PE NUMBER: 0602702F
PE TITLE: Command Control and Communications

Exhibit R-2, RDT&E Budget Item Justification

DATE: February 2005

BUDGET ACTIVITY: 02 Applied Research

PE NUMBER AND TITLE: 0602702F Command Control and Communications

	Cost ($ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
	Total Program Element (PE) Cost	78.879	84.887	93.316	102.163	98.109	100.198	102.109	97.352	Continuing	TBD
4519	Communications Technology	16.383	17.083	23.598	25.619	26.484	27.115	26.503	23.335	Continuing	TBD
4594	Information Technology	28.345	27.765	27.570	30.404	30.244	29.754	30.213	30.336	Continuing	TBD
4917	Collaborative Information Tech	7.678	5.587	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
5581	Command and Control (C2) Technology	26.473	34.452	42.148	46.140	41.381	43.329	45.393	43.681	Continuing	TBD

Note: Increased funding in FY 2006 and out reflects increased emphasis on developing high payoff applications of information technologies to meet C3 needs. In FY 2006, efforts in Project 4917 move into Project 4594, Project 4519, and Project 5581 in this PE.

(U) A. Mission Description and Budget Item Justification

This program develops technology for Air Force Command, Control, and Communications (C3). Advances in C3 are required to increase warfighter readiness by providing the right information, at the right time, anywhere in the world. The program has four projects. The Communication Technology project develops assured and secure communications technology. The Information Technology project develops improved and automated capabilities to generate, process, fuse, exploit, interpret, and disseminate timely and accurate information. The Collaborative Information Technology project develops high payoff emerging technologies for the next generation of distributed, collaborative command and control systems. The Command and Control Technology project investigates and develops planning, assessment, and knowledge base technologies to allow the warfighter to plan, assess, execute, monitor, and re-plan on the compressed time scales required for tomorrow's conflicts. Note: In FY 2005, Congress added $2.5 million for Measurement and Signatures Intelligence Warfighter Visualization Tools, and $1.0 million for Joint Battlespace Infosphere. This program is Budget Activity 2, Applied Research, since it develops and determines the technical feasibility and military utility of evolutionary and revolutionary technologies.

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

		FY 2004	FY 2005	FY 2006	FY 2007
(U)	Previous President's Budget	79.594	82.147	82.865	90.866
(U)	Current PBR/President's Budget	78.879	84.887	93.316	102.163
(U)	Total Adjustments	-0.715	2.740		
(U)	Congressional Program Reductions		-0.006		
	Congressional Rescissions		-0.754		
	Congressional Increases		3.500		
	Reprogrammings				
	SBIR/STTR Transfer	-0.715			
(U)	Significant Program Changes:				

Not Applicable.

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C. Performance Metrics
(U) Under Development.

Exhibit R-2a, RDT&E Project Justification

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BUDGET ACTIVITY: 02 Applied Research

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PROJECT NUMBER AND TITLE: 4519 Communications Technology

Cost ($ in Millions)		FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
4519	Communications Technology	16.383	17.083	23.598	25.619	26.484	27.115	26.503	23.335	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

Note: Increased funding in FY 2006 and out reflects increased emphasis on developing information and networking technologies and the transfer of information technologies development effort from Project 4917 in FY 2006.

(U) A. Mission Description and Budget Item Justification

The Air Force requires technologies that enable assured, worldwide communications for an agile Expeditionary Aerospace Force (EAF). These communication technologies will provide en route and deployed reachback communications for distributed collaborative command and control. A rapidly deployed EAF requires assured connectivity with reliable, responsive, affordable information exchange via all available communications media. This project provides the technologies for: multi-level, secure, seamless networks; advanced communications processors; anti-jam and low probability of intercept techniques; lightweight, phased array antennas; and modular, programmable, low-cost software radios. It includes technologies for advanced processors and devices, advanced network protocols and services, intelligent communications management and control, advanced communications algorithms, and enabling communication signal processing techniques.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007
(U) MAJOR THRUST: Develop assured and survivable information and networking technologies enabling worldwide command, control, and communications operations for the Air Force. Note: FY 2006 and out increase reflects increased emphasis on developing information and networking technologies.	5.534	5.969	10.168	11.767

(U) In FY 2004: Developed technologies to improve quality of service for globally distributed information systems (e.g., Joint Battlespace Infosphere (JBI)). Developed assured networking and information systems technologies to improve survivability against critical infrastructure attacks. Developed securely managed enterprise network technology for development of assured network services across multiple network security domains and coalitions. Developed programmable networking algorithms that enable wide area dynamic creation of advanced information delivery services that are independent of the underlying physical infrastructure devices.

(U) In FY 2005: Continue to develop technologies to improve quality of service and survivability for globally distributed information systems (e.g., JBI). Complete development of assured networking and information systems technologies to improve survivability against critical infrastructure attacks. Complete development of securely managed enterprise network technology to develop assured network services across multiple network security domains. Continue development of programmable networking algorithms that enable wide area dynamic creation of advanced information delivery services, independent of the underlying physical infrastructure devices. Initiate development of capabilities for self-organizing, self-healing, autonomous networking.

(U) In FY 2006: Complete development of technologies to improve quality of service and survivability for

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globally distributed information systems (e.g., JBI). Complete development of programmable networking algorithms that enable wide area dynamic creation of advanced information delivery services, independent of the underlying physical infrastructure devices. Continue development of capabilities for self-organizing, self-healing, autonomous networking. Initiate development of policy-based network management technologies for real-time network response to changes in information condition (INFOCON) levels. Initiate developments focused on communications/resource network management schemas and sensor exploitation technologies enabling the dynamic integration of communications and sensor management functions for more effective moving target exploitation and fusion. Initiate development of content-based delivery networking (CBDN) technologies for intelligent network delivery and management of end user information.

