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

DATE: February 1999

BUDGET ACTIVITY: 2 - Applied Research

PE NUMBER AND TITLE: 0602702F Command,Control, and Communication (C3)

	COST *($ In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	80,686	71,661	46,448	52,283	52,769	63,285	65,615	68,076	Continuing	Continuing
2338	Reliability Sciences Technology	8,191	0	0	0	0	0	0	0	0	Continuing
4506	Surveillance Technology	14,578	11,688	9,224	9,826	10,058	10,485	10,918	11,331	Continuing	Continuing
4519	Communications Technology	10,207	17,259	10,817	13,208	13,300	13,990	14,577	16,026	Continuing	Continuing
4594	Information Technology	14,302	9,549	14,235	14,699	15,331	15,568	15,827	15,941	Continuing	Continuing
4600	Electromagnetic Technology	18,866	13,518	0	0	0	0	0	0	Continuing	Continuing
5581	Command and Control (C2) Technology	14,542	19,647	12,172	14,550	14,080	23,242	24,293	24,778	Continuing	Continuing
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

Note: Project 2338, Reliability Sciences Technology,was eliminated beginning in FY 1999 due to higher Air Force priorities. Project 4600, Electromagnetic Technology, will be eliminated beginning in FY 2000 due to higher Air Force priorities.

(U) A. Mission Description: This Applied Research program is the primary source of new concepts, feasibility demonstrations, and advanced technology for Air Force Command, Control, and Communications (C3). Current developments include: improving effectiveness and survivability through secure communications; improving surveillance range and detection capabilities against low-observable threats and enemy electronic countermeasures; and improving the timeliness and quality of data acquisition for decision making. The program addresses five technology areas: surveillance; communications; information; electromagnetics; and command and control. Note: In FY 1999, Congress added $2.0 million for Protein-Based Memory and $5.0 million for a Cyber Security program.

(U) B. Budget Activity Justification: This program is in Budget Activity 2, Applied Research, since it develops and determines the technical feasibility and military utility of evolutionary and revolutionary technologies.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1999
BUDGET ACTIVITY **2 - Applied Research**	PE NUMBER AND TITLE **0602702F Command,Control, and Communication (C3)**

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

	FY 1998	FY 1999	FY 2000	FY 2001	Total Cost
(U) Previous President's Budget/FY 1999 PB	84,545	65,175	54,146	52,826	Cont
(U) Appropriated Value	88,567	72,175			
(U) Adjustments to Appropriated Value					
a. Congressional/General Reductions	-2,978	-514			
b. SBIR	-1,172				
c. Omnibus/Other Above Threshold Reprogrammings	-1,705				
d. Below Threshold Reprogrammings	-2,026				
(U) Adjustments to Budget Years Since FY 1999 PB			-7,698	-543	
(U) Current Budget Submit/FY 2000 PB	80,686	71,661	46,448	52,283	Cont

(U) Significant Program Changes: Changes to this program since the previous President's Budget are due to higher priorities within the Science and Technology (S&T) Program.

FY 1999: $847 identified as a source for SBIR.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 2338

COST *($ In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
2338 Reliability Sciences Technology	8,191	0	0	0	0	0	0	0	0	Continuing

(U) A. Mission Description: The Air Force requires technology which increases reliability and diagnostic capability for electronic devices and systems while assessing electromagnetic environmental performance. Payoffs are increased system availability and lower life cycle costs. This effort focuses on technology to identify and eliminate design and fabrication characteristics that result in poor reliability. It develops equipment and system reliability and diagnostic techniques to be applied in development of military systems with improved operational readiness and supportability. Areas of emphasis include electronic technology reliability assessment, diagnostic development and integration, design for reliability, and system design and operational assurance.

(U) FY 1998 ($ in Thousands):
- (U) $2,710 Developed electronic reliability techniques to evaluate new devices in an operational environment and recommend corrective action.
- (U) $2,600 Developed diagnostics technologies and integrated them into existing tools and techniques to address high-priority user requirements.
- (U) $2,881 Developed reliability system design process enhancements for improved Command, Control, and Communications (C3) devices.
- (U) $8,191 Total

(U) FY 1999: Not Applicable.

(U) FY 2000: Not Applicable.

(U) FY 2001: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 2338

(U) B. Project Change Summary - Description of Significant Changes: Changes to this program since the previous President's Budget are due to higher priorities within the Science and Technology (S&T) Program.

