RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603789F C3I Advanced Development

	COST ($ in Thousands)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	18,252	33,217	34,288	36,190	32,728	32,921	33,283	Continuing	TBD
4072	Dominant Battlespace Awareness	9,411	11,128	16,093	15,765	12,244	12,478	12,716	Continuing	TBD
4216	Battlespace Information Exchange	3,889	11,640	6,984	6,564	6,602	6,729	6,856	Continuing	TBD
4872	Dynamic Aerospace C2 & Execution	4,952	7,436	9,303	11,549	11,963	11,757	11,717	Continuing	TBD
4925	Collaborative C2	0	3,013	1,908	2,312	1,919	1,957	1,994	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	Continuing	TBD

Note: In FY 2002, efforts previously accomplished in PE 0603726F, Project 4850, move into Project 4925, and efforts previously accomplished in PE 0603726F, Project 2810, move into Project 4072. These actions are part of the Air Force's Science and Technology PE realignment.

(U) A. Mission Description

This program develops and demonstrates Aerospace Command, Control, Communications, and Intelligence (C3I) technologies to the warfighter. The technologies address the ability to support the global information exchange of correlated and fused information to ensure the Air Force can plan and execute missions in a dynamic environment. The Dominant Battlespace Awareness project will provide affordable operational data capabilities for all pertinent personnel to understand militarily relevant situations, on a consistent basis, with the precision and timeliness needed to accomplish the mission. The Battlespace Information Exchange project will develop the reliable, secure, jam-resistant, inter-operable worldwide global information enterprise capabilities, providing the Air Force assured communications and reach-back capability in a joint/coalition environment. The Dynamic Aerospace Command, Control, and Execution project provides the technology and demonstrations needed to allow the warfighter to plan, assess, execute, monitor, and re-plan on the compressed time scales required for tomorrow's conflicts, whether they be combat or peacekeeping missions. The Collaborative Command and Control (C2) project provides the technology and demonstrations needed to establish virtual, distributed C2 centers, allowing the majority of the C2 center resources to remain in CONUS, while only a small command element is deployed forward. The resultant products of this program will be technologies needed to build the capability to dynamically plan and replan over a secure network. Note: In FY 2002,

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(U) A. Mission Description Continued

Congress added $1.7 million for Adaptive Information Protection Technologies and $3.0 million for Information Hiding, Steganography, and Digital Watermarking for Information Protection and Authentication Systems.

(U) B. Budget Activity Justification

This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing system upgrades and/or new system developments that have military utility and address warfighter needs.

(U) C. Program Change Summary ($ in Thousands)

		FY 2001	FY 2002	FY 2003	Total Cost
(U)	Previous President's Budget	19,289	32,273	34,497	
(U)	Appropriated Value	19,468	33,542		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions		-325		
	b. Small Business Innovative Research	-257			
	c. Omnibus or Other Above Threshold Reprogram				
	d. Below Threshold Reprogram	-780			
	e. Rescissions	-179			
(U)	Adjustments to Budget Years Since FY 2002 PBR			-209	
(U)	Current Budget Submit/FY 2003 PBR	18,252	33,217	34,288	TBD

(U) Significant Program Changes:

Not Applicable..

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DATE: February 2002

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603789F C3I Advanced Development

PROJECT: 4072

COST ($ in Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4072	Dominant Battlespace Awareness	9,411	11,128	16,093	15,765	12,244	12,478	12,716	Continuing	TBD

Note: Prior to FY 2002, a portion of this effort was accomplished in PE 0603726F, Project 2810.

(U) A. Mission Description

This project develops, integrates, and demonstrates advanced technologies as needed to achieve Dominant Battlespace Awareness (DBA) using information from all sources, exploiting government and commercial technologies. DBA is the information required to support dynamic planning and execution with the accuracy, fidelity, and timeliness needed to dominate in battle (reference Joint Vision 2010 and 2020). Technology development to achieve DBA includes: tasking information collectors (intelligence, surveillance, and reconnaissance platforms, national intelligence sources, etc,); correlating and geo-registering the collected data; exploiting the data to extract information of military significance; fusing information from multiple sources to create a digital representation of the battlespace; assessing the situation; and archiving the results for ready use by decision makers. This is a dynamic process that involves technologies for information access, extraction, fusion, processing, storage, and retrieval, as well as technologies for machine reasoning, pattern recognition, and timeline analysis.

