY 2010 Plans:
In FY 2010: Continue research to forecast actionable futures to support a decision maker's ability to appraise and plan the "best" blue COA for Rapid, Decide, Act and Adapt (RDAA). Continue investigation of ability to forecast potential adversaries and events based on indications of known evidence and projected known and/or anticipated threat(s). Initiate investigation in the capability to

Exhibit R-2A, **RDT&E Project Justification:** PB 2011 Air Force				**DATE:** February 2010	
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*		**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*		**PROJECT** 635321: *Global Battlespace Awareness*	

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
manage multiple possible future adversary COAs prioritized based on current and future (projected) impact/threat. Initiate investigation in developing screening techniques that give the analyst/decision maker insight into the contribution or sensitivity of various factors on a given observable/response. Initiate investigation of techniques that will allow model adaptation to new regions and nations. *FY 2011 Base Plans:* In FY 2011: Complete research to forecast actionable futures to support a decision maker's ability to appraise and plan the "best" blue course of action for RDAA. Complete investigation of ability to forecast potential adversaries and events based on indications of known evidence and projected known and/or anticipated threat(s). Continue investigating the capability to manage multiple possible future adversary COAs prioritized based on current and future (projected) impact/threat. Continue investigation in developing screening techniques that give the analyst/decision maker insight into the contribution or sensitivity of various factors on a given observable/response. Initiate capability to model and explore policy actions and reactions taken by the different modeled entities. Initiate development of a functional graphical user environment to support output analysis. Complete investigation of techniques that will allow model adaptation to new regions and nations. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
MAJOR THRUST: Develop and demonstrate the mechanisms required to achieve robust, tamperproof, self-authenticating data codes and executables for trusted/optimized computing. *FY 2009 Accomplishments:* FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Initiate the application of developed watermarking technologies to development programs of record, targeting intelligence applications. Integrate audio watermarking technologies	0.000	0.643	0.606	0.000	0.606

Air Force

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635321: *Global Battlespace Awareness*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
into a development program, providing information assurance and provenance to the data. Begin development of protocols for the application of watermarking in specific provenance, pedigree, and information assurance scenarios. *FY 2011 Base Plans:* In FY 2011: Continue integration of developed techniques and protocols for information assurance. Work toward integration of technologies into network-centric programs of record for the purpose of providing information provenance. Formalize methods for the development of protocols. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
Accomplishments/Planned Programs Subtotals	0.000	9.829	9.318	0.000	9.318

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• PE Not Provided (12252): *Activity Not Provided*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

D. Acquisition Strategy

Not applicable.

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-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010

APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635322: *Knowledge Management and Computing*

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
635322: *Knowledge Management and Computing*	0.000	7.444	6.817	0.000	6.817	7.654	10.496	6.949	7.494	Continuing	Continuing

Note

Note: Prior to FY 2010, these efforts were performed in PE 0603789F, C3I Advanced Technologies, Project 4872.

A. Mission Description and Budget Item Justification

The Air Force requires technologies that will provide the decision maker and staff with seamless access to tailored information within a mobile, dynamic, and scalable, globally distributed Air and Space Operations Center (AOC) as well as among other producers, consumers, and managers of information relevant to other particular communities of interest (COI). This project demonstrates the enterprise management capabilities needed for the rapid distribution of actionable information as well as the needed advances in high performance computing to ensure this complex capability. This project develops an agile information environment that focuses on quality of service, transformation and brokering, a federated information environment focusing the relationship among the members of the environment, a secure cross-domain information sharing capability that focuses on the security layer and inter-COI information exchange in different security domains, and a collaboration environment focusing on the information workflow layer of the enterprise. This project will also develop: 1) a computational science and engineering capability demonstrating new models of computation, 2) novel approaches for high performance, interactive, net-centric, distributed, and embedded computing systems, and 3) the technological tools enabling affordable, large scale, complex, software intensive systems.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
MAJOR THRUST: Develop and demonstrate computer architectures with greater capacity and sophistication to enable game changing computing power to the warfighter, anywhere, anytime. *FY 2009 Accomplishments:* In FY 2009: Not Applicable.	0.000	0.491	1.259	0.000	1.259

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635322: *Knowledge Management and Computing*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: In FY 2010: Initiate development of petaflops embedded on-demand computing. Evaluate options for on-board processing of common sensor algorithms. Complete design of a fungible node for autonomous systems. Initiate development of a stacked chip architecture for cognitive and autonomous systems. Develop scalable stacked chip architecture for highly modular computing system for cognitive and autonomous systems. *FY 2011 Base Plans:* In FY 2011: Continue the development of petaflops embedded on-demand computing. Demonstrate achieved performance and functionality. Continue development of stacked chip architecture for cognitive and autonomous systems. Demonstrate performance. Develop and demonstrate high-payoff high performance computing applications to reduce size, weight and power restrictions. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
MAJOR THRUST: Demonstrate how a publish, subscribe, and query information management paradigm can enable vertical and horizontal integration of Air Force information systems. *FY 2009 Accomplishments:* In FY 2009: Not Applicable. *FY 2010 Plans:* In FY 2010: Develop secure, accreditable services to assist in information sharing between two or more independent security domains while preventing information disclosure to untrustworthy users. Develop a single multi-level repository which can securely store information containing multiple security levels but can be accessed from multiple security domains. This capability will promote IT consolidation and reduce the duplicate information storage within each security domain. Develop a common security labeling methodology that promotes the automatic flow of time-sensitive information	0.000	5.354	3.138	0.000	3.138

