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

DATE: June 2001

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems

	COST ($ in Thousands)	FY 2000 Actual	FY 2001 Estimate	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	33,134	43,575	32,748	25,734	28,695	28,903	25,183	25,716	Continuing	TBD
2100	Laser Hardened Materials	10,797	10,632	23,478	14,940	17,411	16,662	12,686	12,954	Continuing	TBD
3153	Non-Destructive Inspection Development	3,480	10,421	3,657	3,496	3,842	4,189	4,277	4,368	Continuing	TBD
3946	Materials Transition	18,857	22,522	4,199	5,175	5,492	5,616	5,733	5,855	Continuing	TBD
4918	Deployed Air Base Demonstrations	0	0	1,414	2,123	1,950	2,436	2,487	2,539	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

Note: In FY 2002, the deployed air base demonstration efforts in PE 0603205F, Flight Vehicle Technology, Project 4398, Air Base Technology, and PE 0603112F, Advanced Materials for Weapon Systems, Project 3946, Materials Transition, are transferred into this PE in Project 4918, Deployed Air Base Demonstrations. FY 2003 - FY 2007 budget numbers do not reflect the DoD strategy review results.

(U) A. Mission Description

The advanced materials for weapon systems program develops and demonstrates materials technology for transition into Air Force systems. The program has four projects: (1) develops laser hardened materials technologies for the broadband laser protection of aircrews and sensors; (2) develops non-destructive inspection and evaluation (NDI/E) technologies; (3) develops transition data on structural and non-structural materials for air and space; and, (4) develops airbase operations technologies including power generators, deployable shelters, and fire fighting capabilities. Note: In FY 2001, Congress added $4.5 million for special aerospace materials and manufacturing processes, $2.0 million for next generation launch vehicle payload fairings and shrouds, $0.8 million for vehicle health monitor, $6.5 million for aging aircraft, $1.8 million for National Composite Programmable Powdered Preform Process for Aerospace (P4I) initiative, $3.9 million for advanced low-observable coatings, $1.8 million for National Center for Industrial Competitiveness, and $1.0 million for handheld holographic radar gun which explains the perceived decrease in FY 2002.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: June 2001
BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon 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 2000	FY 2001	FY 2002	Total Cost
(U)	Previous President's Budget (FY 2001 PBR)	33,978	21,678	20,778	
(U)	Appropriated Value	34,390	43,978		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-1			
	b. Small Business Innovative Research	-810			
	c. Omnibus or Other Above Threshold Reprogram	-996			
	d. Below Threshold Reprogram	909			
	e. Rescissions	-358	-403		
(U)	Adjustments to Budget Years Since FY 2001 PBR			11,970	
(U)	Current Budget Submit/FY 2002 PBR	33,134	43,575	32,748	TBD

Significant Program Changes:

(U) Significant Program Changes:

In FY 2002, the increase in this program is due to realignment of efforts to align with Air Force Research Laboratory organizational structure.

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

DATE: June 2001

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems

PROJECT: 2100

COST ($ in Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
2100	Laser Hardened Materials	10,797	10,632	23,478	14,940	17,411	16,662	12,686	12,954	Continuing	TBD

(U) A. Mission Description

Develops enabling materials and concepts for protecting Air Force assets such as aircrews, munitions, and aerospace sensors against laser and high power microwave (HPM) directed energy threats. Concepts are demonstrated to provide hardening for transition to Air Force systems. The goal is to ensure mission capability before, during, and after threat exposure. Current protection schemes are activated by intensity or color and are only capable of countering a specific portion of the laser threat. To harden systems against all potential lasers the development of a combination of approaches is required.

(U) FY 2000 ($ in Thousands)

(U) $1,620 Developed and demonstrated advanced materials technologies that enhance laser hardening of Air Force spacecraft sensors to ensure safety, survivability, and operability in a laser threat environment. Evaluated hybrid optical limiters and establish specific performance improvement goals for the protection of staring focal plane array . Optimized rugate fixed-wavelength filters and optical switches for mid-wave infrared space systems. Evaluated hardening solutions for critical space sensor designs and environments.

