Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force											Date: March 2014	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603788F / *Battlespace Knowledge Development and Demonstration*							
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	-	27.994	49.079	35.315	-	35.315	44.531	50.418	56.540	58.692	Continuing	Continuing
635319: *Anticipatory OPS Intent and Response*	-	4.339	6.176	4.234	-	4.234	4.091	7.185	4.749	6.196	Continuing	Continuing
635320: *Assured Worldwide Connectivity*	-	11.677	21.471	19.412	-	19.412	19.978	24.959	35.025	32.405	Continuing	Continuing
635321: *Global Battlespace Awareness*	-	7.010	14.079	7.957	-	7.957	15.139	8.491	12.845	14.763	Continuing	Continuing
635322: *Knowledge Management and Computing*	-	4.968	7.353	3.712	-	3.712	5.323	9.783	3.921	5.328	Continuing	Continuing

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

A. Mission Description and Budget Item Justification

This program develops and demonstrates Air Force enterprise-centric information technologies for the warfighter. 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 optical networks will be rapidly deployable, mobile, interoperable, and seamless between Air and Space Operations Centers (AOCs) and air- and space- based platforms either en route or in theater. This project also provides 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, utilization, and management of information in the enterprise. The Anticipatory Operations Intent and Response project develops the technologies for dynamic planning and execution with the accuracy, fidelity, and timeliness needed to dominate the battlespace. This program has been coordinated through the Department of Defense (DoD) Science and Technology (S&T) Executive Committee process to harmonize efforts and eliminate duplication. 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force					Date: March 2014
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)*			R-1 Program Element (Number/Name) PE 0603788F / *Battlespace Knowledge Development and Demonstration*		
B. Program Change Summary ($ in Millions)	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO**	**FY 2015 Total**
Previous President's Budget	31.419	49.093	39.693	-	39.693
Current President's Budget	27.994	49.079	35.315	-	35.315
Total Adjustments	-3.425	-0.014	-4.378	-	-4.378
• Congressional General Reductions	-0.041	-0.014			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.802	-			
• Other Adjustments	-2.582	-	-4.378	-	-4.378

Change Summary Explanation

Decrease in FY13 Other Adjustments was due to Sequestration.
Decrease in FY15 is due to higher Department of Defense priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603788F / *Battlespace Knowledge Development and Demonstration*	Project (Number/Name) 635319 / *Anticipatory OPS Intent and Response*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
635319: *Anticipatory OPS Intent and Response*	-	4.339	6.176	4.234	-	4.234	4.091	7.185	4.749	6.196	Continuing	Continuing

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

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 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 Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Adaptive Planning and Decision Tools	2.103	2.092	2.656
Description: Develop and demonstrate the integration of planning tools and information-based intelligent agents for adaptive replanning and decision support tools.			
FY 2013 Accomplishments: Developed net-centric mission planning and execution capabilities to support a net-enabled dynamic decision support capability for a variety of air and space missions in support of global operations. Initiated design and development of a set of planning tools and services that proactively build and shape the portion of cyberspace employed in support of Mission Assurance (MA) objectives.			
FY 2014 Plans: Complete development and demonstration of cyber defense components that support Mission Aware Cyber Command and Control. Continue development of net-centric mission planning and execution capabilities to support a net enabled dynamic decision support capability for a variety of air, space and cyber missions in support of global operations. Continue the design and development of a set of planning tools and services that proactively build and shape the portion of cyberspace employed in support of MA objectives. Initiate research to demonstrate anticipatory defense of the command and control information infrastructure.			
FY 2015 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635319 / *Anticipatory OPS Intent and Response*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Continue development of net-centric mission planning and execution capabilities to support a net enabled dynamic decision support capability for a variety of air, space and cyber missions in support of global operations. Continue the design and development of a set of planning tools and services that proactively build and shape the portion of cyberspace employed in support of MA objectives. Continue research to demonstrate anticipatory defense of the command and control information infrastructure.			
Title: Next Generation Planning and Assessment Tools ***Description:*** 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 2013 Accomplishments:*** Developed an integration and test decision support environment, within service oriented architectures, that enables the decision-maker to anticipate and shape all aspects of the future battlespace. Designed and conducted limited technology experiments to investigate the technical and operational challenges associated with integrated air, space, and cyber C2 within and across multiple service oriented architectures. Developed and demonstrated real-time information technologies that enable decision-makers to comprehend their current situation 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). ***FY 2014 Plans:*** Continue integration and test decision support environment, within service oriented architectures that enable the decision maker to anticipate and shape all aspects of the future battlespace. Accelerate development and demonstration of real-time information technologies that enable a decision maker to comprehend their current situation 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). ***FY 2015 Plans:*** Complete integration and test decision support environment, within service oriented architectures that enable the decision maker to anticipate and shape all aspects of the future battlespace. Continue real-time information technologies that enable a decision maker to comprehend their current situation 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).	2.236	4.084	1.578
Accomplishments/Planned Programs Subtotals	4.339	6.176	4.234