(U) In FY 2007: Complete development of capabilities for self-organizing, self-healing, autonomous networking. Continue development of policy-based network management technologies for real-time network response to changes in INFOCON levels. Continue development and test of communications/resource network management schemas and sensor exploitation technologies enabling the dynamic integration of communications and sensor management functions for more effective moving target exploitation and fusion. Continue development of airborne CBDN, synergistic with the Joint Tactical Radio System Wideband Networking Waveform's Network Service Layer, and applied to extremely dynamic infrastructure and network/platform mobility dictated by tactical aircraft.

(U)

(U)	MAJOR THRUST: Develop improved, higher bandwidth communications and signal processing technologies to provide secure, adaptive, covert, anti-jam, and assured global battlespace connectivity to highly mobile aerospace forces, while reducing the equipment footprint.	4.378	4.470	4.549	4.674

(U) In FY 2004: Developed information assurance technologies that will improve the robustness of the Global Information Grid in both wireline and wireless networks for ground, air, and joint/coalition environments to preclude information systems attacks, such as denial of service and degradation of device quality. Developed high performance, adaptable, and re-configurable wireless devices to implement new waveform technologies for improved robustness, security, and affordability of critical Air Force command and control networks. Developed higher performance video compression and modulation techniques that enable critical objectives for high bandwidth information transmission and exploitation capabilities over wireless channels.

(U) In FY 2005: Continue development of information assurance technologies that improve the robustness of the Global Information Grid in both wireline and wireless networks for air, space, ground, and joint/coalition environments to preclude information systems attacks such as distributed denial of service and degradation of device quality. Continue to develop high performance, adaptable, and reconfigurable

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wireless devices to implement new waveform technologies for improved robustness, security, and affordability of critical Air Force command and control networks. Continue development of higher performance video compression and modulation techniques that enable critical objectives for high bandwidth information transmission and exploitation capabilities over wireless channels. Explore the feasibility of implementation of above technologies, where applicable, to Joint Tactical Radio System or compatible software radios.

(U) In FY 2006: Continue development of information assurance technologies that improve the robustness of the Global Information Grid in both wireline and wireless networks for air, space, ground, and joint/coalition environments to preclude information systems attacks such as distributed denial of service and degradation of device quality. Continue development of higher performance, adaptively combined multi-dimensional (space, time, frequency, coding, polarization) transmission techniques that enable high bandwidth information transmission and exploitation capabilities over wireless channels which support command and control, and intelligence, surveillance, and reconnaissance missions, and the use of intelligent munitions. Complete development of higher performance video compression and modulation techniques that enable critical objectives for high bandwidth information transmission and exploitation capabilities over wireless channels. Initiate the design and development of a multi-mode, multi-function, sense-and-adapt air-mobile communications capability to dynamically alter communications methods to support, under fast-changing environments, higher-throughput, anti-jam, low probability of intercept, and/or robust [assured] voice, data, and video communications. Perform such design and development within the framework of the Joint Tactical Radio System or compatible software defined radios. Explore/exploit feasible applications of quantum key distribution and cryptography to effect ultra-secure communications for wireline and wireless networks.

(U) In FY 2007: Complete first phase development of information assurance technologies that improve the robustness of the Global Information Grid in both wireline and wireless networks for air, space, ground, and joint/coalition environments to preclude information systems attacks. Demonstrate promising higher performance, adaptively combined multi-dimensional (space, time, frequency, coding, polarization) transmission techniques that enable high bandwidth information transmission and exploitation capabilities amongst airborne command and control, and intelligence, surveillance, and reconnaissance platforms and various weapon delivery systems with their smart munitions. Test and demonstrate a multi-mode, multi-function, sense-and-adapt air-mobile communications capability to dynamically alter communications methods under fast-changing environment within the framework of the Joint Tactical Radio System or compatible software defined radios. Develop and test promising quantum key distribution and cryptography technologies to effect ultra-secure communications for wired and wireless networks. Perform transition planning.

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(U)					
(U)	MAJOR THRUST: Develop critical information transmission technologies to permit the seamless integration of aerospace weapon systems' C2, intelligence, surveillance, and reconnaissance data/information. Note: Effort transferred from Project 4917 in FY 2006.	0.000	0.000	1.822	1.870
(U)	In FY2004: Not Applicable.				
(U)	In FY2005: Not Applicable.				
(U)	In FY2006: Initiate exploration of techniques for tunable, high power radio frequency filtering to reduce overall radio frequency component equipment size, weight, and signal losses. Continue development, test, and assessment of exploratory radio frequency and optical information transfer technologies.				
(U)	In FY2007: Continue to explore multiple technologies/techniques for tunable, high power radio frequency filtering to reduce overall radio frequency component equipment size, weight, and signal losses. Continue development, test, and assessment of exploratory radio frequency and optical information transfer technologies.				
(U)					
(U)	MAJOR THRUST/CONGESSIONAL ADD: Develop cyber operations technologies for enabling worldwide command, control, communications and intelligence. Note: This effort includes Congressional Add funding of $1.2 million in FY 2004.	6.471	6.644	7.059	7.308
(U)	In FY 2004: Developed automated capabilities for damage assessment and recovery techniques. Developed network forensics and data mining tools for detecting adversary information warfare attacks and to provide early warning notification. Developed detection and eradication techniques for malicious code. Developed active response technologies. Completed work in detection of hidden data. Developed advanced correlation fusion techniques for defensive course of action analysis. Developed intrusion detection techniques for wireless networks. Developed new tools and techniques to protect command, control, communications, intelligence, and information systems, and allowed for integration of coalition information elements.				
(U)	In FY 2005: Continue to develop automated capabilities for damage assessment and recovery techniques. Complete development of network forensics. Continue development of data mining tools for detecting adversary information warfare attacks and provide early warning notification. Continue to develop detection and eradication techniques for malicious code. Continue development of active response technologies. Continue development of advanced correlation fusion techniques for defensive course of action analysis. Continue development of intrusion detection techniques for wireless networks. Continue the development of tools and techniques to protect command, control, communications, intelligence, and information systems, and allow for integration of coalition information elements.				
(U)	In FY 2006: Continue development of intrusion detection techniques for wireless networks. Continue to				

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develop automated capabilities for damage assessment and recovery. Continue to develop techniques for defining defensive courses-of-action to counter adversary information warfare attacks. Continue to develop defensive techniques for wireless, mobile and embedded systems. Continue to develop detection and eradication techniques for malicious code. Continue development of active response and computer network attack (CNA) technologies. Continue development of advanced correlation fusion techniques for defensive course of action analysis. Initiate work addressing self-healing systems.