(U) FY 2001 ($ in Thousands)

(U) $1,504 Developed passive exploitation algorithms to enhance the identification of time-critical targets. Exploited information in acoustic, image, and signal intelligence to identify targets for situational awareness and targeting. Developed the technologies to use multiple source correlation of sensor reports to perform target identification and optimize allocation of sensor resources.

(U) $1,618 Developed and demonstrated an all-source advanced capability for the detection and tracking of time-critical targets. Developed fusion systems and architectures capable of exploiting multiple sources to find, fix, identify, and track moving air and ground targets, and to detect and track targets employing camouflage, concealment, and deception techniques. Continued to develop fusion algorithms and tools to exploit fused sensor information to provide higher levels of intelligence such as enemy force structures, lines of communication, and possible courses of action.

(U) $1,108 Developed and demonstrated embedded high performance processors for real-time knowledge and information-based processing to achieve exploitation and rapid fielding of an affordable fusion capability for all-source intelligence surveillance and reconnaissance data. Demonstrated a four times affordability improvement in embedded high performance processing through a reduction in size, weight, and power, thereby reducing the system footprint and cost of deployed systems. Demonstrated a two times improvement in high performance computing software affordability through the continued maturation of software standards, such as Vector Signal Image Processing Library and Message Processing Interface, which serve to protect the software investment over hardware generations.

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	PROJECT 4072

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

(U) $2,915 Continued to develop advanced fusion technology to evaluate the capability of Unmanned Combat Aerial Vehicles to operate in a Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) data-rich environment as part of an integrated Command, Control, Communications (C3) network. Developed and demonstrated command and control (C2) technologies for the dynamic C2 of multiple vehicles under a highly dynamic mission environment. Developed and demonstrated, through simulation, the software elements for both the air vehicle and Mission Control Station required for the dynamic C2 of multiple vehicles.

(U) $2,266 Developed and demonstrated technologies to support the affordable Unmanned Combat Aerial Vehicle unit recurring flyaway goal in a C4ISR data-rich environment as part of an integrated C3 network. Initiated the integration of the C2 software elements into the Mission Control Station and UCAV air vehicle. State-of-the-art tools were used to maximize the reuse of software components.

(U) $9,411 Total

(U) FY 2002 ($ in Thousands)

(U) $3,341 Develop and demonstrate advanced signal and data exploitation technologies for detection, tracking, identification, and targeting of time-critical targets, and information extraction technologies for situational awareness. Develop tools to extract information from data derived from acoustic, image, and signal intelligence. Continue to develop and demonstrate information extraction tools that automatically extract events and their relationships from free form text, allowing the warfigther more time to perform analysis. (Prior to FY 2002, a portion of this effort was accomplished in PE 0603726F, Project 2810.)

(U) $6,519 Develop and demonstrate advanced data and information fusion capabilities to support multi-source missions, new sensor types, cognitive models, and automated fusion process management. Continue to develop and demonstrate an all-source advanced capability for the detection and tracking of time-critical targets. Continue to develop fusion systems and architectures capable of exploiting multiple sources to find, fix, identify, and track moving air and ground targets, and to detect and track targets employing camouflage, concealment, and deception techniques. Continue to develop fusion algorithms and tools to exploit fused sensor information to provide higher levels of intelligence such as enemy force structures, lines of communication, and possible courses of action. (Prior to FY 2002, a portion of this effort was accomplished in PE 0603726F, Project 2810.)

