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

DATE: February 2002

BUDGET ACTIVITY: 02 - Applied Research

PE NUMBER AND TITLE: 0602805F Dual Use Science & Technology

PROJECT: 4770

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
4770	Dual Use Science and Technology (S&T)	9,717	10,316	10,626	10,820	11,031	11,242	11,455	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0

(U) A. Mission Description

The Dual Use Science and Technology program seeks to leverage industry investments and interests in advanced technologies of mutual advantage to the Air Force and industry. A key objective of this program is for the Air Force to stimulate the development of dual use technologies so as to provide greater access to commercial technologies and to lead to affordable defense systems that maintain battlefield superiority. A critical component of the program is the cost-sharing requirement from both industry and the Air Force. The cooperative funding assures joint commitment to the development effort of successful transitions. Specific projects are determined through annual competitive solicitation(s). Technology areas considered include advanced materials and manufacturing; sensors; advanced propulsion, power, and fuel efficiency; information and communications technologies; and weapon systems sustainment.

(U) FY 2001 ($ in Thousands)

(U) $1,802 Developed advance materials and manufacturing technologies that will reduce the cost and improve the capability of both Air Force and commercial air and space vehicles and launch systems. Technology areas considered included: growth processes for wide bandgap semiconductor materials such as Silicon Carbide (SiC), Gallium Nitride (GaN), and related materials; superior ceramic matrix composites (CMCs); advanced metal matrix composites (MMCs) and intermetallics materials for durable, maintainable vehicles; composite material structures based upon low-cost preforming, infusion, and curing; and inflatable membrane solar concentrators for high powered (>100kW) military and commercial satellites.

(U) $1,264 Developed affordable advanced sensors technologies that can be applied to both commercial and military space and airborne systems to provide a complete and timely picture of the battlespace, enable a timely precision response, and enhance the warfighter's survivability, as well as enhance commercial telecommunications, imaging, and surveying. Technology areas considered included: antennas that are conformal in shape, cost-effective to manufacture, operate over a very wide frequency bandwidth, and are polarization diverse; laser radar (LADAR) to provide precise and timely topographical maps for both commercial and military purposes; innovative focal plane arrays (FPAs) for LADAR; and navigation aids, including inertial navigation components and satellite-based global positioning.

(U) $4,578 Developed advanced propulsion, power, and fuel efficiency technologies that improve the performance, increase life, and reduce emissions of airbreathing and rocket propulsion systems. Technology areas considered include: advanced gas turbine combustion; cost-effective, long life,

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(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

turbine blades; mitigation of particulate formation in airbreathing and rocket propulsion systems; advanced common core compressors; lightweight rocket nozzles; enhanced fuel-air mixing and jet penetration techniques; and smart engine health monitoring techniques.

(U) $1,399 Developed information and communication systems technologies that enhance human-vehicle interactions, improve the capability of aerospace command and control, advance information dominance and battlefield management, as well as enhance commercial communications and awareness. Technology areas considered included: automation of logistics and equipment failure reporting; information recovery; intelligent information systems; information fusion; intelligent image correlators; smart data processing; and web-based virtual consortiums for modeling and simulation research/application.

(U) $674 Developed weapon systems sustainment technologies that extend the life and improve the performance, effectiveness, and reliability of both Air Force and commercial air and space vehicles. Technology areas considered include: computational methods for assembling and validating system maintenance instructions; on-board aircraft generation and liquefaction of oxygen and nitrogen; structural integration of subsystems to reduce weight and cost; design tools; and cost-effective techniques for monitoring system health.

(U) $9,717 Total

(U) FY 2002 ($ in Thousands)

(U) $2,606 Develop information technologies to ensure the collection, dissemination, security, accuracy, and presentation of information to U.S. military decision-makers and corresponding commercial industry sectors. Technology areas considered include gathering of pertinent information; providing for the fusion, accuracy, security, and transmission of information; and presenting the information in a consistent and easily understood manner to a decision maker.

(U) $2,570 Develop innovative techniques and processes for non-destructive inspection, evaluation, and maintenance of Air Force and commercial aircraft assets. These techniques and processes are relevant to enable critical maintenance and repair decisions by depot and flight line maintenance personnel. The focus is on refinement and optimization of inspection, evaluation, and prediction techniques for maintenance and troubleshooting. Technology areas include inspection, evaluation, and maintenance of avionics, propulsion, structures, flight controls, and expendables such as fuels, lubricants, and hydraulic fluid; application of these new techniques to in-flight monitoring and early warning indicators; and automated and/or autonomous operation of inspection and evaluation techniques.

(U) $2,570 Develop affordable, robust manufacturing processing and fabrication techniques for metals and special materials critical to defense weapon system applications. The technology will also support commercial applications and significantly impact the cost and performance of future aircraft, missiles, space systems, or other defense related applications. Technology areas considered include more efficient and affordable

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(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

manufacturing processes/components, part count reduction techniques, improved yields, improved process/dimensional control, reduced lead times, improved inspection techniques, and advanced prototyping techniques.