(U) In FY 2007: Complete development of intrusion detection techniques for wireless networks. Continue to develop automated capabilities for damage assessment and recovery. Continue to develop techniques for defining defensive courses-of-action to counter adversary information warfare attacks. Continue to develop defensive techniques for wireless, mobile and embedded systems. Continue to develop detection and eradication techniques for malicious code. Continue development of active response and CNA technologies. Continue development of advanced correlation fusion techniques for defensive course of action analysis. Continue efforts in self-healing systems.

(U) Total Cost	16.383	17.083	23.598	25.619

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

	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U) Related Activities:										
(U) PE 0603789F, C3I Advanced Development. This project has been coordinated through the										
(U) Reliance process to harmonize efforts and eliminate duplication.										

(U) D. Acquisition Strategy

Not Applicable.

Exhibit R-2a, RDT&E Project Justification

DATE: February 2005

BUDGET ACTIVITY: 02 Applied Research

PE NUMBER AND TITLE: 0602702F Command Control and Communications

PROJECT NUMBER AND TITLE: 4594 Information Technology

Cost ($ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
4594 Information Technology	28.345	27.765	27.570	30.404	30.244	29.754	30.213	30.336	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

The Air Force requires technologies that improve and automate their capability to generate, process, manage, fuse, exploit, interpret, and disseminate timely and accurate information. This project improves global awareness at all levels, enabling warfighters to understand relevant military situations on a consistent basis with the timeliness and precision needed to accomplish their missions. Global awareness is achieved by exploiting information provided by the Air Force, other government agencies, and open source information. The information is fused to support the dynamic planning and execution cycle via the global information enterprise. Knowledge, information, and data are all archived in the global information base for continued use and historical analysis. The information technologies required to achieve this capability are developed under this project in an affordable manner and include appropriate access mechanisms for our coalition partners. This project develops high-payoff embedded information systems technologies for the next generation of distributed information integration architectures to enable global information dominance and air and space superiority. The embedded information systems technologies provide affordable, innovative, secure, net-enabled embedded information systems to the warfighter.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007
(U) MAJOR THRUST: Develop innovative multi-sensor collaborative fusion technologies in a fully distributed air and space environment.	6.571	6.753	6.460	7.241

(U) In FY 2004: Developed techniques to quantitatively evaluate fusion algorithms that support the analysis of a new emerging information era. Developed optimized multi-source fusion techniques for continuous tracking of militarily significant vehicles in the battlespace. Developed and evaluated fusion technologies for enemy threat prediction through the use of multi-source fusion.

(U) In FY 2005: Evaluate fusion techniques to determine optimal algorithms based upon data available that support the analysis of a new emerging information era. Continue to develop optimized multi-source fusion techniques for positive identification and continuous tracking of militarily significant vehicles in the battlespace. Continue development and evaluation of fusion technologies for enemy threat prediction based on the use of multi-source fusion.

(U) In FY 2006: Continue to develop and evaluate fusion techniques for optimal fusion management. Test and analyze vehicle motion models for variable state multiple algorithm to associate the current location of vehicle with a future state. Enhance multi-source fusion techniques for probabilistic identification and continuous tracking of military significant threats in the battlespace. Evaluate evidence accrual and data mining techniques for improved fusion performance. Develop new measures of performance for higher levels of fusion in analyzing situational assessment and process refinement.

(U) In FY 2007: Evaluate fusion management and advance the state-of-the-art in track-to-track fusion

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techniques. Continue the process of probabilistic identification though the use of multi-source fusion. Increase probabilistic confidence through the inclusion of higher-level fusion techniques in the situational assessment and process refinement area. Develop techniques to dynamically update advanced reasoning fusion engines to adapt to changing threat conditions. Develop intelligence, surveillance, and reconnaissance management techniques that optimize the fusion process for identification and continuous tracking of military significant threats. Evaluate network centric approaches to provide distributed fusion techniques to the warfighter.

(U)

(U)	MAJOR THRUST: Develop higher-level fusion and the enabling information/knowledge base technologies to achieve situational awareness at all command levels for the dynamic planning and execution process.	5.468	5.644	5.785	6.386

(U) In FY 2004: Developed intermediate information extraction techniques to reduce data overload and increase time allocated to analysis and decision-making, enabling the ability to populate knowledge base systems. Developed data mining techniques for a self-organizing data repository and content-based extraction to support prediction of potential events in the world. Developed advanced web-based search techniques, data filtering techniques, and information aggregation methods required for rapid situational understanding.

(U) In FY 2005: Continue development of intermediate information extraction techniques to decrease analysis time for decision-making and enabling the ability to populate knowledge base systems. Continue development of data mining techniques for self-organizing data repositories and content-based extraction to support identification of potential events in the world. Continue development of web-based search techniques, data filtering techniques, and information aggregation methods to take advantage of the explosion of available data on the Web required for rapid situational understanding. Develop new techniques addressing key entity extraction technology gaps, to improve the accuracy of Air Force and joint systems that exploit information from unstructured text for situation analysis.