(U) $5,398 Developed and demonstrated advanced materials technologies that enhance laser hardening for Air Force aircrews to ensure safety and to enable aircrews to perform required missions in a laser threat environment. Designed and developed fixed filters for panoramic night vision goggles. Fabricated and tested wrap-around tristimulus spectacles (eye-glasses). Designed and developed prescription capable flexible filter for eye protection. Demonstrated prescription-capable, eye-centered rugates on lenses with dyed plastic substrates. Transitioned eye centered rugate spectacles for preliminary human factors study.

(U) $3,779 Developed and demonstrated advanced materials technologies that enhance laser hardening for sensors, avionics, and components to increase survivability and mission effectiveness of air vehicles systems. Integrated laser hardening modules into operational electro-optical systems. Performed flight test demonstrations of hardened sensor for Air Force Special Operational Command. Characterized and transitioned enhanced sensor modules for Air Force targeting systems. Initiated development of hardening architecture for low light level television systems.

(U) $10,797 Total

(U) FY 2001 ($ in Thousands)

(U) $1,598 Develop and demonstrate advanced materials technologies that enhance laser hardening of Air Force spacecraft sensors to ensure safety, survivability, and operability in a laser threat environment. Fabricate and characterize hybrid optical limiters for the protection of staring focal plane arrays (FPAs). Fabricate rugate fixed-wavelength filters and optical switches for mid-wave infrared (MWIR) space systems. Develop hardening solutions for critical space sensor designs and environments based on successful approaches employed in tactical sensors.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: June 2001
BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems	PROJECT: 2100

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

(U)	$5,327	Develop and demonstrate advanced materials technologies that enhance laser hardening for Air Force aircrews to ensure safety and to enable aircrews to perform required missions in a laser threat environment. Develop fixed filters and invisible laser eye protection visor for panoramic night vision goggles (PNVG). Evaluate tunable filter PNVG protection technology. Validate wrap-around tristimulus spectacles (eye-glasses). Develop prescription capable flexible filter for eye protection. Transition prescription-capable, eye-centered rugates on lenses with dyed plastic substrates.
(U)	$3,707	Develop and demonstrate advanced materials technologies that enhance laser hardening for sensors, avionics, and components to increase survivability and mission effectiveness of air vehicles systems. Fabricate high performance rugate filters for hardened low light level television systems. Initiate development of specific hardening techniques for specific munitions. Develop specific hardening techniques for MWIR and long-wave infrared staring forward looking infrared systems.
(U)	$10,632	Total

(U) FY 2002 ($ in Thousands)

(U)	$5,663	Develop and demonstrate advanced materials technologies that enhance laser hardening of Air Force spacecraft sensors to ensure safety, survivability, and operability in a laser threat environment. Design and fabricate hybrid optical limiters for the protection of mid-wave infrared staring FPAs. Test and update hardened coating process for rugate fixed-wavelength filters and optical switches for MWIR space systems. Fabricate hardening solutions for critical space sensor designs and environments based on successful approaches employed in tactical sensors.
(U)	$9,146	Develop and demonstrate advanced materials technologies that enhance laser hardening for Air Force aircrews to ensure safety and to enable aircrews to perform required missions in a laser threat environment. Fabricate and validate flexible filter technology (rugate and enhanced thin films) in prescription capable spectacles. Demonstrate first generation tristimulus filter technology (enhanced thin films combined with absorbing dyes) for daytime missions. Complete and transition both flexible filters and tristimulus filters in wraparound spectacles for human factors evaluations. Demonstrate laser protective fixed filters for the PNVG program. Begin development of tunable liquid crystal filter technology for the PNVG program.
(U)	$8,669	Develop and demonstrate advanced materials technologies that enhance laser hardening for sensors, avionics and components to increase survivability and mission effectiveness of areospace systems. Develop damage resistant image intensifier tubes. Develop laser damage resistant image intensifiers, charge couple devices, and architectures for fielded television targeting systems. Evaluate laser hardening materials for mid-wave infrared targeting systems and precision-guided munitions.
(U)	$23,478	Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: June 2001

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
03 - Advanced Technology Development	0603112F Advanced Materials for Weapon Systems	2100

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0602102F, Materials.

(U) PE 0602202F, Human Effectiveness Applied Research.