(U) C. Other Program Funding Summary:

(U) Related Activities:
- (U) PE 0603617F, C3 Applications.
- (U) PE 0603726F, C3 Subsystem Integration.
- (U) PE 0603728F, Advanced Computing Technology.
- (U) PE 0603789F, C3 Advanced Development.
- (U) PE 0604609F, Reliability and Maintainability Technology Insertion Program.
- (U) PE 0708026F, Producibility, Reliability, Availability, and Maintainability.
- (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: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY **2 - Applied Research**	PE NUMBER AND TITLE **0602702F Command,Control, and Communication (C3)**
	PROJECT **4506**

COST *($ In Thousands)*	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4506 Surveillance Technology	14,578	11,688	9,224	9,826	10,058	10,485	10,918	11,331	Continuing	Continuing

(U) A. Mission Description: The Air Force requires advanced surveillance technologies to improve the performance and reduce the cost of Air Force surveillance systems. Major Applied Research areas of interest include: low-observable surveillance; passive surveillance; information fusion; and advanced processing technologies. Technologies being developed include: advanced passive bistatic radar; spatial coordinate and time processing techniques; sensor and data fusion; and advanced signal processors.

(U) FY 1998 ($ in Thousands):

- (U) $6,110 Developed, tested, and demonstrated new high-speed signal processor processing technologies and algorithms (space and time) to enhance small target detection in a complex electromagnetic background.
- (U) $5,120 Developed and tested technologies and concepts for passive surveillance with emphasis on airborne unmanned aerial vehicle (UAV) platforms.
- (U) $2,753 Developed, tested, demonstrated, and assessed advanced multispectral/multisensor knowledge-based fusion techniques and artificial intelligence machines for enhanced target detection and tracking.
- (U) $595 Designed, developed, and tested ultrahigh frequency microwave electronics and optically controlled antenna array for radar applications.
- (U) $14,578 Total

(U) FY 1999 ($ in Thousands):

- (U) $1,467 Develop and demonstrate sensor performance analysis and software for synthetic aperture radar and moving target indicator from airborne and space-based platforms in hostile (jamming) scenarios.
- (U) $2,880 Develop technologies and concepts for passive surveillance with emphasis on electronic support measures and airborne wideband bistatics for UAV platform applications.
- (U) $4,040 Develop, test, and demonstrate improved real-time multispectral and multisensor fusion techniques for enhanced air and space situational awareness. Implement measures of merit for advanced distributed fusion system evaluation.
- (U) $3,163 Design architecture for an affordable, scaleable, teraflop information processor and augment it to support rapid fusion processing.
- (U) $138 Identified as a source for SBIR.
- (U) $11,688 Total

(U) FY 2000 ($ in Thousands):

- (U) $2,647 Continue to develop technologies and concepts for passive surveillance with emphasis on electronic support measures and advanced bistatic waveform and antenna designs for operation in severe clutter and jamming environments. Develop and evaluate space-based radar subsystem technologies and concepts.
- (U) $3,905 Demonstrate and assess operational algorithms processing massive global databases to produce improved real-time multispectral and multisensor data fusion, delivering an enhanced air and space situational picture. Complete development and demonstrate fusion quality measures validating enhanced performance.
- (U) $2,672 Complete design and implementation technologies for fully programmable, scaleable, affordable teraflop processors for real-time fusion and processing.
- (U) $9,224 Total

(U) FY 2001 ($ in Thousands):

- (U) $2,888 Continue to develop technologies and concepts for passive surveillance with emphasis on electronic support measures and bistatics for enhanced detection, tracking, and classification in severe clutter and jamming environments. Evaluate space-based radar subsystem concepts.
- (U) $4,214 Develop, test, and demonstrate fused and unfused data information sharing strategies enhancing common interfaces to a consistent battlespace knowledge.
- (U) $2,724 Demonstrate fully programmable, scaleable, affordable teraflop processors and algorithms for real-time fusion and processing.
- (U) $9,826 Total

(U) B. Project Change Summary - Description of Significant Changes: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0603726F, C3 Subsystems Integration.
- (U) PE 0603789F, C3 Advanced Development.
- (U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 4506

(U) E. Schedule Profile: Not Applicable.