(U) $1,268 Develop and demonstrate advanced data handling and event visualization technologies. Continue to develop and demonstrate automated capabilities to access, extract, process, and display fused multi-source intelligence for near-real-time situational awareness. Develop timeline, event and motion pattern recognition tools for analysis, visualization and decision aids to detect enemy activity. Develop and demonstrate probabilistic approaches for accumulation of data/information to support target/activity identification and situation awareness. Initiate

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PROJECT 4072	

(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

development of a capability for precise geo-location and identification of targets exploiting multi-sensor data. Continue to develop the technologies to use multiple source correlation of sensor reports to optimize allocation and tasking of sensor resources.

(U) $11,128 Total

(U) FY 2003 ($ in Thousands)

(U) $4,168 Develop and demonstrate advanced signal and data exploitation technologies for detection, tracking, identification, and targeting of time-critical targets, and information extraction technologies for situational awareness. Develop tools to extract information from data derived from image, and measurement and signature intelligence. Continue to develop and demonstrate information extraction tools that automatically extract events and their relationships from free form text, allowing the warfigther more time to perform analysis.

(U) $8,928 Develop and demonstrate advanced data and information fusion capabilities to support multi-source capabilities, new sensor types, cognitive models, and automated fusion process management. Continue to develop and demonstrate an all-source advanced capability for the detection and tracking of time-critical targets. Demonstrate fusion systems and architectures capable of exploiting multiple sources to find, fix, identify, and track moving air and ground targets, and to detect and track targets employing camouflage, concealment, and deception techniques. Continue to develop fusion algorithms and tools to exploit fused sensor information to provide higher levels of intelligence such as enemy force structures, lines of communication, and possible courses of action. Initiate collaborative collection and fusion of intelligence, surveillance, and reconaissance information to improve accuracy and timeliness for situational awareness and targeting.

(U) $2,997 Develop and demonstrate advanced data handling and event visualization technologies. Continue to develop and demonstrate automated capabilities to access, extract, process, and display fused multi-source intelligence for in-time situational awareness. Continue development of tools for timeline, event, and motion pattern recognition to support analysis, visualization, and decision aids to detect enemy activity. Continue to develop probabilistic approaches for accumulation of data/information to support target/activity identification and situational awareness. Develop a capability for precise geo-location and identification of targets exploiting multi-sensor data. Continue to develop the technologies to use multiple source correlation of sensor reports to optimize allocation of sensor resources.

(U) $16,093 Total

(U) B. Project Change Summary

Not Applicable.

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
03 - Advanced Technology Development	0603789F C3I Advanced Development	4072

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

(U) Related Activities:

(U) PE 0603203F, Advanced Aerospace Sensors.

(U) PE 0602702F, Command, Control, and Communications (C3).

(U) PE 0603742F, Combat Identification Technology.

(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

(U) E. Schedule Profile

(U) Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603789F C3I Advanced Development

PROJECT: 4216

COST ($ in Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4216	Battlespace Information Exchange	3,889	11,640	6,984	6,564	6,602	6,729	6,856	Continuing	TBD

(U) A. Mission Description

This project develops and demonstrates advanced communications technologies to implement a secure information grid for the worldwide information exchange of near-real-time multimedia (i.e., voice, data, video, and imagery) information in a joint/coalition environment. This secure information grid will be rapidly deployable, mobile, interoperable, and seamless between aircraft, either en-route or in theater, and command and control (C2) centers. It will: a) provide interoperability across echelon, Service, and multi-national force boundaries; b) support mobile C2, sensor-to-shooter operations, and the battle management decision process; and c) provide in-transit visibility of en-route aircraft, cargo, mission status, and reachback capabilities for aircraft to CONUS operations centers (i.e., updating information and mission changes to en-route aircraft). Technology developments include an information assurance decision support system, advanced information management, multi-level secure communications, secure survivable networks, and communications transmission systems.

(U) FY 2001 ($ in Thousands)

(U) $807 Designed, developed, integrated, and demonstrated advanced expert system decision algorithms to prioritize and control resources for global reach in a mobility environment. Continued to develop an intelligent information manager agent to throttle and regulate mission information flow among Air Mobility Command (AMC) components based on changing system capabilities. Demonstrated to AMC the capabilities to perform heterogeneous data base access and mission/user profiles under a web-based architecture.

