

<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>	DATE <b>February 1999</b>
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<b>BUDGET ACTIVITY</b> <b>3 - Advanced Technology Development</b>	<b>PE NUMBER AND TITLE</b> <b>0603789F C3 Advanced Development</b>
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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	12,288	13,179	17,402	14,985	16,300	15,541	15,865	16,195	Continuing	Continuing
2335 Advanced C3 Technology	4,710	4,021	4,093	2,557	5,087	5,198	5,306	5,416	Continuing	Continuing
4072 Correlation and Fusion	6,258	6,775	10,851	9,788	8,526	7,591	7,750	7,911	Continuing	Continuing
4216 Warfighter Information Usage, Management, and Integration Technologies	1,320	2,383	2,458	2,640	2,687	2,752	2,809	2,868	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

Note: Beginning in FY 1998, PE 0603238F, Global Surveillance and Communications, has been incorporated as Project 4216, Warfighter Information Usage, Management, and Integration Technologies, within this PE.

(U) **A. Mission Description:** This Advanced Technology Development program develops and demonstrates ground and aerospace Command, Control, and Communications (C3) technology required to maintain Air Force capabilities in a fast-paced, sophisticated, high threat, and intense jamming environment. Enhanced surveillance and communications technology must be developed to counteract an enemy's jamming and to restore critical communications links to the warfighter. The technologies developed in this program include detection, identification, and tracking of hostile targets at long ranges on Command and Control (C2) and Intelligence platforms under combat conditions. Additionally, this project develops reliable, secure, jam-resistant communications and battle management technology that supports the military leader's combat decisions in response to the changing dynamics of the battlespace.

(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.

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

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>Total Cost</u>
(U) Previous President's Budget/FY 1999 PB	12,865	13,235	13,645	15,651	Cont
(U) Appropriated Value	13,647	13,235			
(U) Adjustments to Appropriated Value					
a. Congressional/General Reductions	-483	-56			
b. SBIR	-301				
c. Omnibus/Other Above Threshold Reprogrammings	-87				
d. Below Threshold Reprogrammings	-488				
e. Rescissions					
(U) Other Adjustments to Budget Years Since FY 1999 PB			+3,757	-666	
(U) Current Budget Submit/FY 2000 PB	12,288	13,179	17,402	14,985	Cont

(U) Significant Program Changes: Not Applicable.

FY 1999: \$373 identified as a source for SBIR.

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<b>BUDGET ACTIVITY</b> <b>3 - Advanced Technology Development</b>	<b>PE NUMBER AND TITLE</b> <b>0603789F C3 Advanced Development</b>	<b>PROJECT</b> <b>2335</b>
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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
2335 Advanced C3 Technology	4,710	4,021	4,093	2,557	5,087	5,198	5,306	5,416	Continuing	Continuing

**(U) A. Mission Description:** This project develops Command, Control, and Communications (C3) technology for contingency and joint operations focusing on the concepts of force deployment, sustainment, and employment. Dynamic, hostile battlefield environments demand near instantaneous transmission and processing of vast amounts of C3 information for real-time decision making. This project develops and integrates technologies for: low probability of intercept/anti-jam transmission; modular, programmable, multi-level secure communications; secure survivable networks; advanced displays and interfaces; and battle management decision support capabilities for survivable, distributed Command and Control (C2) facilities. Multiband/multimode programmable radios will be enhanced to address the transmission link requirements of joint combat theater communications. Note: During FY 1997, the Defensive Planning and Execution (DPE) program was renamed the Joint Defensive Planner (JDP) per the Joint Standards Air Operations Software Configuration Control Board. The board designated DPE as the joint-Services' software application for theater air and missile defensive planning and monitoring.

**(U) FY 1998 (\$ in Thousands):**

- (U) \$2,070 Developed and demonstrated critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers.
- (U) \$1,630 Demonstrated advanced networking technologies to provide efficient, secure, interoperable, and deployable communications systems, including network management capability for survivable Asynchronous Transfer Mode (ATM).
- (U) \$610 Demonstrated theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities, including a limited brassboard capability for JDP.
- (U) \$400 Unmanned Combat Aerial Vehicle demonstration.
- (U) \$4,710 Total