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

DATE: February 1999

BUDGET ACTIVITY: 2 - Applied Research

PE NUMBER AND TITLE: 0602702F Command,Control, and Communication (C3)

PROJECT: 4519

COST *($ In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4519 Communications Technology	10,207	17,259	10,817	13,208	13,300	13,990	14,577	16,026	Continuing	Continuing

(U) A. Mission Description: The Air Force requires technologies that enable worldwide communications. The rapid build-up of U.S presence abroad, via rapid application of air power, requires assured connectivity providing reliable, responsive, affordable transfer of information using all available communications media. This program provides the technologies for: multi-level, secure, seamless networks; advanced communications processors; anti-jam and low probability of intercept techniques such as spread spectrum and adaptive null steering; lightweight antennas and phased array antennas; modular, programmable, low-cost radios; and Command, Control, and Communications (C3) across the electromagnetic and optical spectrums. It includes technologies for advanced processors and devices, advanced network protocols, artificial intelligent communications management and control, advanced algorithms, and enabling processing techniques.

(U) FY 1998 ($ in Thousands):

- (U) $3,340 Developed critical high frequency (HF) to super-high frequency (SHF) communications technologies employing on-board programmable devices, processing technologies, nulling algorithms, and monolithic microwave integrated circuits to provide survivable radios and transceivers.
- (U) $4,645 Developed technologies for improved security, survivability, timeliness, and reconstruction of communications networks between airborne and fiber optic networks that are commercially compatible.
- (U) $2,222 Developed advanced adaptive electronic and photonic processors and controllers, advanced network protocols, advanced artificial intelligence algorithms, and enabling adaptive signal processing technologies essential for robust, survivable, spread spectrum communications.
- (U) $10,207 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 4519

(U) FY 1999 ($ in Thousands):

- (U) $3,414 Develop critical communications technologies (for imagery and video) employing programmable devices, processing technologies, and monolithic microwave integrated circuits to provide global connectivity to aerospace forces in the ultra-high frequency (UHF) and super-high frequency (SHF) spectrums. Analyze weight, cost, and drag for unmanned aerial vehicle (UAV) applications.
- (U) $4,576 Develop assurance of service and universal transaction service technologies for improved security, survivability, timeliness, and reconstruction of communications networks.
- (U) $3,188 Develop advanced communications signal processors, an advanced Smart Network protocol, advanced algorithms, and enabling processing technologies essential for survivable radio communications.
- (U) $5,877 Develop Defensive Information Warfare (DIW) tools and technologies (i.e., pathology and forensics to detect and countermeasure break-ins) to ensure information protection and security of sensitive and encrypted Air Force information systems.
- (U) $204 Identified as a source for SBIR.
- (U) $17,259 Total

(U) FY 2000 ($ in Thousands):

- (U) $3,700 Develop assurance of services and universal transaction services technologies for improved security, survivability, and timeliness in a global, seamless, distributed communications network employing wireless and wired links.
- (U) $5,078 Develop critical communications and signal processing technologies to provide adaptive, covert, anti-jam, and global connectivity to aerospace forces. Continue millimeter component development and the Smart Network Radio program.
- (U) $2,039 Develop DIW tools (Net Visualization) and technologies (attack indicators) to ensure information and database protection and security for Air Force communication and information systems.
- (U) $10,817 Total

(U) FY 2001 ($ in Thousands):

- (U) $4,400 Continue to develop assurance of service and universal transaction service technologies for improved security, survivability, and timeliness in a global, seamless, distributed communications network and global distributed information system.
- (U) $6,112 Continue to develop critical communications technologies to provide adaptive, covert, anti-jam, and global seamless military and commercial connectivity to aerospace forces. Develop stealth antennas and subsystems and continue efforts on Smart Network Radio.
- (U) $2,696 Develop DIW tools and technologies to ensure information protection using preemptive indicators, damage assessment, recovery, and security for Air Force information systems (normal and encrypted).
- (U) $13,208 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 4519

(U)B. Project Change Summary - Description of Significant Changes: Changes to this program since the previous President's Budget are due to higher priorities within the Science and Technology (S&T) Program.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0603726F, C3 Subsystem Integration.
- (U) PE 0603728F, Advanced Computing Technology.
- (U) PE 0603789F, C3 Advanced Development.
- (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: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY **2 - Applied Research**	PE NUMBER AND TITLE **0602702F Command,Control, and Communication (C3)**
	PROJECT **4594**

COST *($ In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4594 Information Technology	14,302	9,549	14,235	14,699	15,331	15,568	15,827	15,941	Continuing	Continuing

(U) A. Mission Description: The Air Force requires technologies which improve and automate capabilities to process, manage, generate, fuse, exploit, interpret, and disseminate timely information. This project improves Global Awareness at all levels enabling warfighters to understand relevant military situations on a consistent basis with the precision needed to accomplish their missions. Global Awareness is achieved by exploiting information provided by other government agencies. The information is fused to support Dynamic Planning and Execution via the Global Information Exchange distribution system. Knowledge, information, and data are 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.