(U) $416 Designed, developed, integrated, and demonstrated modular, reprogrammable radio communications technologies for commercial and military global reach in an airborne mobility environment. Continued to develop the Media Access Controller for integrating all near-term legacy AMC radios, medium-term multi-band radios, and available commercial system components into a synergistic information transport mechanism.

(U) $644 Designed, developed, integrated, and demonstrated advanced protocol network and commercial management technologies to provide communications from deployed aircraft and ground elements to the AMC Tanker Airlift Control Center (TACC), as well as, in-transit visibility at the TACC of all aircraft, personnel, and cargo. Continued to develop technology to dynamically reconfigure the network and communications systems to optimally match the requirements for information transfer with changing transmission path availability. Demonstrated the capability to perform adaptive routing, quality-of-service based architecture, and smart bandwidth management.

(U) $773 Developed and demonstrated improved communications technologies that provide reliable, efficient, secure, interoperable, and dynamic deployable communications to Air Combat Command, thus improving mission effectiveness through optimized resource management. Developed and demonstrated an Intelligent Adaptive Communications Controller system to efficiently and effectively control the use of diverse

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	PROJECT: 4216

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

communications media to provide increased aggregate bandwidth. Developed and integrated applications to provide mechanisms that intelligently and dynamically negotiate quality of service and bandwidth management techniques between applications and network transport services. Developed and integrated management mechanisms to provide dynamic, intelligent, management, and control of information system resources.

(U) $462 Developed and demonstrated intelligent networking technology to provide assured, seamless, battlespace connectivity to the aerospace forces with a greatly reduced footprint. Continued to develop a capability to support a multilevel secure information system manager. Developed and demonstrated user-friendly, assured multiband and wideband wireless intelligent networking capability that automatically senses and adapts to its environment and service demands, as well as detects, protects, and reacts against intrusion and disruption of service.

(U) $787 Developed and demonstrated theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. Completed weather impact decision aid capability and developed space weather impact decision aid capability. Developed master caution panel capability to centrally monitor and manage command and control assets.

(U) $3,889 Total

(U) FY 2002 ($ in Thousands)

(U) $1,234 Develop, integrate, and demonstrate advanced expert system decision algorithms to prioritize and control resources for global reach in a mobility environment. Demonstrate an intelligent information manager agent that will throttle and regulate mission information flow among Air Mobility Command (AMC) components based on changing system capabilities. Integrate in an AMC airlifter the airborne components of Intelligent Information Manager (IIM), Integrated Network Controller (INC), and the Global Media Access Controller (GMAC) to produce a combined commercial/military global communications system, a dynamically switched network, and an intelligent heterogeneous database access interface to prioritize and control resources in a mobility environment.

(U) $1,206 Develop, integrate, and demonstrate advanced network protocols and commercial management technologies to provide communications from deployed aircraft and ground elements to the AMC Tanker Airlift Control Center (TACC), as well as, in-transit visibility at the TACC of all aircraft, personnel, and cargo. Demonstrate technology to dynamically reconfigure the network and communications systems to optimally match the requirements for information transfer with changing transmission path availability. Integrate and demonstrate the ground-based components of the IIM, INC, and GMAC in AMC's TACC and AMC's forward deployed unit, the Tanker Airlift Control Element, resulting in a seamless information infrastructure providing total asset visibility and enhanced situation awareness.

(U) $696 Develop and demonstrate improved global networking and resource management technologies that provide reliable, efficient, secure,

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

interoperable, and dynamic deployable communications to Air Combat Command. Continue to develop the ability to manage and control adaptive communications controller system(s) and to integrate additional and emerging media types for increased bandwidth capabilities. Continue development of mechanisms that intelligently and dynamically negotiate quality of service and bandwidth between Command and Control (C2) applications and network transport services. Continue development of affordable multi-level secure network management capabilities and incorporate additional management mechanisms to affect commander's control of all information grid network resources.