**(U) FY 1999 (\$ in Thousands):**

- (U) \$1,749 Develop and demonstrate programmable devices and monolithic microwave integrated circuit technology in survivable radios and transceivers for critical ground and aerospace communications.
- (U) \$1,428 Demonstrate advanced networking technologies to provide efficient, secure, interoperable, and deployable communications systems, including dynamic, integrated, self-healing networking.
- (U) \$730 Demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. Complete the brassboard JDP capability.
- (U) \$114 Identified as a source for SBIR.
- (U) \$4,021 Total

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<b>BUDGET ACTIVITY</b> <b>3 - Advanced Technology Development</b>	<b>PE NUMBER AND TITLE</b> <b>0603789F C3 Advanced Development</b>	<b>PROJECT</b> <b>2335</b>
<p>(U) <u>FY 2000 (\$ in Thousands):</u></p> <ul style="list-style-type: none"> <li>- (U) \$1,475     Develop and demonstrate user-friendly radio communications capability that can automatically sense and adapt to its environment and demand for service.</li> <li>- (U) \$2,018     Demonstrate integrated and distributed networking and information system technologies to provide efficient, secure, interoperable, and deployable information systems, including a Multi-level Secure Information System Manager.</li> <li>- (U) \$600        Demonstrate integrated theater battle management and time-critical air operations technologies, including brassboard to extend displays and contingency replanning capability to mobile Tactical Air Control Parties (TACP) and Special Operations Forces (SOF)</li> <li>- (U) \$4,093     Total</li> </ul> <p>(U) <u>FY 2001 (\$ in Thousands):</u></p> <ul style="list-style-type: none"> <li>- (U) \$1,054     Continue to develop and demonstrate user-friendly radio communications capability that can automatically sense and adapt to its environment and demand for service.</li> <li>- (U) \$503        Continue to demonstrate integrated and distributed networking and information system technologies to provide efficient, secure, interoperable, and deployable information.</li> <li>- (U) \$1,000     Continue to demonstrate integrated theater battle management and time-critical air operations technologies, adding micro-miniature, large volume storage capability for large-scale geographic mapping applications.</li> <li>- (U) \$2,557     Total</li> </ul> <p>(U) <b>B. <u>Project Change Summary - Description of Significant Changes:</u></b> Not Applicable.</p> <p>(U) <b>C. <u>Other Program Funding Summary:</u></b></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"> <li>- (U) PE 0603617F, C3 Applications.</li> <li>- (U) PE 0603737D, Advanced Research Projects Agency.</li> <li>- (U) PE 0603006A, C3 Technology.</li> <li>- (U) PE 0602702F, Command, Control, and Communications (C3).</li> <li>- (U) PE 0602232N, C3 Technology.</li> <li>- (U) PE 0603726F, C3 Subsystem Integration.</li> <li>- (U) PE 0603728F, Advanced Computing Technology.</li> <li>- (U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</li> </ul>		
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(U) D. Acquisition Strategy: Not Applicable.

(U) E. Schedule Profile: Not Applicable.

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BUDGET ACTIVITY <b>3 - Advanced Technology Development</b>					PE NUMBER AND TITLE <b>0603789F C3 Advanced Development</b>				PROJECT <b>4072</b>	
<i>COST (\$ In Thousands)</i>	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
4072 Correlation and Fusion	6,258	6,775	10,851	9,788	8,526	7,591	7,750	7,911	Continuing	Continuing
<p><b>(U) A. <u>Mission Description:</u></b> In order to ensure maximum target engagement ranges and a first-shot, first-kill capability, the Air Force must be able to detect, positively identify, and track hostile targets. This project develops and demonstrates sensor processing techniques, track and fusion algorithms, bistatic sensor technologies, and correlation techniques in order to enhance target detection and tracking ranges. This project develops and integrates the necessary suite of complementary passive and active hostile target identification technologies for command and control platforms. These technologies will enhance the performance of identification and threat assessment systems for improved acquisition, tracking, and target engagement ranges for theater operations.</p> <p><b>(U) <u>FY 1998 (\$ in Thousands):</u></b></p> <ul style="list-style-type: none"> <li>– (U) \$2,816 Developed and demonstrated advanced sensor technologies and concepts for assured detection and tracking of hostile airborne targets using multiple off-board sensors.</li> <li>– (U) \$940 Developed and demonstrated advanced passive sensor technologies and concepts for increased survivability of fielded systems and assured detection and tracking of combat threats.</li> <li>– (U) \$2,502 Developed and demonstrated advanced sensor correlation technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors.</li> <li>– (U) \$6,258 Total</li> </ul> <p><b>(U) <u>FY 1999 (\$ in Thousands):</u></b></p> <ul style="list-style-type: none"> <li>– (U) \$2,864 Develop and evaluate acoustic analysis algorithms, radar identification technologies, and intelligent technologies for assured detection, tracking, and identification of hostile airborne targets using multiple off-board sensors.</li> <li>– (U) \$1,011 Continue to develop a bistatic airborne testbed and refine concepts that increase the survivability of fielded systems by quietly detecting and tracking combat threats.</li> <li>– (U) \$2,708 Continue design of real-time airborne demonstration of all-source advanced correlation capability for time-critical targets and develop teraflop signal processor technology.</li> <li>– (U) \$192 Identified as a source for SBIR.</li> <li>– (U) \$6,775 Total</li> </ul>										
Project 4072			Page 6 of 10 Pages				Exhibit R-2A (PE 0603789F)			