(U) FY 1998 ($ in Thousands):
- (U) $7,470 Developed processing technologies (including memories, sorting algorithms, and fusion and correlation displays) that improve information timeliness, reliability, and accessibility for applications such as non-cooperative combat target identification.
- (U) $2,231 Developed information data handling techniques to automatically and expertly extract event data from multimedia databases for prediction and awareness purposes.
- (U) $2,291 Developed sensor exploitation techniques for faster and more efficient imaging to support planning, targeting, damage assessment, and mission execution.
- (U) $2,310 Developed protein-based optical memories for high-density, high-throughput mass storage systems of the future.
- (U) $14,302 Total

(U) FY 1999 ($ in Thousands):
- (U) $1,867 Develop information exploitation capabilities for imagery and electromagnetic signals. Develop technology to transition the capability to tag targets in space and sort large volumes of communications in direct support of information superiority for global engagement.
- (U) $3,824 Develop information warehousing and protein storage and retrieval technologies to provide timely warfighter access to a complete multimedia, multidimensional suite of Command, Control, Communications, Computers, and Intelligence information.
- (U) $1,920 Develop technologies for real-time and stored data fusion to support target identification, dynamic planning, and weapons engagement.
- (U) $1,825 Develop advanced technologies and approaches for the acquisition, analysis, and timely dissemination of intelligence information.
- (U) $113 Identified as a source for SBIR.
- (U) $9,549 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 4594

(U) FY 2000 ($ in Thousands):

- (U) $4,552 Automate multisensor and multimedia technologies to automatically detect and track targets using radiated signals across the entire spectrum for precision location and identification.
- (U) $4,500 Develop innovative multisensor collaboration system to fuse events in time and space, to locate and identify objects, and to project future behavior for spaceborne systems in a fully distributed fusion environment.
- (U) $5,183 Develop Global Information Base technologies for global, theater, and local situation awareness providing timely and accurate input to dynamic planning and execution operations.
- (U)$14,235 Total

(U) FY 2001 ($ in Thousands):

- (U) $4,800 Continue to develop multisensor, multimedia analytical techniques to automatically detect and track the presence and location of targets, and demonstrate improvements in decision-making execution resulting from the integration of these capabilities. Evaluate advanced information extraction capabilities for seamless integration into the Global Information Base.
- (U) $4,818 Develop and evaluate innovative multisensor collaborative fusion technologies addressing surface, airborne, and spaceborne systems in a fully distributed environment.
- (U) $5,081 Develop, evaluate, and demonstrate Global Information Base technology concepts that employ multiple levels of abstraction, providing timely and accurate input to dynamic planning and execution operations in response to dynamically changing requirements and guidance.
- (U)$14,699 Total

(U) B. Project Change Summary - Description of Significant Changes: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0603726F, C3 Subsystem Integration.
- (U) PE 0603789F, C3 Advanced Development.
- (U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy: Not Applicable.

	DATE **February 1999**
BUDGET ACTIVITY **2 - Applied Research**	PE NUMBER AND TITLE **0602702F Command,Control, and Communication (C3)**

(U) E. Schedule Profile: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 4600

COST *($ In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
4600 Electromagnetic Technology	18,866	13,518	0	0	0	0	0	0	Continuing	Continuing

(U) A. Mission Description: This project consists of three subset technologies: electromagnetics; solid state sciences; and photonics. Future surveillance, communications, and imagery/information processing systems will require improved technology for the generation, control, processing, and radiation of electromagnetic and optical energy to reduce system cost, improve system sensitivity, and increase processing rates. Promising technologies for improving Command, Control, and Communications (C3) systems are electromagnetic propagation and scattering (from targets and clutter), and monolithic microwave and millimeter-wave integrated components and antennas. This project develops: a technology base for electronic and photonic devices and device materials for C3 systems; optical technology for electronic data processing and storage; real-time target recognition and high-speed fiber optic interconnects; and control techniques for large phased array antennas. It also characterizes phenomena for low-observable surveillance.