(U) PE 0603231F, Crew Systems and Personnel Protection Technology.

(U) PE 0604706F, Life Support System

(U) Coordinated through the Tri-Service Laser Hardening Materials and Structures Working Group and the Joint Service Agile Laser Eye Protection Program.

(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: June 2001

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems

PROJECT: 3153

COST ($ in Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
3153	Non-Destructive Inspection Development	3,480	10,421	3,657	3,496	3,842	4,189	4,277	4,368	Continuing	TBD

(U) A. Mission Description

Develops and demonstrates advanced Non-Destructive Inspection/Evaluation (NDI/E) technologies to monitor performance integrity and to detect failure causing conditions in weapon systems components and materials. NDI/E capabilities greatly influence and/or limit many designs, manufacturing, and maintenance practices. Reduction in the number of fighter wings and the need for rapid sortie generation demand an ability to perform real-time NDI/E more rapidly than current capability. This project provides technology to satisfy Air Force requirements to extend lifetimes of current systems through increased reliability and cost-effectiveness at field and depot maintenance levels. Equally important is assuring manufacturing quality, integrity, and safety requirements. Note: In FY 2001, Congress added $0.8 million for vehicle health monitor, $6.5 million for aging aircraft, and $1.0 million for handheld holographic radar gun which explains the perceived decrease in FY 2002.

(U) FY 2000 ($ in Thousands)

(U) $1,507 Developed and demonstrated advanced technologies for improved capabilities in materials corrosion and fatigue monitoring and testing of aging aircraft to reduce operation and maintenance costs and to guarantee full operability and safety of the aircraft fleet. Demonstrated enhanced laser generated ultrasonics for corrosion detection that use an alternate source of laser pulses to generate ultrasound and are efficiently transmitted through fiber optics, thus enabling laser-based ultrasonics sensors for remote access inspection. Demonstrated a high-resolution digital radioscopy technique to evaluate and characterize cracks as an alternative to current X-ray film-based systems which eliminates the need for hazardous material usage and enables electronic storage, transmission, and analysis of images.

(U) $1,372 Developed and demonstrated advanced inspection technologies supporting low-observable (LO) and space systems to enhance affordability and ensure full performance and survivability and rapid turnaround of space systems. Validated a signature assessment tool for fighter aircraft and initiated development of an advanced multispectral LO non-destructive evaluation (NDE) tool for assessing radio frequency signature (zone versus whole aircraft) that is real-time, small, lightweight, portable, user friendly, and covers multiple frequency bands. Selected multiple NDE methods to detect changes in key material properties necessary for ten-year service life estimate prediction of solid rocket motors. This technology provides improved capabilities to monitor vehicle health and enables anticipatory condition-based maintenance actions on aerospace vehicles.

(U) $601 Developed and demonstrated advanced technologies for improved capabilities to assess high cycle fatigue and engine life prediction practices to extend the total 'safe' life of turbine engine disks. Established NDE benchmarks and designed an automated inspection capability to inspect engine rotary components for planned life extension of engine rotors. Established a baseline capability to retain digital NDE records for extended periods and enable enhanced analysis of the aging aircraft fleet.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: June 2001
BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems / PROJECT: 3153

(U) A. Mission Description Continued

(U) FY 2000 ($ in Thousands) Continued

(U) $3,480 Total

(U) FY 2001 ($ in Thousands)

(U) $7,122 Develop and demonstrate advanced technologies for improved capabilities in materials corrosion and fatigue monitoring and testing of aging aircraft to reduce operation and maintenance costs and to guarantee full operability and safety of the aircraft fleet. Transition to industry enhanced laser-generated ultrasonics for corrosion detection that use an alternate source of laser pulses to generate ultrasound and are efficiently transmitted through fiber optics. This enables laser-based ultrasonics sensors for remote access inspection. Transition a high-resolution digital radioscopy technique to evaluate and characterize cracks as an alternative to current X-ray film-based systems. This technique eliminates the need for hazardous material usage and enables electronic storage, transmission, and analysis of images.