(U) In FY 2006: Complete development of intermediate information extraction techniques to decrease analysis time for decision-making and enabling the ability to populate knowledge base systems. Complete development of techniques addressing key entity extraction technology gaps, to improve the accuracy of Air Force and joint systems that exploit information from unstructured text for situation analysis. Continue development of interactive contextual reasoning with inference techniques for self-organizing data repositories, and content-based extraction to support identification of potential events in the world. Continue enhancement of web-based search techniques, data filtering techniques, and information aggregation methods to take advantage of the explosion of available open source data on the Web required for rapid situational understanding. Develop inferencing techniques for reasoning

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	about the situation and predict enemy intent and threat possibility.				
(U)	In FY 2007: Enhance techniques for interactive contextual reasoning with inference techniques for self-organizing data repositories and content-based extraction to support identification of potential events in the world. Continue enhancement of web-based search techniques, data filtering techniques, and information aggregation methods to take advantage of the explosion of available open source data on the Web required for rapid situational understanding. Continue developing inferencing techniques for reasoning about the situation and for predicting enemy intent and threat possibility.				
(U)					
(U)	MAJOR THRUST: Develop automatic and dynamically reconfigurable, affordable, scalable, distributed petaflop processing technologies for real-time C2 global information systems.	3.606	3.913	4.099	4.508
(U)	In FY 2004: Developed and demonstrated architectures for rapid extraction of information from globally distributed knowledge bases. Evaluated architectures to support real-time requirements for dominant battlespace awareness. Studied next generation information technologies (e.g., quantum computing and bio-molecular computing) for C2 systems.				
(U)	In FY 2005: Demonstrate architecture for rapid extraction of information from globally distributed knowledge bases. Demonstrate architecture to support real-time requirements for dominant battlespace awareness. Continue study of next generation information technologies (e.g., quantum computing and bio-molecular computing) for C2 systems.				
(U)	In FY 2006: Complete architecture for support of real-time requirements for dominant battlespace awareness. Complete study results of next generation information technologies for C2 systems. Continue evaluation of architectural features for cognitive information processing. Initiate algorithm development for next generation information technologies for C2 systems. Initiate architectural development for cognitive information processing. Develop and characterize high performance computers for quantum computing applications.				
(U)	In FY 2007: Complete evaluation of architectural features for cognitive information processing. Continue algorithm development for next generation information technologies for C2 systems. Continue architectural development for cognitive information processing. Continue development and characterization of high performance computers for quantum computing applications. Initiate development and characterization of the next generation of high performance computers.				
(U)					
(U)	MAJOR THRUST: Develop modeling and simulation technologies for the next generation of planning, execution, and assessment environments.	1.916	1.989	2.461	2.630
(U)	In FY 2004: Completed model abstraction and multi-resolution modeling techniques to reduce the complexity of existing high-resolution models and simulations for next generation distributed				

collaborative decision support environments. Developed decision support technologies and their theoretical foundation to support high-profile system concepts, such as the Joint Synthetic Battlespace and the Global Strike Task Force.

(U) In FY 2005: Continue to develop modeling and simulation technologies to support next generation planning execution and assessment environments. Develop adversarial behavior models and modeling techniques for course of action assessment and prediction. Prototype and demonstrate decision support technologies and the theoretical foundation to support high-profile system concepts such as Air Force Concepts of Operations.

(U) In FY 2006: Continue to develop advanced modeling and simulation technologies to support next generation planning execution and assessment environments. Continue development of adversarial behavior models and modeling techniques for dynamic course of action assessment and prediction. Initiate investigation of techniques for integrated interaction and assessment of friendly versus enemy courses of action. Develop simulation techniques for dynamic situation assessment and prediction.

(U) In FY 2007: Demonstrate advanced modeling and simulation technologies to support next generation planning execution and assessment environments. Demonstrate adversarial behavior models and modeling techniques for course of action assessment and prediction. Conduct concept demonstrations of integrated interaction and assessment of friendly versus enemy courses of action. Demonstrate a prototypical dynamic situation assessment and prediction system. Investigate advanced concepts to provide approaches for a modeling toolset that enables the warfighter to build composable simulations.

(U)

(U) MAJOR THRUST: Develop real-time embedded information system technologies for complex, time-critical, embedded systems to enable affordable design and development of state-of-the-art hardware and software, innovatively incorporate new capabilities, reactively adapt to multiple missions and changing environments, verify, validate, and assure functionality and integrity, and facilitate rapid insertion to support real-time, collaborative operations within a net-centric enterprise. Note: Effort transfered from Project 4917 in FY 2006.	0.000	0.000	2.007	2.130

(U) In FY 2004: Not Applicable.

(U) In FY 2005: Not Applicable.

(U) In FY 2006: Continue development of dynamically reconfigurable aerospace systems using adaptive computing techniques to support image/video processing and data compression. Continue to develop adaptive embedded computing technologies to support enhanced interoperability and information exchange between tactical C2 platforms to support network centric operations, based on Real-Time Java and reconfigurable computing. Continue to develop processes, methods, and techniques to provide assured performance, integrity, and security of real-time embedded information systems. Continue to

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develop algorithms, methods, and processes to support real-time, adaptive resource management of system resources across multiple tactical platforms. Continue to develop multi-level secure middleware for real-time embedded system architectures. Continue development of methods of computation and computing processes using biologically-inspired and biologically-based computation for embedded systems application. Initiate development of power-aware, polymorphic aerospace systems for mission-aware computing.

(U) In FY 2007: Continue development of dynamically reconfigurable aerospace systems using adaptive computing techniques to support image/video processing and data compression. Complete program to develop adaptive embedded computing technologies to support enhanced interoperability and information exchange between tactical C2 platforms to support network centric operations, based on Real-Time Java and reconfigurable computing. Continue to develop processes, methods, and techniques to provide assured performance, integrity, and security of real-time embedded information systems. Continue to develop algorithms, methods, and processes to support real-time, adaptive resource management of system resources across multiple tactical platforms. Continue to develop multi-level secure middleware for real-time embedded system architectures. Continue development of methods of computation and computing processes using biologically-inspired and biologically-based computation for embedded systems application. Continue development of power-aware, polymorphic aerospace systems for mission-aware computing.

(U)	MAJOR THRUST/CONGRESSIONAL ADD: Develop digital information exploitation technologies for electronic communications and special signals intelligence, imagery, and measurement signatures to increase accuracy, correlation, and timeliness of the information value to the decision maker. Note: This effort includes Congressional Add funding of $4.0 million in FY 2004 and $2.5 million in FY 2005.	10.784	9.466	6.758	7.509

(U) In FY 2004: Developed advanced multi-sensor open systems techniques and automated analyst tools for exploiting measurement and signature intelligence, hyperspectral imagery, on-board video processing, new electronic signals, moving target indicator, and speech intelligence products for improved situational awareness, indication and warning, and reporting capabilities. Researched techniques in steganography, steganalysis, and watermarking of imagery, video, and speech for information protection and authentication, intelligence exploitation, and analysis tool aids.