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635322: *Knowledge Management and Computing*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
among different security domains. Provide for security labeling assurance and pedigree to enforce information access policies. Develop approaches for applying secure information sharing concepts to mobile ad-hoc networks which are often characterized by low-bandwidth and intermittent connectivity. Initiate development of a method to securely link data and metadata. Initiate development of an adaptive security policy expression and enforcement mechanism for automated information review and release among different security domains. Develop and perform field demonstrations of cross domain sharing mechanisms in an operational setting to support a prototype installation command system. Demonstrate content-based dissemination mechanisms. Begin development of a mature open-systems based implementation of distributed mission operations infrastructure that leverages context-aware information management technologies to enable the rapid incorporation and interaction of live, virtual and constructive entities and systems. Develop and demonstrate capability to intelligently collect, correlate, and analyze multi-source threat data across multiple security domains to assist cyber operators determine minimum impact of detected threat events. *FY 2011 Base Plans:* In FY 2011: Continue to develop secure, accreditable cross domain information sharing techniques. Initiate an effort to develop a scalable integrated environment where information is easily and securely shared across multiple secure domains while preventing accidental or intentional information disclosure. Initiate development of a framework for integrating and evaluating techniques under development. Continue development of an adaptive security policy expression and enforcement mechanism for automated information review and release among different security domains. Complete development of a method to securely link data and metadata. Initiate formulation and development of the demonstration of the methodology required to quickly and reliably transfer information from a higher classification domain to a lower classification domain as well as coalition partners as part of a scalable cross domain information management system. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					

Air Force

Exhibit R-2A, **RDT&E Project Justification:** PB 2011 Air Force		**DATE:** February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635322: *Knowledge Management and Computing*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
MAJOR THRUST: Demonstrate expertise in applied math and algorithms, optimization for modern architectures including multi-tiered memory hierarchies, and multi-core processors.	0.000	0.445	0.820	0.000	0.820

FY 2009 Accomplishments:
  In FY 2009: Not Applicable.

FY 2010 Plans:
  In FY 2010: Initiate rapid reaction identifying and optimizing codes demonstrating at least 100x improvement through the techniques applied. Initiate predictable software testing. Create tools for exploiting mechanisms in emerging technology to ease the complexity, understanding, and managing software in embedded and software-intensive systems and enabling rapid construction/modernization of provably correct systems and guaranteed interoperability providing trusted components and systems.

FY 2011 Base Plans:
  In FY 2011: Continue predictable software testing by creating tools for exploiting mechanisms in emerging technology to ease the complexity, understanding, and managing software in embedded and software-intensive systems and enabling rapid construction/modernization of provably correct systems and guaranteed interoperability providing trusted components and systems. Develop and demonstrate real-time high performance computing services to enhance space situational awareness.

FY 2011 OCO Plans:
  In FY 2011 OCO: N/A

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
MAJOR THRUST: Demonstrate how agile information management services enable effective information sharing in a tactical environment.	0.000	1.154	1.600	0.000	1.600

FY 2009 Accomplishments:
  In FY 2009: Not Applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603788F: *Global Information Dev/Demo*	PROJECT 635322: *Knowledge Management and Computing*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: In FY 2010: Develop and demonstrate pub/sub/query mechanisms for tactical airborne platforms such as Global Hawk and Joint STARS. These tactical sharing mechanisms will be evaluated against operational concepts of employment and the ability to perform the operational objectives. *FY 2011 Base Plans:* In FY 2011: Initiate development of tactical information management pub/sub/query mechanisms focusing on stability, performance, and reliability. Establish mechanisms for assured access and isolation from malicious client applications, assured levels of quality of service, and in some cases best case where all resources are not locally controlled. Develop tactical service approaches that appear similar to conventional service oriented architectures but operate and compensate for airborne based disruptions. Initiate development of tactical information dominance capabilities that include unmanned aerial systems, "wide-body" assets and high-altitude platforms. Complete the development of the capability to integrate a variety of common operating display technologies to visualize individual data set contexts for better situational awareness across the air, space, and cyber domains at the strategic, operational, and tactical levels. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
Accomplishments/Planned Programs Subtotals	0.000	7.444	6.817	0.000	6.817

Air Force

Exhibit R-2A, **RDT&E Project Justification:** PB 2011 Air Force		**DATE:** February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603788F: *Global Information Dev/Demo*	**PROJECT** 635322: *Knowledge Management and Computing*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• PE Not Provided (12415):	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Activity Not Provided

D. Acquisition Strategy

  Not applicable.

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.

Air Force