(U) $1,300 Develop and demonstrate advanced power generation, power conditioning, energy conversion, energy storage, thermal management and power distribution component and system technologies for space applications. Military and commercial applications include satellites, energy storage, power distribution and conditioning, and thermal management systems. The focus is on enabling power generation improvements in efficiency, volume, mass, life, and reliability. The goal is to demonstrate significant improvements in size, weight, and reliability over state-of-the-art systems and/or enable new concepts.

(U) $1,270 Develop and demonstrate advanced power generation, power conditioning, energy conversion, energy storage, thermal management, and power distribution technologies for More Electric Aircraft military and civilian use. Applications include commercial aircraft, inhabited and uninhabited aircraft, and airborne directed energy weapons. Technologies of interest include aircraft power components and systems that demonstrate significant improvements in size, weight, and reliability over-state-of-the-art systems and/or enable new concepts. The focus is on improvements in reliability, maintainability, commonality, and supportability. Technology areas considered include concepts to replace hydraulic, mechanical and pneumatic power subsystems and their costly logistics support; compact high power generation and conditioning; and high rate energy storage.

(U) $10,316 Total

(U) FY 2003 ($ in Thousands)

(U) $2,126 Develop advance materials and manufacturing technologies that will reduce the life-cycle cost while enhancing the capability of both Air Force and commercial air and space vehicles and launch systems. Technology areas of interest include: non-destructive/non-intrusive evaluation techniques; smart and adaptive skins; corrosion resistant coatings; micro and nano-scale electronics; durable, light weight materials for space launch; and agile materials for use in force protection.

(U) $2,125 Develop affordable advanced sensors technologies that have application to commercial and military aerospace platforms. Technology areas of interest include: timely, high quality, precision imaging; sensitive, ambient environment electromagnetic (i.e., infrared) detection; and high speed, precision temporal, spatial, and attitude sensors and controllers.

(U) $2,125 Develop advanced propulsion, power, and fuel efficiency technologies to improve the performance, increase the life, and reduce the cost of military and commercial aerospace operations. Technology areas of interest include: performance and emissions of airbreathing and rocket propulsion systems; advanced gas turbine combustion and blades; electric propulsion alternatives; energy processing, storage, and conversion;

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(U) A. Mission Description Continued

(U) FY 2003 ($ in Thousands) Continued

lasers; and smart engine health monitoring techniques.

(U) $2,125 Develop advanced information and communication technologies to enhance the collection, processing, dissemination, security, accuracy, and presentation of information to U.S. and coalition military decision-makers and corresponding commercial industry sectors. Technology areas of interest include: collecting, synthesizing, and encoding of pertinent information; securing the high-speed and reliable fusion, accuracy, security, and transmission of information; and presenting the appropriate information in an efficient, timely, consistent, and easily understood manner.

(U) $2,125 Develop weapon systems sustainment technologies that extend the life and improve the performance, efficiency, reliability, and maintainability of both Air Force and commercial aerospace systems. Technology areas of interest include: avionics; materials fatigue and fracture; corrosion; cost-effective techniques for non-invasive, real-time monitoring of system health/performance; and associated environmental impacts.

(U) $10,626 Total

(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.

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

		FY 2001	FY 2002	FY 2003	Total Cost
(U)	Previous President's Budget	10,051	10,417	10,652	
(U)	Appropriated Value	10,144	10,417		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions		-101		
	b. Small Business Innovative Research	-238			
	c. Omnibus or Other Above Threshold Reprogram				
	d. Below Threshold Reprogram	-96			
	e. Rescissions	-93			
(U)	Adjustments to Budget Years Since FY 2002 PBR			-26	
(U)	Current Budget Submit/FY 2003 PBR	9,717	10,316	10,626	TBD

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

(U) Significant Program Changes:
Not Applicable.

D. Execution - Not Applicable.

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

(U) Related Activities:
(U) PE 0601102F, Defense Research Sciences.
(U) PE 0602102F, Materials.
(U) PE 0602201F, Aerospace Flight Dynamics.
(U) PE 0602202F, Human Effectiveness.
(U) PE 0602203F, Aerospace Propulsion.
(U) PE 0602204F, Aerospace Sensors.
(U) PE 0602601F, Space Technology.
(U) PE 0602602F, Conventional Munitions.
(U) PE 0602605F, Directed Energy Technology.
(U) PE 0602702F, Command Control and Communications.
(U) PE 0602805N, Dual Use Science and Technology (S&T).
(U) PE 0602805A, Dual Use Science and Technology (S&T).
(U) PE 0603112F, Advanced Materials for Weapon Systems.
(U) PE 0603203F, Advanced Aerospace Sensors.
(U) PE 0603211F, Aerospace Structures.
(U) PE 0603216F, Aerospace Propulsion and Power Technology.
(U) PE 0603231F, Crew Systems and Personnel Protection Technology.
(U) PE 0603270F, Electronic Combat Technology.
(U) PE 0603401F, Advanced Spacecraft Technology.
(U) PE 0603601F, Conventional Weapons Technology.
(U) PE 0603605F, Advanced Weapons Technology.

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

(U) PE 0603789F, C3I Advanced Development.

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

(U) E. Acquisition Strategy

Not Applicable.

(U) F. Schedule Profile

(U) Not Applicable.