(U) In FY 2005: Continue development of advanced multi-sensor and automated analyst tools for exploiting measurement and signature intelligence, commercial sources and hyperspectral imagery, on-board video processing, new digital electronic signals, moving target indicator, and speech intelligence products to feed an information fusion process in support of the decision maker. Continue development of techniques in steganography, steganalysis, watermarking, and digital data forensics for imagery, video, and speech information protection and authentication, intelligence exploitation, and analysts' tool aids.

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Initiate investigation of new techniques to improve open systems techniques for multi-sensor exploitation for enhanced indications and warning and situational awareness.

(U) In FY 2006: Continue to develop tools to increase the production capability of the intelligence analyst. Continue development of techniques in steganography, steganalysis, watermarking, and digital data forensics for imagery, video, and speech information protection and authentication, intelligence exploitation, and analysts' tool aids. Continue the development of tools to detect, track, and analyze document and file tampering through the use of steganography, steganalysis, and digital watermarking.

(U) In FY 2007: Complete first phase development of techniques in steganography, steganalysis, watermarking, and digital data forensics for imagery, video, and speech information protection and authentication, and intelligence exploitation. Continue the development of the multi- intelligence toolsets for the processing, exploitation and dissemination of actionable intelligence.

(U) Total Cost	28.345	27.765	27.570	30.404

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

	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U) Related Activities:										
(U) PE 0603789F, C3I Advanced Development. This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.										

(U) D. Acquisition Strategy

Not Applicable.

Exhibit R-2a, RDT&E Project Justification

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BUDGET ACTIVITY: 02 Applied Research

PE NUMBER AND TITLE: 0602702F Command Control and Communications

PROJECT NUMBER AND TITLE: 4917 Collaborative Information Tech

Cost ($ in Millions)		FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
4917	Collaborative Information Tech	7.678	5.587	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

Note: In FY 2006, efforts in this Project move to Project 4594, Project 4519, and Project 5581 in this PE.

(U) A. Mission Description and Budget Item Justification

To implement the Global Strike Task Force and other task force concepts, the Air Force requires a distributed, collaborative C2 system, allowing the majority of the C2 center to remain in the continental United States, while only a small command element is deployed forward. This project accomplishes the initial exploration of high payoff emerging technologies for the next generation of distributed collaborative C2 systems. This program develops technologies for platform connectivity, distributed collaboration, and embedded information systems. Platform connectivity technologies focus on advanced modulation waveforms for bandwidth efficiency, assured aerospace platform connectivity for C2, and conceptual design approaches for seamless integration of aerospace weapon systems into the information grid. Distributed collaboration technologies advance collaboration science, virtual environments, and predictive simulation tools to facilitate the development and fielding of next generation operational collaborative decision support systems. Embedded information systems technologies explore high payoff technologies for the next generation of distributed information integration architectures, which will provide cross disciplinary products/capability to a decision maker when, where, and how it is needed. It also provides embedded information system technologies for affordable and adaptable design and development of complex C2 systems, facilitated by an open system architecture approach.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007
(U) MAJOR THRUST: Develop critical information transmission technologies to permit the seamless integration of aerospace weapon systems' C2, intelligence, surveillance, and reconnaissance data/information. Note: In FY 2006, this effort moves to Project 4519 in this PE.	1.989	1.992	0.000	0.000
(U) In FY 2004: Developed assured communications technology, leveraging commercial infrastructure, for positive C2 of aerospace assets in commercial airspace. Developed secure, wide-band wireless miniaturized transceiver information transfer technology for assured communications between munitions and aircraft.				
(U) In FY 2005: Continue the development of assured communications technology, leveraging commercial infrastructure for positive C2 of aerospace assets in commercial airspace. Complete the design and development of secure, wide-band wireless miniaturized transceiver information transfer technology for assured communications between munitions and aircraft. Develop, test, and assess exploratory information transfer technologies.				
(U) In FY 2006: Not Applicable.				
(U) In FY 2007: Not Applicable.				
(U)				
(U) MAJOR THRUST: Develop processes, methods, and techniques to provide assured performance,	1.388	1.495	0.000	0.000

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	integrity, and security of real-time embedded information systems. Note: In FY 2006, this effort moves to Project 4594 in this PE.				
(U)	In FY 2004: Developed dynamically reconfigurable aerospace systems using adaptive computing techniques. Defined and developed algorithms, methods, and processes to support real-time, adaptive resource management of system resources across multiple tactical platforms.				
(U)	In FY 2005: Continue development of dynamically reconfigurable aerospace systems using adaptive computing techniques. Continue to develop algorithms, methods, and processes to support real-time, adaptive resource management of system resources across multiple tactical platforms. Develop methods and processes for implementation of Java and Real-Time Java Virtual Machines using adaptive computing techniques.				
(U)	In FY 2006: Not Applicable.				
(U)	In FY 2007: Not Applicable.				
(U)					
(U)	MAJOR THRUST/CONGRESSIONAL ADD: Develop advanced information technologies for collaborative decision support, knowledge management, and rapid adaptation/re-allocation of assets in response to the continually changing threat environment. Note: This effort includes Congressional Add funding of $2.4 million in FY 2004. In FY 2006, this effort moves to Project 5581 in this PE.	4.301	2.100	0.000	0.000
(U)	In FY 2004: Developed techniques to assist in performing the collaborative planning for the seven Air Force Concepts of Operations (CONOPS). Developed distributed collaborative environment technology for effects-based operations and predictive battlespace awareness. Developed technology to support a sensor-to-shooter scenario stressing time-critical target requirement, which will deny the enemy sanctuary of time.				
(U)	In FY 2005: Continue development of techniques to perform collaborative, capability-based planning required by the seven Air Force CONOPS. Continue development of distributed collaborative environment technology for effects-based operations and predictive battlespace awareness. Complete work to develop technology to support a sensor-to-shooter scenario stressing time-critical target requirement, which will deny the enemy sanctuary of time.				
(U)	In FY 2006: Not Applicable.				
(U)	In FY 2007: Not Applicable.				
(U)					
(U)	Total Cost	7.678	5.587	0.000	0.000

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

	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U) Related Activities:										
(U) PE 0603789F, C3I Advanced Development. This project has been coordinated through the										
(U) Reliance process to harmonize efforts and eliminate duplication.										