(U) $1,379 Develop and demonstrate intelligent wireless networking technologies to provide seamless and assured connectivity to all aerospace forces while reducing the forward-deployed footprint. Develop and demonstrate technology to support an en-route and in-theater information grid for the worldwide exchange of near-real-time multimedia (i.e., voice, data, video, and imagery). Continue to develop and demonstrate dynamic intelligent bandwidth management concepts and militarized protocols for highly dynamic and ad-hoc wireless network topologies.

(U) $1,191 Develop and demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. Continue to develop space weather impact decision aid capability. Continue to develop master caution panel capability to centrally monitor and manage command and control assets within the air operations center C2 process. Develop interface methodologies for seamless integration of theater battle management applications into the joint battlespace information environment.

(U) $2,934 Develop and demonstrate an information assurance decision support system to provide real time defensive courses-of-action relating to intrusion detection, intrusion response, and information system recovery. Develop data correlation and data fusion tools for detection of large-scale coordinated attacks, and provide automatic forensics analysis of attack information. Develop and demonstrate Adaptive Information Protection Technologies that will allow systems to tolerate adversary attacks and intrusions, gracefully degrade, recover and reconstitute not only the system but also the critical processes, programs and data.

(U) $3,000 Develop and demonstrate Information Hiding, Steganography and Digital Watermarking for Information Protection and Authentications Systems. Develop stegongraphic algroithms that detect if infomation and information systems have been tampered with and demonstrate this capability in Air Force operational systems.

(U) $11,640 Total

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BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603789F C3I Advanced Development
	PROJECT: 4216

(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands)

(U) $1,295 Develop, integrate, and demonstrate advanced expert system decision algorithms to prioritize and control resources for global reach in a mobility environment. Continue to demonstrate an intelligent information manager agent that will throttle and regulate mission information flow among AMC components based on changing system capabilities. Continue to integrate in an Air Mobility Command airlifter the airborne components of Intelligent Information Manager, Integrated Network Controller, and the Global Media Access Controller to produce a combined commercial/military global communications system, a dynamically switched network, and an intelligent heterogeneous database access interface to prioritize and control resources in a mobility environment.

(U) $1,304 Develop, integrate, and demonstrate advanced network protocols and commercial management technologies to provide communications from deployed aircraft and ground elements to the Air Mobility Command (AMC) Tanker Airlift Control Center (TACC), as well as, in-transit visibility at the TACC of all aircraft, personnel, and cargo. Continue to demonstrate technology to dynamically reconfigure the network and communications systems to optimally match the requirements for information transfer with changing transmission path availability. Continue to integrate and demonstrate the ground-based components of the Intelligent Information Mannager, Integrated Network Controller, and Global Media Access Controller in AMC's TACC and AMC's forward deployed unit, the Tanker Airlift Control Element, resulting in a seamless information infrastructure providing total asset visibility and enhanced situation awareness.

(U) $1,000 Develop and demonstrate improved global networking and resource management technologies that provide reliable efficient, secure, interoperable, and dynamic deployable communications to Air Combat Command. Complete the adaptive communications controller system(s), integrating additional and emerging media types for increased bandwidth capability. Continue development and integration of mechanisms that intelligently and dynamically negotiate quality of service and bandwidth between applications and network transport services based on mission priorities. Complete development of affordable multi-level secure network management capabilities to provide commanders with status and control of information grid network resources.

(U) $1,411 Develop and demonstrate intelligent wireless networking technologies to provide seamless and assured connectivity to all aerospace forces while reducing the forward-deployed footprint. Continue to develop and demonstrate technology to support an en-route and in-theater information grid for the worldwide exchange of near-real-time multimedia (i.e., voice, data, video, and imagery). Develop and demonstrate beyond line of sight wideband technologies between airborne platforms and ground terminals.

(U) $1,008 Develop and demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. Complete development and demonstrate technologies that integrate, illuminate, and manage command and control (C2) assets within the air operations center C2 process. Develop and demonstrate advanced application and network technologies that provide the capability to monitor, understand, and maintain the status of distributed C2 weapon systems. Continue

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PROJECT: 4216	

(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

development of interface methodologies for seamless integration of theater battle management applications into the joint battlespace infosphere.