(U) $1,857 Develop and demonstrate advanced inspection technologies supporting low-observable (LO) systems to enhance affordability and ensure full performance and survivability. Transition a LO material assessment tool for fighter aircraft. Develop an advanced multispectral LO nondestructive evaluation (NDE) tool for assessing radio frequency signature (zone versus whole aircraft) that is real-time, small, lightweight, portable, user friendly, and covers multiple frequency bands. Evaluate an advanced hand-held directional reflectometer for field level infrared signature NDE.

(U) $548 Develop and demonstrate advanced technologies for improved capabilities to assess high cycle fatigue and engine life prediction practices to extend the total `safe' life of turbine engine disks. Evaluate NDE benchmarks and develop an automated inspection capability to inspect engine rotary components for planned life extension of engine rotors. Develop a method to retain digital NDE records for extended periods and enable enhanced analysis of the aging aircraft fleet.

(U) $894 Develop and demonstrate advanced technologies for improved capabilities to monitor vehicle health and enable anticipatory condition-based maintenance actions on aerospace vehicles. Investigate interfaces to material behavior prediction tools. Establish a NDE baseline capability method to detect changes in key material properties necessary for ten-year service life estimate prediction of solid rocket motors.

(U) $10,421 Total

(U) FY 2002 ($ in Thousands)

(U) $1,200 Develop and demonstrate advanced technologies for improved capabilities in materials corrosion, fatigue monitoring, and testing of aging aircraft to reduce operation and maintenance costs. These technologies will guarantee full operability and safety of the aircraft fleet. Develop and demonstrate advanced technologies for improved capabilities in detection and characterization of corrosion in aging aircraft while emphasing improving the probability of detecting serviceable cracks. Develop advanced methods to detect cracks in multiple layers to meet aging aircraft life extension requirements.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: June 2001

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
03 - Advanced Technology Development	0603112F Advanced Materials for Weapon Systems	3153

(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

(U) $1,454 Develop and demonstrate advanced technologies for improved capabilities to assess high cycle fatigue and engine life prediction practices to extend the total `safe' life of turbine engines. Transition nondestructive evaluation (NDE) benchmarks and continue development of an automated inspection capability to inspect engine rotary components for increased rotor life extension. Investigate candidate NDE techniques to extend the life of fracture-critical gas turbine engine components and develop techniques for subsurface component evaluations. Develop an advanced X-ray robotic brassboard to measure surface residual stress on full-scale turbine engine components.

(U) $1,003 Develop and demonstrate advanced inspection technologies supporting low-observable (LO) systems to enhance affordability and ensure full performance and survivability. Demonstrate an advanced multispectral LO NDE tool for assessing radio frequency signature (zone versus whole aircraft) that is real-time, lightweight and portable, user friendly, and covers multiple frequency bands. Complete and transition to the field an advanced hand-held directional reflectometer for field level infrared signature NDE.

(U) $3,657 Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0602102F, Materials.

(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: June 2001

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems

PROJECT: 3946

COST ($ in Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
3946 Materials Transition	18,857	22,522	4,199	5,175	5,492	5,616	5,733	5,855	Continuing	TBD

Note: In FY 2002, the deployed air base demonstration efforts in PE 0603205F, Flight Vehicle Technology, Project 4398, Air Base Technology, and PE 0603112F, Advanced Materials for Weapon Systems, Project 3946, Materials Transition, are transferred into this PE in Project 4918, Deployed Air Base Demonstrations.

(U) A. Mission Description

Develops and demonstrates advanced material and processing technologies for fielded and planned Air Force weapon, airframe, engine, and space applications. Advanced materials and processes that have matured beyond applied research are characterized, critical data are collected, and critical evaluations in the proposed operating environment are performed. This design and scale-up data enhances overall affordability of promising material and processing technologies, providing needed initial incentive for their industrial development. Note: In FY 2001, Congress added $4.5 million for special aerospace materials and manufacturing processes, $2.0 million for next generation launch vehicle payload fairings and shrouds, $1.8 million for National Composite Programmable Powdered Preform Process for Aerospace (P4I) initiative, $3.9 million for advanced low observable coatings, and $1.8 million for National Center for Industrial Competitiveness which explains the perceived decrease in FY 2002.