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635319 / *Anticipatory OPS Intent and Response*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A

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 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603788F / *Battlespace Knowledge Development and Demonstration*	Project (Number/Name) 635320 / *Assured Worldwide Connectivity*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
635320: *Assured Worldwide Connectivity*	-	11.677	21.471	19.412	-	19.412	19.978	24.959	35.025	32.405	Continuing	Continuing

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

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 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 provides enterprise networking capabilities for agile, policy-based network management. In addition, this project develops and demonstrates flight ready systems consisting of high capacity radio frequency (RF) and optical components and architectures for next generation communications. 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 cyber attack capabilities (access, stealth and persistence, cyber intelligence, and weapons delivery), cyber defense capabilities (attack detection, attack attribution, and response automation), and cyber support capability (situational awareness and war gaming.)

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Cyber Offense	4.427	5.918	3.570
Description: Develop and demonstrate offensive cyber operations capabilities in a series of experimental technology demonstrations.			
FY 2013 Accomplishments: Conducted experiments using testbed capability for in-house investigations of cyber defense policies and offensive cyber techniques to gain a better understanding of how an adversary might attack Air Force systems. Completed analysis of the development of additional offensive cyber operations capabilities, integrated kinetic and cyber operations planning and execution capabilities, and cyber C2 operations functions. Developed and demonstrated capabilities that provide integrated cyber operations.			
FY 2014 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635320 / *Assured Worldwide Connectivity*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Continue conducting experiments using testbed capability for in-house investigations of cyber defense policies and offensive cyber techniques to gain a better understanding of how an adversary might attack Air Force systems. Continue to develop and demonstrate capabilities that provide integrated cyber operations. ***FY 2015 Plans:*** Continue conducting experiments using testbed capability for in-house investigations of cyber defense policies and offensive cyber techniques to gain a better understanding of how an adversary might attack Air Force systems.			
Title: Connectivity Technologies ***Description:*** Develop and demonstrate intelligent networking transport and management technology to provide assured, seamless, battlespace connectivity to the Air Force tailored to anti-access/area denial environments and contested operations. ***FY 2013 Accomplishments:*** Completed development of cognitive radio technology that will enable mission specific adaptive optimization of communications links responsive to current conditions, situations, and priorities as each mission is executed. Conducted an advanced demonstration of end-to-end quality-of-service(QoS) and quality-of-assurance (QoA) performance for various application-dependent network configuration, management, and implementation scenarios. ***FY 2014 Plans:*** Demonstrate and transition a set of modular, foundational technologies required to develop an aerial layer secure tactical intranet. Continue advanced demonstration of end-to-end QoS and QoA performance for various application-dependent network configuration, management, and implementation scenarios. Initiate advanced demonstration of new technologies on an airborne testbed in support of creating an air-air/air-ground secure tactical intranet. ***FY 2015 Plans:*** Continue advanced demonstration of end-to-end QoS and QoA performance for various application-dependent network configuration, management, and implementation scenarios. Continue advanced demonstration of new technologies on an airborne test bed in support of creating an air-air/air-ground secure tactical intranet. Initiate research to demonstrate exploiting of cloud computing and virtualization technologies to provision sufficient computational power for high demand semantic processing of large data sets for mission relevant information dissemination within mission timeline constraints.	1.222	5.634	6.117
Title: Resiliency ***Description:*** Integrate and demonstrate a resilient and self-regenerating information enterprise that dynamically recognizes, characterizes, and understands novel cyber attacks and reconfigures and self-optimizes to resist new attacks. ***FY 2013 Accomplishments:***	1.439	1.744	8.088