(U) $966 Develop and demonstrate an information assurance decision support system to provide real-time defensive courses-of-action relating to intrusion detection, intrusion response, and information system recovery. Demonstrate data correlation and data fusion tools for detection of large-scale coordinated attacks, and provide automatic forensics analysis of attack information. Develop the capability to assess attacks and sophistication of the threat level against the mission. Initiate development and demonstration of automated deployment of defensive counter measures.

(U) $6,984 Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0602702F, Command, Control, and Communications (C3).

(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

(U) E. Schedule Profile

(U) Not Applicable.

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BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603789F C3I Advanced Development

PROJECT: 4872

COST ($ in Thousands)		FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4872	Dynamic Aerospace C2 & Execution	4,952	7,436	9,303	11,549	11,963	11,757	11,717	Continuing	TBD

(U) A. Mission Description

In order to perform command, control, and execution for the Expeditionary Aerospace Force (EAF), the Air Force must be able to plan, assess, monitor, and replan missions rapidly in a dynamic environment. This project develops and demonstrates technologies necessary for dynamic command and control (C2) decision making. It provides the technology and demonstrations needed to enable the warfighter to plan, assess, execute, monitor, and replan on the compressed time scales required for tomorrow's conflicts, whether they be combat or operations other than war. It will develop and demonstrate a new generation of planning assessment technologies that enable a new paradigm of effects-based operations, allowing the aerospace commanders to determine the desired operational effects and prosecute the mission accordingly. It will develop innovative capabilities capable of realizing a strategy to task approach to aerospace warfare exploiting a link between command, strategy, and assessment functions. It will develop and demonstrate distributed C2 technologies that provide the commander and staff with seamless access to tailored multi-media, multi-spectral data within a mobile, dynamic C2 center. Knowledge-based intelligent information technologies will be developed to support robust, real-time, large-scale Air Force C2 systems. The resultant products of the project will be the capabilities required to dynamically plan and execute missions, which is a key component of battlespace infosphere concept set forth in the Air Force Scientific Advisory Board Reports, 'Information Management to Support the Warrior' and 'Building the Joint Battlespace Infosphere.'

(U) FY 2001 ($ in Thousands)

(U) $1,373 Developed and demonstrated an effects-based approach for the next generation of planning and assessment techniques that enable aerospace commanders to determine the desired operational effects at the right place at the right time. Developed the effects-based operations capability through active template technologies to provide recommended priorities, resource availability, and provide the information to the battle managers in time to achieve mission objectives. Developed and demonstrated model abstraction to replicate/replay military exercises, provide near-real-time dynamic situation assessment, and identify preferred courses of action for decision making, while predicting likely outcomes.

(U) $1,594 Developed and demonstrated distributed C2 technologies that are scalable and reconfigurable and provide seamless access to tailored multi-media, multi-spectral data for commanders and staff within mobile, dynamic C2 centers. Developed technology that integrates offensive, defensive, and support elements into an aerospace command center that provides the EAF a cohesive environment for planning, execution, and assessment. Developed and integrated multi-user collaborative interaction technology for adaptive visualization and presentation to enhance joint force battle plan simulation, assessment, and implementation focused on aerospace operations.

(U) $1,985 Developed and demonstrated knowledge-based intelligent information tools to support robust, real-time, large-scale aerospace C2 systems.

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	PROJECT: 4872

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

Demonstrated knowledge-based C2 technologies in support of continuous planning and scheduling. Developed and integrated planning and information-based intelligent agents for adaptive replanning. Developed and demonstrated the capability to enhance decisions by providing commanders and decision makers a totally integrated perspective of available forces and employment options, including both operational and supporting element capabilities and limitations within an info-centric environment such as the Air Mobility Command Mobility 2000 Initiative.