(U) FY 2000 ($ in Thousands)

(U) $5,436 Developed and demonstrated advanced materials technologies for air vehicles and subsystems to enhance lift, propulsion, low-observable performance, and affordability of manned and unmanned air vehicles. Developed advanced aircraft brake materials with improved braking capacity, increased life, and better environmental stability. Developed large integrated composite structures for aircraft with reduced part count and assembly costs. Developed advanced non-linear optical materials for aircraft infrared countermeasures against far-infrared laser sources.

(U) $6,990 Developed and demonstrated advanced materials technologies for space vehicles and subsystems to provide enhanced surveillance and sensing capabilities and improved access to space. Initiated development of robust, high performance, and producible infrared focal plane array materials. Developed materials and materials processing technologies to improve spacecraft component designs, performance, and reliability.

(U) $1,004 Developed and demonstrated advanced materials technologies to enhance the sustainability of Air Force air and space systems by lowering operations and maintenance costs and ensuring full operability and safety of systems and personnel. Developed and verified an accelerated environmental effects test to determine in-service performance degradation of aircraft coating systems and initiated development of large aperture Aluminum Oxynitride window material with high optical quality, durability, and strength. Demonstrated the utilization of residual stress measurements in the fatigue life management of turbine engine disks.

(U) $2,438 Provided affordability education and training through the application of Integrated Product and Process Development (IPPD) tenets and cost modeling to the Air Force Science and Technology (S&T) environment. Training is focused on Air Force S&T scientists and engineers,

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BUDGET ACTIVITY: 03 - Advanced Technology Development	PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems
PROJECT: 3946	

(U) A. Mission Description Continued

(U) FY 2000 ($ in Thousands) Continued

including executives, middle managers, and all advanced development program managers. Enhanced Integrated Product and Process Development (IPPD) and cost modeling course material, including web-based methods and tools.

(U) $2,989 Developed technologies (i.e., utilities and shelters) that improve airmobile systems performance and reduce airlift requirements in support of Air Expeditionary Force (AEF) operations. Emphasized two areas of AEF operations: deployed base systems and physical force protection. Demonstrated small air-inflatable shelters that reduce deployment weight by 50% and require 30% less set-up time. Fabricated advanced cycle technologies for mobile heat pumps that reduce weight and volume by 30%. Developed a small-footprint fuel cell reformer capable of converting logistics fuels into hydrogen for fuel cell power generation. Developed structural retrofit and evaluated deployable blast protection reinforcement systems for buildings to reduce blast debris hazards.

(U) $18,857 Total

(U) FY 2001 ($ in Thousands)

(U) $13,318 Develop and demonstrate advanced materials technologies for air vehicles and subsystems to enhance lift, propulsion, low-observable performance, and affordability of manned and unmanned air vehicles. Fabricate advanced aircraft brake materials with improved braking capacity, increased life, and better environmental stability. Fabricate large integrated composite structures for aircraft with reduced part count and assembly costs. Validate advanced non-linear optical materials for aircraft infrared countermeasures against far-infrared laser sources.

(U) $4,116 Develop and demonstrate advanced materials technologies for space vehicles and subsystems to provide enhanced surveillance and sensing capabilities and improved access to space. Develop improved material processes with increased yields for robust, high performance, and producible infrared focal plane array materials. Demonstrate materials and materials processing technologies to improve spacecraft component designs, performance, and reliability. Evaluate effort to develop the key data needed for reduced risk and increased confidence in organic matrix composite materials.

(U) $1,871 Develop and demonstrate advanced materials technologies to enhance the sustainability of Air Force areospace systems by lowering operations and maintenance costs and ensuring full operability and safety of systems and personnel. Validate an accelerated environmental effects test to determine in-service performance degradation of aircraft coating systems. Fabricate a large aperture Aluminum Oxynitride window material with high optical quality, durability, and strength. Transition the utilization of quantitative residual stress measurements in the fatigue life management of turbine engine disks.

(U) $447 Provide affordability education and training through the application of IPPD tenets and cost modeling to the Air Force Science and Technology (S&T) environment. Training is focused on Air Force S&T scientists and engineers, including executives, middle managers, and all advanced development program managers. Initiate education and training of organic IPPD and cost modeling experts in each Air Force S&T Technical

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PROJECT: 3946	

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

Directorate.