(U) D. Acquisition Strategy

Not Applicable.

Exhibit R-2a, RDT&E Project Justification			DATE: February 2005
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	Cost ($ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
5581	Command and Control (C2) Technology	26.473	34.452	42.148	46.140	41.381	43.329	45.393	43.681	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

Note: Increased funding in FY 2006 and out reflects increased emphasis on developing automatically reconfigurable information system technologies and the transfer of collaborative technologies development effort from Project 4917 in FY 2006.

(U) A. Mission Description and Budget Item Justification

The Air Force requires C2 technologies that will provide the next generation of weapon systems with improved processing and presentation of information for real-time, distributed battle management. Technologies in this project must be capable of taking advantage of future net-centric environments including new structured and ad hoc processes in response to rapidly changing warfare challenges. Technologies being developed will increase capability, quality, and information interoperability, while reducing the cost of C2 systems and infrastructure. Technology development in this project focuses on planning and assessing techniques knowledge bases, distributed information systems, and information management and distribution services. Advances in planning and assessment technologies will vastly improve the military decision making process within C2 systems. Advances in the ability to detect, classify, identify, and track objects and events will improve the understanding and prediction of enemy intentions, allowing the development of various courses of action to counter their intentions. Advances in the development of very large comprehensive knowledge bases to rapidly formulate and create new knowledge are needed by the Expeditionary Aerospace Force. Advances in distributed intelligent information systems will allow automatic rapid reconfiguration of C2 centers to respond to varying crisis levels, as required, by a Net-Centric Aerospace Force. Advances in robust information management and dissemination technologies will ensure the delivery of high-quality, timely, secure information to the warfighter.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007
(U) MAJOR THRUST: Investigate and develop technologies for the rapid development and application of next generation knowledge bases for aerospace C2 systems.	6.576	7.327	6.924	6.943

(U) In FY 2004: Developed tools that will automate the intelligent extraction, correlation, and classification of link patterns for discovering relevant linkages between entities. Investigated and developed ultra-large, all-source information repositories and associated privacy protection technologies. Completed development of enhanced reasoning techniques for complex inferencing and performance of C2 systems.

(U) In FY 2005: Investigate and develop technologies for the rapid development and application of next generation knowledge bases for aerospace C2 systems. Continue to develop tools that will automate the intelligent extraction, correlation, and classification of link patterns for discovering relevant linkages between entities. Continue development of ultra-large all-source information repositories and associated privacy protection technologies.

(U) In FY 2006: Demonstrate tools that will automate the intelligent extraction, correlation, and

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classification of link patterns for discovering relevant linkages between entities. Continue to develop technologies for the rapid development and application of next generation knowledge bases for aerospace C2 systems. Initiate development of foundations, technology, and tools to enable effective, practical automated reasoning of the scale and complexity required for computers to perform complex tasks in the real world requiring intelligence. Initiate development of cognitive architectures for self-aware, learning agents.

(U) In FY 2007: Complete development of technologies for the rapid development and application of next generation knowledge bases for aerospace C2 systems. Continue to develop foundations, technology, and tools to enable effective, practical automated reasoning of the scale and complexity required for computers to perform complex tasks in the real world requiring intelligence. Investigate and develop specialized cognitive architectures using self-aware, learning agents that can generate well-focused knowledge bases for automated intelligent extraction, correlation, and classification of link patterns for discovering relevant linkages between entities.

(U)

(U)	MAJOR THRUST: Investigate, analyze, and develop technologies for automatic rapid reconfiguration of distributed intelligent information systems to varying crisis levels faced by the Expeditionary Aerospace Force. Note: FY 2006 and out increase reflects increased emphasis on developing automatically reconfigurable information system technologies.	7.385	8.154	12.975	13.577

(U) In FY 2004: Developed a dynamic and adaptable interface technology that allows commanders to create a mission-tailored view of the configuration and status of the currently executing Air Operations Center (AOC) C2 process. Developed advanced interactive displays suitable for deployment with C2 applications and command centers. Completed the development of techniques and applications for visualization of multiple, heterogeneous data sets. Developed technologies to improve the fidelity, accuracy, and interconnection of computer-based wargames used to prepare contingency plans and response strategies.

(U) In FY 2005: Continue to develop dynamic and adaptable interface technology that allows commanders to create a mission-tailored view of the configuration and status of the currently executing AOC C2 process. Continue to develop advanced interactive displays suitable for deployment with C2 applications and command centers. Initiate development of advanced techniques and AOC-based applications for information visualization for use in conjunction with multiple, heterogeneous data sets. Continue to develop technologies to improve the fidelity, accuracy, and interconnection of computer-based wargames used to prepare contingency plans and response strategies.

(U) In FY 2006: Continue to develop dynamic and adaptable interface technology that allows commanders to create a mission-tailored view of the configuration and status of the currently executing AOC C2

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process. Continue to develop advanced interactive displays suitable for deployment in harsh environments with C2 applications and command centers. Continue development of advanced techniques and AOC-based applications for information visualization for use in conjunction with multiple, heterogeneous data sets. Continue to develop technologies to improve the fidelity, accuracy, and interconnection of computer-based wargames used to prepare contingency plans and response strategies. Initiate development of technologies for a holistic tool set that commanders can use to probe, study, analyze, visualize, reason, and predict activities in the battlespace.