(U) $4,952 Total

(U) FY 2002 ($ in Thousands)

(U) $1,928 Develop and demonstrate an effects-based approach for the next generation of planning and assessment techniques that enable aerospace commanders to determine the desired operational effects at the right place at the right time. Continue to develop the effects-based operations capability through active template technologies to provide recommended priorities, resource availability, and provide the information to the battle managers in time to achieve mission objectives. Continue to develop and demonstrate model abstraction to replicate/replay military exercises, provide near-real-time dynamic situation assessment, and identify preferred courses of action for decision making, while predicting likely outcomes. Develop effects-based tools to operate in the battlespace infosphere that will allow the commander and his/her staff to make decisions with uncertain, ambiguous, or vague information during the course of an air campaign.

(U) $1,474 Develop and demonstrate distributed Command and Control (C2) technologies that are scalable and reconfigurable and provide seamless access to tailored multi-media, multi-spectral data for commanders and staff within mobile, dynamic command and control centers. Continue to develop and integrate multi-user collaborative interaction technology for adaptive visualization and presentation to enhance joint force battle plan simulation, assessment, and implementation focused on aerospace operations within the battlespace infosphere. Continue to develop technology that integrates offensive, defensive, and support elements into an aerospace command center that provides the Expeditionary Aerospace Force a cohesive environment for planning, execution, and assessment. Develop and demonstrate the techniques to produce and manage information objects within the battlespace infosphere from numerous web-enabled information sources, to customize information products, and to deliver decision-quality information to any warfighter.

(U) $4,034 Develop and demonstrate knowledge-based intelligent information tools to support robust, real-time, large-scale aerospace C2 systems. Demonstrate knowledge-based C2 technologies in support of network intrusion detection. Continue to develop and integrate planning and information-based intelligent agents for adaptive replanning. Continue to develop and demonstrate the initial improved integrated flight management capability that will enhance decisions by providing commanders and decision makers a totally integrated perspective of available forces and employment options, including both operational and supporting element capabilities and limitations, within Air Mobility

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	PROJECT 4872

(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

Command's info-centric environment.

(U) $7,436 Total

(U) FY 2003 ($ in Thousands)

(U) $2,066 Develop and demonstrate an effects-based approach for the next generation of planning and assessment techniques that enable aerospace commanders to determine the desired operational effects at the right place at the right time. Demonstrate the effects-based operations capability through active template technologies to provide recommended priorities, resource availability, and provide the information to the battle managers in time to achieve mission objectives. Continue to develop and demonstrate effects-based tools to operate in the battlespace infosphere that will allow the commander and his/her staff to make decisions with uncertain, ambiguous, or vague information during the course of an aerospace campaign. Develop a dynamic tasking toolkit that enables the warfighter to develop a comprehensive, coherent, and integrated joint aerospace operations plan.

(U) $2,213 Develop and demonstrate distributed Command and Control (C2) technologies that are scalable and reconfigurable and provide seamless access to tailored multi-media, multi-spectral data for commanders and staff within mobile, dynamic command and control centers. Continue to develop and demonstrate multi-user collaborative interaction technology for adaptive visualization and presentation to enhance joint force battle plan simulation, assessment, and implementation focused on aerospace operations within the battlespace infosphere. Continue to develop technology that integrates offensive, defensive, and support elements into an aerospace command center that provides the EAF a cohesive environment for planning, execution, and assessment. Develop embedded training technologies to provide rapid mission readiness for the warfighter.

(U) $2,257 Develop and demonstrate knowledge-based intelligent information tools to support robust, real-time, large-scale aerospace C2 systems. Continue to develop and integrate planning and information-based intelligent agents for adaptive replanning. Continue to develop and demonstrate improved integrated flight management capabilities for mobility operations such as an improved search, retrieval, and handling of data and information required for optimal use of available mobility resources. Develop and demonstrate continuous updating of the type, location, and status of DoD transportation assets to improve situational awareness

(U) $2,767 Continue to develop and demonstrate the techniques to produce and manage information objects within the joint battlespace infosphere (JBI) from numerous web-enabled information sources, to customize information products, and to deliver decision-quality information to any warfighter. Develop and demonstrate data system wrapper technologies to dynamically integrate disparate command and control, intelligence, surveillance, and reconnaissance information systems into the JBI. Evaluate and integrate core JBI information management services that

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
03 - Advanced Technology Development	0603789F C3I Advanced Development	4872

(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

enable information exchange among disparate information systems.