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<b>BUDGET ACTIVITY</b> <b>3 - Advanced Technology Development</b>	<b>PE NUMBER AND TITLE</b> <b>0603789F C3 Advanced Development</b>	<b>PROJECT</b> <b>4072</b>
<p>(U) <u>FY 2000 (\$ in Thousands):</u></p> <ul style="list-style-type: none"> <li>- (U) \$2,930 Initiate an effort for over-the-horizon situation awareness through passive exploitation of signals emanating from weapon systems and develop an integrated approach to positive target identification utilizing advanced resource management and cueing techniques.</li> <li>- (U) \$1,198 Evaluate and assess bistatic airborne testbed data and continue development of integrated adaptive processing for spaceborne and airborne radar applications.</li> <li>- (U) \$2,847 Demonstrate an all-source advanced capability for the detection and tracking of time-critical targets and continue development of affordable teraflop signal processor technology.</li> <li>- (U) \$3,876 Develop advanced fusion technology to evaluate the capability of Unmanned Combat Aerial Vehicle (UCAV) to operate in a C4ISR data-rich environment as part of an integrated C3 network.</li> <li>- (U)\$10,851 Total</li> </ul> <p>(U) <u>FY 2001 (\$ in Thousands):</u></p> <ul style="list-style-type: none"> <li>- (U) \$2,427 Continue development of techniques to provide over-the-horizon situation awareness through passive exploitation of signals emanating from weapon systems.</li> <li>- (U) \$1,559 Complete analysis of bistatic airborne testbed data and continue development of integrated adaptive processing for spaceborne and airborne radar applications.</li> <li>- (U) \$2,946 Evaluate the all-source capability developed for the detection and tracking of time-critical targets and demonstrate affordable teraflop signal processor technology.</li> <li>- (U) \$2,856 Continue to develop advanced fusion technology to evaluate the capability of UCAV to operate in a C4ISR data-rich environment as part of an integrated C3 network.</li> <li>- (U) \$9,788 Total</li> </ul>		
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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
<b>3 - Advanced Technology Development</b>	<b>0603789F C3 Advanced Development</b>	<b>4072</b>
<p>(U) <b>B. <u>Project Change Summary - Description of Significant Changes:</u></b> Not Applicable.</p> <p>(U) <b>C. <u>Other Program Funding Summary:</u></b></p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"><li>- (U) PE 0603203F, Advanced Aerospace Sensors.</li><li>- (U) PE 0602702F, Command, Control, and Communications (C3).</li><li>- (U) PE 0603742F, Combat Identification Technology.</li><li>- (U) PE 0603726F, C3 Subsystem Integration.</li><li>- (U) PE 0603728F, Advanced Computing Technology.</li><li>- (U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</li></ul> <p>(U) <b>D. <u>Acquisition Strategy:</u></b> Not Applicable.</p> <p>(U) <b>E. <u>Schedule Profile:</u></b> Not Applicable.</p>		
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<b>BUDGET ACTIVITY</b> <b>3 - Advanced Technology Development</b>	<b>PE NUMBER AND TITLE</b> <b>0603789F C3 Advanced Development</b>	<b>PROJECT</b> <b>4216</b>
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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
4216 Warfighter Information Usage, Management, and Integration Technologies	1,320	2,383	2,458	2,640	2,687	2,752	2,809	2,868	Continuing	Continuing