(U) In FY 2007: Continue to develop dynamic and adaptable interface technology that allows commanders to create a mission-tailored view of the configuration and status of the currently executing AOC C2 process. Continue to develop advanced interactive displays suitable for rapid deployment in harsh environments with C2 applications and command centers. Continue development of advanced techniques and AOC-based applications for information visualization for use in conjunction with multiple, heterogeneous data sets. Continue to develop technologies to improve the fidelity, accuracy, and interconnection of computer-based wargames used to prepare contingency plans and response strategies. Continue development of technologies for a holistic tool set that commanders can use to probe, study, analyze, visualize, reason, and predict activities in the battlespace.

(U)

(U)	MAJOR THRUST: Investigate and develop technologies to securely share information via publish, subscribe, and query with coalition partners as part of the overall Global Information Grid approach. Sharing of information is in part a function of secure sharing, but is also a function of the managing of the information in assessing the trustworthiness of the information and its markup. Note: This effort was broken out from the next Major Thrust below due to the increased emphasis on C2 in a coalition environment.	0.000	5.229	6.548	9.248

(U) In FY 2004: Not Applicable.

(U) In FY 2005: Initiate investigation and development of technologies to dynamically filter and fuse information and produce customized coalition information products. Start development of techniques and tools that will ensure availability, integrity, and survivability of information within a coalition net-centric environment. Initiate development of technology approaches that will rapidly incorporate coalition force structure units into an operational Community of Interest (COI) Infosphere.

(U) In FY 2006: Complete investigation of technologies to dynamically filter and fuse information and produce customized coalition information products. Continue development of technology approaches to rapidly assimilate appropriate coalition partners into appropriate COI Infospheres. Extend cross-domain information sharing research and development to include collaborative monitoring and management of multi-national enterprise resources such as firewalls/guards/routers, application servers, intrusion

detection systems, etc. Investigate the ability to perform and enforce role-based access control to these COI Infospheres. Focus research on multi-domain event correlation from a centralized perspective (e.g., guarding services enabled, multi-level security repository) in order to establish a composite picture of resource status with the ability to centrally react to that status. Continue development of techniques and tools that will ensure availability, integrity, and survivability of information within a coalition net-centric environment. Initiate development of publish/subscribe technologies for application to a CBDN system for intelligent network management of user information.

(U) In FY 2007: Complete development of techniques and tools that will ensure availability, integrity, and survivability of information within a coalition net-centric environment. Complete development of technology approaches to rapidly assimilate appropriate coalition partners into appropriate COI Infospheres. Complete investigation on performing and enforcing role-based access control to these COI Infospheres. Continue cross-domain information sharing research and development to include collaborative monitoring and management of multi-national enterprise resources. Continue development of techniques and tools that will ensure availability, integrity, and survivability of information within a coalition net-centric environment. Investigate technologies, which can determine the pedigree of information in a coalition environment and assess the trustworthiness of the marked up information to be shared throughout the coalition. Investigate and prototype the application of information fusion and information management technologies such as fuselets to extend composite views of events across a multi-domain enterprise into fused events. Continue development of publish/subscribe technologies for application to a CBDN system for intelligent network management of user information.

(U)

(U) MAJOR THRUST: Develop distributed collaboration technologies, advance collaboration science, virtual environments, and predictive simulation tools to facilitate the development and fielding of next generation operational collaborative decision support systems. Note: This effort was performed in Project 4917 prior to FY 2006.	0.000	0.000	2.002	1.937

(U) In FY 2004: Not Applicable.

(U) In FY 2005: Not Applicable.

(U) In FY 2006: Continue development of advanced information technologies for collaborative decision-making and knowledge management in support of capability-based planning, Air Force concepts of operations, and next generation planning, execution, and assessment environments. Continue development of distributed collaborative environment technology for operations other then war and similar applications.

(U) In FY 2007: Continue development of advanced information technologies for collaborative decision-making and knowledge management in support of capability-based planning and next

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generation planning, execution, and assessment environments. Prototype distributed collaborative environment technologies for advanced decision support for high-profile system concepts, such as the Global Strike Concept of Operations and operations other then war.

(U)

(U)	MAJOR THRUST/CONGRESSIONAL ADD: Develop next generation monitoring, planning, execution, and assessment technologies and tools enabling distributed aerospace commanders to efficiently and collaboratively develop effects based campaigns. Note: This effort includes Congressional Add funding of $1.0 million in FY 2004.	9.841	9.873	9.667	9.044

(U) In FY 2004: Developed the next generation of monitoring, planning, execution, and assessment technologies and tools enabling aerospace commanders to efficiently and collaboratively develop effects-based campaigns. Developed technologies to dynamically and rapidly assess the battlespace, and provide near-real-time command of manned and unmanned forces to execute the required missions. Investigated developments in decision support science for incorporation into C2 tools. Developed tools to visualize the probability of success of qualitatively different courses of action. Developed intelligent information systems capable of supporting joint/coalition C2 for various missions. Developed and assessed active template and semantic ontology technologies for use in mobile C2 applications. Developed tools to increase situational awareness through intelligent information push and pull in dynamic environments.

(U) In FY 2005: Continue to develop technologies to dynamically and rapidly assess the battlespace, and provide near-real-time C2 of available resources to execute the required missions incorporating developments in decision support science. Complete development of tools to visualize the probability of success of qualitatively different courses of action. Continue to develop intelligent information systems capable of supporting joint/coalition C2 for various missions. Continue to develop and assess active template and semantic ontology technologies for use in C2 applications. Continue to develop tools to increase situational awareness through intelligent information push and pull in dynamic environments. Initiate investigation of intelligent information processing techniques to enhance the C2 decision-making process, such as family of web service concepts; secure, shareable object spaces; legacy bridges; component-based architectures; information presentation components; and incorporation of Network Centric Warfare Service concepts. Investigate application of decision support sciences to C2 activities within a Coalition AOC.