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635320 / *Assured Worldwide Connectivity*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Completed development of cognitive radio technology that will enable mission specific adaptive optimization of communications links responsive to current conditions, situations, and priorities as each mission is executed. Conducted an advanced demonstration of end-to-end QoS and QoA performance for various application-dependent network configuration, management, and implementation scenarios. ***FY 2014 Plans:*** Complete demonstration of cyber defense applications against relevant strategic scenarios. 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. Continue developing techniques for guaranteeing the execution of critical processes during system recovery and data reconstitution. ***FY 2015 Plans:*** 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. Increase development of techniques for guaranteeing the execution of critical processes during system recovery and data reconstitution. Initiate the development of scientific underpinnings of mission assurance and survivability which links mission awareness data and has dynamic control of information flows with resiliency to maintain levels of assurance.			
Title: Effects-based Cyber Defense ***Description:*** Integrate technology to demonstrate an effects-based strategic approach to cyber defense that focuses on avoiding, deterring, and minimizing the threat, and rendering the adversary ineffective. ***FY 2013 Accomplishments:*** Developed technologies to implement cyber maneuver capabilities that change the face of the network to confuse the adversaries intelligence gathering attempts thereby not allowing them to find/identify the target system, preventing a future attack. Simulated a diverse set of active machines to thwart an adversary by transferring the attack to specialized nodes for analysis. Developed a capability to automatically generate secure system/network configurations based on policy, architectural specifications, and operational requirements. ***FY 2014 Plans:*** Complete development technologies to simulate a diverse set of active machines to thwart an adversary by transferring the attack to specialized nodes for analysis. Continue development of capability to automatically generate secure system/network configuration based on policy, architectural specifications, and operational requirements. ***FY 2015 Plans:***	4.004	7.228	1.637

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635320 / *Assured Worldwide Connectivity*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Continue development of capability to automatically generate secure system/network configuration based on policy, architectural specifications, and operational requirements.			
Title: Airborne Communication Technologies ***Description:*** Develop and demonstrate flight ready systems consisting of high capacity RF and optical components and architectures for next generation communications. ***FY 2013 Accomplishments:*** Initiated development of V/W band (50 GHz to 110 GHz) airborne communications components. Initiated flight demonstration of communications systems for use in contested environments. ***FY 2014 Plans:*** Continue development of V/W band airborne communications components. Continue flight demonstration of communications systems for use in contested environments. ***FY 2015 Plans:*** Effort terminated due to higher Department of Defense priorities.	0.585	0.947	-
Accomplishments/Planned Programs Subtotals	11.677	21.471	19.412

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603788F / *Battlespace Knowledge Development and Demonstration*	Project (Number/Name) 635321 / *Global Battlespace Awareness*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
635321: *Global Battlespace Awareness*	-	7.010	14.079	7.957	-	7.957	15.139	8.491	12.845	14.763	Continuing	Continuing