**(U) A. Mission Description:** This project will develop and demonstrate the advanced technologies required to implement an interoperable, worldwide Information For The Warrior (IFTW) construct capable of supporting near-real-time multimedia (i.e., voice, data, video, and imagery) information exchange between ground and airborne platforms. The IFTW technology will provide “reachback” (i.e., updating information and mission changes to enroute aircraft and “in-transit visibility” of the aircraft and cargo status at Command and Control centers.) The IFTW capabilities will be enhanced through the incremental development, demonstration, and integration of advanced information management, network management, and communications transmission technologies. It will address interoperation across echelon, Service, and multi-national force boundaries, as well as provide support for mobile command and control, and sensor-to-shooter operations. This program directly responds to user deficiencies as expressed by the Joint Staff (Command, Control, Communications, Computers, and Intelligence for the Warrior), the Air Force (Theater Deployable Communications), Air Mobility Command (Air Mobility Master Plan and Airborne Situational Awareness), and the Defense Information Systems Agency (Far-Term Defense Information Systems Network).

**(U) FY 1998 (\$ in Thousands):**

- (U) \$543 Designed, developed, demonstrated, and integrated IFTW advanced information management technologies for data retrieval, transfer, and presentation.
- (U) \$383 Designed, developed, demonstrated, and integrated advanced airborne, high-speed super-high frequency communications technologies for global broadcast service and IFTW.
- (U) \$394 Designed, developed, demonstrated, and integrated advanced network module and bandwidth management and communications protocol technologies into the IFTW effort. Conducted studies on Asynchronous Transfer Mode (ATM) technologies for the IFTW environment.
- (U) \$1,320 Total

**(U) FY 1999 (\$ in Thousands):**

- (U) \$726 Design, develop, demonstrate, and integrate advanced information communication mediation management technologies for IFTW joint task force and international operations.
- (U) \$794 Design, develop, demonstrate, and integrate advanced airborne, super-high frequency communications and low-cost, phased array antenna technologies.
- (U) \$796 Design, develop, demonstrate, and integrate advanced network and bandwidth management and technologies, including agents and routers, for IFTW in joint and international environments.
- (U) \$67 Identified as a source for SBIR.
- (U) \$2,383 Total

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
<b>3 - Advanced Technology Development</b>	<b>0603789F C3 Advanced Development</b>	<b>4216</b>
<p>(U) <u>FY 2000 (\$ in Thousands):</u></p> <ul style="list-style-type: none"><li>- (U) \$830 Design, develop, integrate, and demonstrate advanced expert system decision algorithms and software to prioritize and control resources for global reach in a mobility environment.</li><li>- (U) \$865 Design, develop, integrate, and demonstrate modular, reprogrammable radio communications technologies for commercial and military global reach in an airborne mobility environment.</li><li>- (U) \$763 Design, develop, integrate, and demonstrate advanced protocol network and commercial management technologies to validate communications between air platforms and Command and Control centers at Scott Air Force Base for global reach in a mobility environment. Develop autonomous network setup and control for a global reach capability.</li><li>- (U) \$2,458 Total</li></ul> <p>(U) <u>FY 2001 (\$ in Thousands):</u></p> <ul style="list-style-type: none"><li>- (U) \$880 Design, develop, integrate, and demonstrate advanced intelligent agents and information structure management technologies for global reach in a mobility environment.</li><li>- (U) \$909 Design, develop, integrate, and demonstrate advanced reprogrammable radio communication and media control reach and awareness in a mobility environment.</li><li>- (U) \$851 Design, develop, integrate, and demonstrate advanced global intranet technologies for global reach in a mobility environment.</li><li>- (U) \$2,640 Total</li></ul> <p>(U) <b>B. <u>Project Change Summary - Description of Significant Changes:</u></b> Not Applicable.</p> <p>(U) <b>C. <u>Other Program Funding Summary:</u></b> Not Applicable.</p> <p>(U) <u>Related Activities:</u></p> <ul style="list-style-type: none"><li>- (U) PE 0602702F, Command, Control, and Communications (C3).</li><li>- (U) PE 0603726F, C3 Subsystem Integration.</li><li>- (U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</li></ul> <p>(U) <b>D. <u>Acquisition Strategy:</u></b> Not Applicable.</p> <p>(U) <b>E. <u>Schedule Profile:</u></b> Not Applicable.</p>		
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