(U) In FY 2006: Continue to develop technologies to dynamically and rapidly assess the battlespace with a special emphasis on effects based assessment. Continue to investigate application of decision support sciences to C2 activities within a Coalition AOC. Extend Course of Action analysis capability to allow collaboration between geographically remote locations. Continue to develop intelligent information

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systems capable of supporting joint/coalition C2 for various missions. Continue to develop and apply semantic ontology technologies for use in C2 applications, such as effects-based planning and dynamic tasking. Continue to develop tools to increase situational awareness through intelligent information push and pull in dynamic environments. Continue investigation of intelligent information processing techniques to enhance the C2 decision-making process, such as family of web service concepts; secure, shareable object spaces; legacy bridges; component-based architectures; information presentation components; and incorporation of Network Centric Warfare Service concepts. Prototype these techniques and demonstrate feasibility and usefulness. Explore the application of system of systems and federation of systems engineering principles to enable joint C2 capabilities.

(U) In FY 2007: Complete development of next generation of monitoring, planning, execution, and assessment technologies and tools enabling aerospace commanders to efficiently and collaboratively develop effects-based campaigns. Complete development of technologies to dynamically and rapidly assess the battlespace, and provide near-real-time command of manned and unmanned forces to execute the required missions. Complete the incorporation of decision support science into C2 tools. Complete Course of Action analysis capability to allow collaboration between geographically remote locations. Continue to investigate application of decision support sciences and advanced decision-making concepts to C2 activities within a Coalition AOC. Continue to develop intelligent information systems capable of supporting joint/coalition C2 for various missions in a dynamically changing environment. Continue to develop tools to increase situational awareness through intelligent information processing. Continue the application of system of systems and federation of systems engineering in the creation of joint C2 capabilities. Explore the application of intelligent software agents as virtual battle staff members to enhance various C2 processes. Develop and demonstrate an effects-based dynamic tasking process enabled by dynamically accessible data and information services.

(U) MAJOR THRUST/CONGRESSIONAL ADD: Investigate and develop technologies to implement flexible, high performance, secure, scalable, and survivable information management and dissemination services to enable a Global Information Grid-based COI Infosphere. Note: This effort includes Congressional Add funding of $1.0 million in FY 2005. 2.671 3.869 4.032 5.391

(U) In FY 2004: Developed techniques and tools for integrating legacy client-server C2 systems into a publish, subscribe, and query infosphere.

(U) In FY 2005: Complete development of techniques and tools for integrating legacy client-server C2 systems into a publish, subscribe, and query COI infosphere. Continue to investigate and develop publish, subscribe, and query technologies enabling a secure infosphere that can support thousands of C2 and intelligence, surveillance, and reconnaissance clients at various levels of security classification, and can operate within a coalition warfighting environment. Investigate new advanced publish, subscribe,

and query technologies for the information management services, which provide higher levels of performance, security, and scalability to meet Air Force net-centric requirements. Investigate techniques to optimize these publish, subscribe, and query mechanisms to be used within bandwidth limited environments. Investigate automated methods of tailoring the user perspective of the COI Infosphere to reduce information overload and increase information awareness and utilization. Investigate the interoperability of various COI Infospheres (e.g., Combat Support, Intel, Business) with respect to the management and sharing of information across them. Investigate the ability to monitor, obtain feedback, and assert control over the COI Infosphere.

(U) In FY 2006: Continue to investigate and develop publish, subscribe, and query technologies enabling a secure infosphere that can support thousands of C2 and intelligence, surveillance, and reconnaissance clients at various levels of security classification, and can operate within a coalition warfighting environment. Complete investigation of new advanced publish, subscribe, and query technologies for the Information Management services, which provide higher levels of performance, security, and scalability to meet Air Force net-centric requirements. Complete investigation of techniques to optimize these publish, subscribe, and query mechanisms to be used within bandwidth-limited environments. Continue to investigate automated methods of tailoring the user perspective of the COI Infosphere to reduce information overload and increase information awareness and utilization. Complete investigation of the interoperability of various COI Infospheres (e.g., Combat Support, Intel, Business) with respect to the management and sharing of information across them. Develop high payoff publish, subscribe and query laboratory prototypes which provide higher levels of performance, security, and scalability capable of exceeding commercial products and support Air Force Net-centric environment needs. Continue to investigate automated methods of tailoring the user perspective of the COI Infosphere to reduce information overload and increase information awareness and utilization. Focus on automated composition of tailoring entities, and runtime environments. Continue to investigate methods and techniques for dynamically evolving the net-centric environment so as to avoid system crashes or latency as new information sources arrive or depart the environment. Focus is on representation of real-time performance guarantees and negotiation for various levels of service as would be required in tactical aircraft. Investigate and assess the use of semantic markup and semantic web languages as part of the COI Infosphere. Initiate the investigation of technology and approaches to prioritizing information in a COI Infosphere so as to effectively utilize communication and computing resources. Continue to develop technology and techniques to monitor, obtain feedback, and assert control over the COI Infosphere.

(U) In FY 2007: Complete investigation in the use of semantic markup and semantic web languages as part of the COI Infosphere. Complete investigation of technology and approaches to prioritizing information

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in a COI Infosphere so as to effectively utilize communication and computing resources. Continue to develop high-payoff publish, subscribe, and query laboratory prototypes, which provide higher levels of performance, security, and scalability capable of exceeding commercial products and support Air Force net-centric environment needs. Continue to investigate automated methods of tailoring the user perspective of the COI Infosphere to reduce information overload and increase information awareness and utilization. Continue to develop technology and techniques to monitor, obtain feedback, and assert control over the COI Infosphere. Investigate the security policy enforcement between COI Infospheres at various levels of security classification. Continue to investigate methods and techniques for dynamically evolving the net-centric environment so as to avoid system crashes or latency as new information sources arrive or depart the environment.

(U) Total Cost	26.473	34.452	42.148	46.140	

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

	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U) Related Activities:										
(U) PE 0603617F, C3 Applications.										
(U) PE 0303401F, Communications-Computer Systems (C-CS) Security RDT&E.										
(U) PE 0603789F, C3I Advanced Development.										
(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.										

(U) D. Acquisition Strategy

Not Applicable.