(U) FY 1998 ($ in Thousands):
- (U) $6,010 Developed electromagnetic technologies, such as digital beamforming and phased array correction algorithms, for advanced surveillance and communications systems applications.
- (U) $4,016 Developed advanced materials and components capable of higher processing speeds at reduced power levels for telecommunications and survivable server applications.
- (U) $8,840 Developed photonic components and related materials for insertion into core Command, Control, and Communications (C3) programs to increase efficiencies and reduce costs.
- (U) $18,866 Total

(U) FY 1999 ($ in Thousands):
- (U) $4,616 Demonstrate digital beam nulling techniques and new computer codes for advanced surveillance and communications systems applications. (In FY 2000, this effort will be conducted under Project 7622, PE 0602204F.)
- (U) $1,177 Develop advanced electromagnetic materials and components capable of higher processing speeds for sensing and communications applications.
- (U) $5,748 Develop photonic sub-systems and components for control and processing of both data and radio frequency signals.
- (U) $1,817 Develop advanced concepts for electromagnetic apertures. (In FY 2000, this effort will be conducted under Project 7622, PE 0602204F.)
- (U) $160 Identified as a source for SBIR.
- (U) $13,518 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 4600

(U) FY 2000 ($ in Thousands): Not Applicable.

(U) FY 2001 ($ in Thousands): Not Applicable.

(U) B. Project Change Summary - Description of Significant Changes: : Changes to this program since the previous President's Budget are due to higher priorities within the Science and Technology (S&T) Program.

(U) C. Other Program Funding Summary:

(U) Related Activities:
- (U) PE 0603617F, C3 Applications.
- (U) PE 0603726F, C3 Subsystem Integration.
- (U) PE 0603789F, C3 Advanced Development.
- (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: Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 5581

COST *($ In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
[5581] Command and Control (C2) Technology	14,542	19,647	12,172	14,550	14,080	23,242	24,293	24,778	Continuing	Continuing

(U) A. Mission Description: The Air Force requires Command and Control (C2) technologies which provide the next generation of weapon systems with improved processing and presentation of information for real-time battle management. Technologies being developed in this project will increase capability, quality, and reliability while reducing the cost of computer resources in C2 systems. Work in this project focuses on developing advanced C2 computer software systems capable of providing vast improvements in military decision making. These include collaborative intelligent agent, planning, and scheduling technologies. The project develops technology for distributed systems, data bases, and fault tolerance mechanisms; and knowledge-based technologies, systems, and data bases.

(U) FY 1998 ($ in Thousands):

- (U) $4,862 Developed intelligent information technologies for real-time battle management and command and control including full-dialog man-machine interface.
- (U) $4,760 Developed software technologies to support modeling and analysis of evolvable software and parallel processing systems.
- (U) $4,920 Developed enabling technology for distributed computing and database technology using cluster techniques.
-
- (U) $14,542 Total

(U) FY 1999 ($ in Thousands):

- (U) $7,128 Develop intelligent information technologies including preplan-to-react planning technology for noncontinuous planning and tools and techniques for collaborative intelligent systems.
- (U) $6,139 Develop architecture-centered technology that provides easier-to-design and easier-to-maintain software for increased capability, quality, and reliability with reduced support cost.
- (U) $6,148 Develop distributed computing and database technology including collaborative workspaces shared across a distributed computing environment and optical storage multimedia database management systems.
- (U) $232 Identified as a source for SBIR.
- (U) $19,647 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 2 - Applied Research	PE NUMBER AND TITLE 0602702F Command,Control, and Communication (C3)
	PROJECT 5581

(U) FY 2000 ($ in Thousands):

- (U) $5,816 Develop intelligent information technologies including planning technology for coalition Command and Control (C2).
- (U) $1,046 Develop high performance knowledge base technology for coordination and cooperative use of aerospace C2 resources.
- (U) $5,310 Investigate, analyze, and develop intelligent information management and user interface systems that tailor visualization strategies, information, access, and assurance mechanisms based on C2 application parameters.
- (U) $12,172 Total

(U) FY 2001 ($ in Thousands):

- (U) $6,263 Demonstrate intelligent information technologies for real-time battle management and C2 for time-critical air operations, including collaborative systems and agents.
- (U) $1,963 Continue to develop high performance knowledge base technology for coordination and cooperative use of aerospace C2 resources.
- (U) $6,324 Investigate, analyze, and develop reconfiguration mechanisms to adapt an intelligent information system to varying crisis levels based on quality of service parameters.
- (U) $14,550 Total

(U) B. Project Change Summary - Description of Significant Changes: Changes to this program since the previous President's Budget are due to higher priorities within the Science and Technology (S&T) Program.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0603617F, C3 Applications.
- (U) PE 0603728F, Advanced Computing Technology.
- (U) PE 0603789F, C3 Advanced Development.
- (U) PE 0303401F, Communications-Computer Systems (C-CS) Security RDT&E.
- (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: Not Applicable.

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