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

A. Mission Description and Budget Item Justification

The Air Force must be able to process and exploit data and information from a variety of sources and domains to create a common operating picture of the battlespace to allow commanders to maintain information dominance. 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, such as intelligence, surveillance, and reconnaissance (ISR) 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-and-dimensional representation of the battlespace; assessing the situation; predicting adversary 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 Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Advanced Signal and Data Exploitation Technologies	3.137	3.586	1.439
Description: Demonstrate advanced signal and data exploitation technologies for detection, tracking, identification, and targeting of time-critical targets, and information extraction.			
FY 2013 Accomplishments: Conducted both the integration of developed watermarking techniques and protocols for information assurance, provenance, and pedigree leading to the integration of watermarking technologies into network-centric programs of record, and the development of novel steganalysis methods for identifying and disrupting embedded information.			
FY 2014 Plans: Continue both the integration of developed watermarking techniques and protocols for information assurance, provenance and pedigree leading to the integration of watermarking technologies into network-centric programs of record, and the development of novel steganalysis methods for identifying and disrupting embedded information. Deliver capabilities to increase analyst production by integrating and enhancing multi-intelligence exploitation within the Distributed Common Ground Station (DCGS). Enable semi-automated data-sharing across multiple security enclaves with intelligent data tagging. Provide automated extraction of motion-derived linkages/routes and network relationships.			
FY 2015 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635321 / *Global Battlespace Awareness*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Deliver activity characterization tools and data mining and fusion capailites that support multiple sources of intelligence (INT) data for cross INT support. Continue both the integration of developed watermarking techniques and protocols for information assurance, provenance and pedigree leading to the integration of watermarking technologies into network-centric programs of record, and the development of novel steganalysis methods for identifying and disrupting embedded information. Deliver capabilities to increase DCGS-PED cell operators and NASIC analysts assessment, evaluation, and production activities production by integrating and enhancing multi-intelligence exploitation analytics within the resource-constrained DCGS. Provide automated extraction of motion-derived linkages/routes and network relationships.			
Title: Advanced Data Handling, Visualization and Distributed Data Fusion	2.251	5.367	1.779
Description: Develop and demonstrate advanced data handling, event visualization technologies, and distributed data fusion to enable a more effective utilization of data available. ***FY 2013 Accomplishments:*** Completed development to mature and integrate models for adversarial behavior and provide support for situation analysis utilizing a service oriented architecture. Completed development of algorithmic tools and techniques to analyze and exploit recorded signals intelligence data across multiple missions, to provide the capability for forensic analysis of single or multi-platform data across multiple missions for increased situational awareness and intelligence. Initiated development of a prototype for the fusion of information (temporally and geospatially) from multiple exploitation domains to create a comprehensive understanding of the battlespace. ***FY 2014 Plans:*** Continue development of a prototype for the fusion of information (temporally and geospatially) from multiple exploitation domains to create a comprehensive understanding of the battlespace. Continue development of a wide variety of exploitation methods to enhance signals exploitation of modern emerging signals expected from contested environments. Develop real-time audio processing technology to improve the extraction, analysis and reporting of tactical information. Initiate development of learning and inferencing architecture techniques that operate on raw sensor data from heterogeneous sensors in order to determine an automated situational awareness picture. ***FY 2015 Plans:*** Complete development of a prototype for the fusion of information (temporally and geospatially) from multiple exploitation domains to create a comprehensive understanding of the battlespace. Continue development of a wide variety of exploitation methods to enhance signals exploitation of modern emerging signals expected from contested environments. Develop real-time audio processing technology to improve the extraction, analysis, and reporting of tactical information. Continue development of learning and inferencing techniques that operate on raw sensor data from heterogeneous sesnors in order to perform automated multi-			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635321 / *Global Battlespace Awareness*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
domain raw signal fusion. Initiate development of a capability for anticipating adversary courses of actions, situation awareness and automated impact assessment across all mission areas (cyber, space, air).			
Title: Autonomous Text Exploitation ***Description:*** Develop and demonstrate capabilities for reasoning and learning, text understanding, link and group discovery, and advanced analysis for situational awareness and understanding. ***FY 2013 Accomplishments:*** N/A ***FY 2014 Plans:*** Continue exploring general purpose bridges between the corpus of electronic text and formal reasoning systems. Develop capabilities enabling analysts to efficiently extract/consolidate information from massive amounts of textual data and identify enemy entity-relation. Increase the accuracy and speed of cross-document entity co-reference and consolidation. Initiate demonstration of analysis and visualization of multi-layered networks consisting of diverse data sets. ***FY 2015 Plans:*** Continue exploring general purpose bridges between the corpus of electronic text and formal reasoning systems. Complete technologies enabling analysts to efficiently extract/consolidate information from massive amounts of textual data and identify enemy entity-relation. Demonstrate the analysis and visualization of multi-layered networks consisting of diverse data sets with increased accuracy and speed of cross-document entity co-reference and consolidation.	-	1.742	1.294
Title: Adversary Courses of Action ***Description:*** Develop models to provide detailed understanding of the adversary's probable intent and future strategy to identify adversary COAs, the most likely COA, and the COA most dangerous to friendly forces and mission accomplishment. ***FY 2013 Accomplishments:*** Developed a functional graphical user environment to support output analysis and completed investigations in developing screening techniques that give the analyst/decision-maker insight into the contribution or sensitivity of various factors on a given observable/response. Used scenarios and conducted user testing and feedback of models for new regions and nations. Developed capability to model and explore policy actions and reactions taken by the different modeled entities, and started developing the capability to allow users to perform automated generation, assessment, and visualization of traces from model results to key underlying causes. Initiated development of tools to increase awareness of alternatives and ramifications of selecting given target sets. Initiated development of exploitation and analysis tools to automate target recognition and tracking. ***FY 2014 Plans:***	1.622	3.384	3.445