(U) $9,303 Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0602702F, Command, Control,and Communications (C3).

(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

(U) E. Schedule Profile

(U) Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)

DATE: February 2002

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603789F C3I Advanced Development

PROJECT: 4925

COST ($ in Thousands)	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4925 Collaborative C2	0	3,013	1,908	2,312	1,919	1,957	1,994	Continuing	TBD

Note: In FY 2001, efforts were accomplished in PE 0603726F, Project 4850.

(U) A. Mission Description

This project develops and demonstrates technologies for the next generation of distributed collaborative environments, which will provide cross-disciplinary information to a decision-maker when, where, and how it is needed. Technologies developed will demonstrate advanced integrated information architectures for the near-real-time transfer of large volumes of information over existing and future command, control, and communications systems. The application of these new technologies will allow reconfiguration and adaptation of existing operational aerospace systems to support seamless integrated operations, and will facilitate an affordable implementation of the battlespace infosphere concept set forth in the Air Force Scientific Advisory Board Reports, 'Information Management to Support the Warrior' and 'Building the Joint Battlespace Infosphere.'

(U) FY 2001 ($ in Thousands)

(U) $0 Effort was accomplished in PE 0603726F, Project 4850.

(U) $0 Total

(U) FY 2002 ($ in Thousands)

(U) $998 Develop and demonstrate next generation distributed collaborative environments and integrated aerospace information architectures. Continue to develop collaborative technologies for split aerospace operations; coalition warfare; simulation-based acquisition; platform information mining; blended air/ground decision aiding; and information migration.

(U) $1,016 Develop communication technology to increase aerospace platform information transfer capacity. Continue to develop the technology to increase aerospace platform information transfer capacity for exchange of time-critical threat, sensor, and command and control information between aircraft and cooperating space, airborne, and surface communication assets. Develop the design of a high capacity, bandwidth efficient, modulation/network and phased array antenna control technology for point-to-point and multiple platform connectivity.

(U) $999 Develop and demonstrate embedded information system technologies to support a transparent framework for seamless, rapid insertion of battlespace infosphere technology. Develop techniques for inserting battlespace infosphere technology that do not require a comprehensive re-test of the entire command and control (C2) system. Develop capability for modernization of aerospace and C2 platforms to support system-of-systems interoperability within the battlespace infosphere.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: February 2002
BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603789F C3I Advanced Development
PROJECT: 4925	

(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

(U) $3,013 Total

(U) FY 2003 ($ in Thousands)

(U) $255 Develop and demonstrate next generation distributed collaborative environments, and integrated aerospace information architectures. Continue to develop next generation collaborative environments, and integrated aerospace information architectures for advanced Air Force enterprises. Demonstrate technology to perform platform information mining and collaborative environments for simulation-based acquisition.

(U) $906 Develop communications technology to increase aerospace platform information transfer capacity. Continue to develop technology to increase aerospace platform information transfer capacity exchange of time-critical threat, sensor, and command and control (C2) information between aircraft and cooperating space, airborne, and surface communication assets. Complete the design and begin the fabrication of high capacity, bandwidth efficient, modem technology for point-to-point and multiple platform connectivity.

(U) $747 Develop and demonstrate embedded information system technologies to support a transparent framework for seamless, rapid insertion of battlespace infosphere technology. Continue to develop techniques for inserting battlespace infosphere technology that do not require a comprehensive re-test of the entire C2 system. Continue to develop capability for modernization of aerospace and C2 platforms to support system-of-systems interoperability within the battlespace infosphere.

(U) $1,908 Total

(U) B. Project Change Summary

Not Applicable.

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

(U) related Activities:

(U) PE 0602702F, Command, Control, and Communications (C3).

(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

(U) E. Schedule Profile

(U) Not Applicable.