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635321 / *Global Battlespace Awareness*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Continue development of a functional graphical user environment to support output analysis and complete investigations in developing screening techniques that give the analyst/decision-maker insight into the contribution or sensitivity of various factors on a given observable/response. Use scenarios and conduct user testing and feedback of models for new regions and nations. Initiate demonstration of advanced analytical capabilities that integrate kinetic and non-kinetic options for full spectrum targeting. Initiate development of assessment technologies that identify causal linkages of executing mission results to achievement of effects. Increase targeting capabilities to include the full range of options available to increase the depth and breadth of the analysis and reduce the overall time to perform analyses and generate targeting options. Enable assessment of kinetic/non-kinetic effects across the targeting process. ***FY 2015 Plans:*** Continue development of a demonstration of advanced analytical capabilities that integrate kinetic and non-kinetic options for full spectrum targeting. Initiate the development of assessment tools that assist the analyst/operator in determining the success/failure of a given target set and/or plan in meeting a stated set of mission objectives. Continue to add targeting capabilities to increase the full range of options available. Enable assessment of kinetic/non-kinetic effects across the targeting process.			
Accomplishments/Planned Programs Subtotals	7.010	14.079	7.957

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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 2015 Air Force			Date: March 2014
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603788F / *Battlespace Knowledge Development and Demonstration*	Project (Number/Name) 635322 / *Knowledge Management and Computing*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
635322: *Knowledge Management and Computing*	-	4.968	7.353	3.712	-	3.712	5.323	9.783	3.921	5.328	Continuing	Continuing

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

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 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 Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Game Changing Computing Power	0.717	1.221	1.128
Description: Develop and demonstrate computer architectures with greater capacity and sophistication to enable game changing computing power to the warfighter, anywhere, anytime.			
FY 2013 Accomplishments: Completed the development of petaflops embedded on-demand computing, and demonstrate achieved performance and functionality. Developed architectures for a compact large array of many node clusters with very low power demand for intelligent systems. Developed and demonstrated an autocode generation capability for software intensive systems.			
FY 2014 Plans: Transfered the continued development of architectures for a compact large array of many node clusters with very low power demand and the development of an autocode generation capability for software intensive systems to applied research Dominant Information Sciences and Methods (Program 0602278F), Project 625316. Initiate the design, development, and demonstration of affordable, high-performance, interactive, parallel data exploitation and massively parallel systems.			
FY 2015 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Air Force		Date: March 2014
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603788F / *Battlespace Knowledge Development and Demonstration*	**Project (Number/Name)** 635322 / *Knowledge Management and Computing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Continue the design, development and demonstration of affordable, high performance, interactive, parallel data exploitation and massively parallel systems.			
Title: Advanced Information Management ***Description:*** Demonstrate how a publish, subscribe, and query information management (IM) paradigm can enable vertical and horizontal integration of Air Force information systems. ***FY 2013 Accomplishments:*** Developed attack resistant cross domain services. Enabled Voice- Over-IP (VOIP) and video tele-confrence (VTC) content filters for allowing real time domain voice and video communications across coalition partners using cisco video phones. Transitioned filters to Collaboration Gateway Program of Record for C&A with sponsorship from EUCOM for fielding. Developed full cross-domain VTC capability. ***FY 2014 Plans:*** Continue development of attack resistant cross domain services. Deliver a suite of new U.S./coalition collaboration services, producing cross-domain capabilities including voice/video, full motion video (FMV) streaming, automated content inspection, and global trusted remote management. Create Secure Cross Domain Video Teleconference capability. ***FY 2015 Plans:*** Demonstrate a suite of new US/coalition collaboration services, producing cross-domain capabilities including voice/video, full motion video (FMV) streaming, automated content inspection, and global trusted remote management. Demonstrate a Secure Cross Domain Video Teleconference capability.	0.426	1.499	1.450
Title: Agile Information Management Services ***Description:*** Demonstrate how agile information management services enable effective information sharing in a tactical environment. ***FY 2013 Accomplishments:*** Completed development of tactical information management publish/subscribe/query mechanisms focusing on stability, performance, and reliability for assured access and isolation from malicious client applications, and assured levels of QoS. Designed and developed a mission-oriented, highly adaptive and self-aware unified intelligent capability to provide observable, actionable insights and visibility across information management services and their deployed platforms from inside-out and provide survivability-aware information sharing capabilities to anticipate achieving the information level mission goals under any conditions. Investigated and quantified the network burden and QoS requirements for service oriented architecture	3.825	4.633	1.134

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
implementations across a variety of tactical environments. Developed information management capabilities in support of force protection. ***FY 2014 Plans:*** Complete development of survivability-aware information sharing capabilities. Demonstrate a capability to link information flows to missions, providing the mission context for mission-driven sense and respond IM services. Continue investigating and quantifying the network burden and quality of service requirements for service oriented architecture implementations across a variety of tactical environments. Continue to develop IM capabilities in support of force protection. Continue design, development and demonstration of mission-oriented, highly adaptive information management technologies. Demonstrate IM services embedded with sensor platforms, such as targeting pods, to quickly and affordably link pilots, remotely-piloted vehicles (RPVs), and ground personnel for improved situation awareness. Continue to develop resource-aware IM services that are responsive to the information needs of high priority missions and users, respond to resource availability changes in contested/degraded environments, minimize information overload and dissemination latency, and improve situational understanding for missions, allowing commanders to make more timely and informed decisions. ***FY 2015 Plans:*** Continue investigating and quantifying the network burden and quality of service requirements for service oriented architecture implementations across a variety of tactical environments. Continue design, development and demonstration of mission-oriented, highly adaptive information management technologies. Continue to develop resource-aware IM services that are responsive to the information needs of high priority missions and users, respond to resource availability changes in contested/degraded environments, minimize information overload and dissemination latency, and improve situational understanding for missions, allowing commanders to make more timely and informed decisions. Initiate the development and demonstration of a domain-specific application of high performance, cloud-based, mission relevant information management services. Initiate the development and demonstration of seamless information discovery and delivery through dynamically federated information spaces from forward-deployed tactical networks to reachback to enterprise information assets.			
Accomplishments/Planned Programs Subtotals	4.968	7.353	3.712

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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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.