(U) $2,770 Develop technologies (i.e., utilities and shelters) that improve airmobile systems performance and reduce airlift requirements in support of Air Expeditionary Force (AEF) operations. Emphasize two areas of the AEF operations: deployed base systems and physical force protection. Develop scaled air-inflatable frames for large shelters. Demonstrate advanced cycle technologies for mobile heat pumps that reduce weight and volume by 30%. Fabricate a small-footprint fuel cell reformer capable of converting logistics fuels into hydrogen for fuel cell power generation. Fabricate structural retrofits and develop deployable blast protection reinforcement systems for buildings to reduce blast debris hazards.

(U) $22,522 Total

(U) FY 2002 ($ in Thousands)

(U) $1,377 Develop and demonstrate advanced materials and processing technologies for air vehicles and subsystems to enhance the lift, propulsion, low-observable performance, and overall affordability of air vehicles. Fabricate and characterize integrated composite structure assemblies for aircraft with reduced part count and assembly costs. Complete demonstration of advanced aircraft brake materials with improved braking capacity, increased life, and better environmental stability. Characterize advanced non-linear optical materials for aircraft infrared countermeasure against far-infrared laser sources.

(U) $1,557 Develop and demonstrate advanced materials and processing technologies for space vehicles and subsystems to provide enhanced surveillance capabilities, improved access to space, and improve the overall affordability of space vehicles. Characterize improved material processes with increased yields for robust, high performance, and producible infrared detector materials. Continue efforts to validate and demonstrate materials and materials processing technologies to improve performance, reliability, and affordability of spacecraft components and subsystems. Characterize effects of space exposure on advanced material systems.

(U) $1,265 Develop and demonstrate advanced materials and processing technologies to enhance the sustainability of Air Force air and space systems by lowering operations and maintenance costs while ensuring full operability and safety of systems and personnel. Complete the characterization of a large-aperture Aluminum Oxynitride (ALON) window material with high optical quality, durability, and strength. Evaluate the effectiveness of corrosion abatement treatments and transition the results.

(U) $4,199 Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0602102F, Materials.

(U) PE 0603211F, Aerospace Structures

(U) PE 0603202F, Aerospace Propulsion Subsystem Integration

(U) PE 0603203F, Advanced Aerospace Sensors.

(U) PE 0603216F, Aerospace Propulsion and Power 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.

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DATE: June 2001

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems

PROJECT: 4918

COST ($ in Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
4918 Deployed Air Base Demonstrations	0	0	1,414	2,123	1,950	2,436	2,487	2,539	Continuing	TBD

Note: In FY 2002, the deployed air base demonstration efforts in PE 0603205F, Flight Vehicle Technology, Project 4398, Air Base Technology, and PE 0603112F, Advanced Materials for Weapon Systems, Project 3946, Materials Transition, are transferred into this PE in Project 4918, Deployed Air Base Demonstrations.

(U) A. Mission Description

Supports the Air Expeditionary Forces (AEF) through technology development and demonstration of advanced rapid deployment airbase technologies that reduce airlift, setup times, manpower requirements, and sustainment costs. Develops and demonstrates efficient and cost-effective technologies to provide physical protection technologies including fire fighting, to AEF deployed warfighters and infrastructure. Develops and demonstrates affordable, rapid deployment technologies that ensure military readiness, support advanced weapon systems, and enable enhanced peacetime training operations.

(U) FY 2000 ($ in Thousands)

(U) $0 This effort was performed in PE 0603205F, Flight Vehicle Technology, Project 4398, Air Base Technology, ($1.363 million) and PE 0603112F, Advanced Materials for Weapon Systems, Project 3946, Materials Transition, ($2.989 million).

(U) $0 Total

(U) FY 2001 ($ in Thousands)

(U) $0 This effort was performed in PE 0603205F, Flight Vehicle Technology, Project 4398, Air Base Technology, ($7.794 million) and PE 0603112F, Advanced Materials for Weapon Systems, Project 3946, Materials Transition, ($2.770 million).

(U) $0 Total

(U) FY 2002 ($ in Thousands)

(U) $556 Demonstrate and transition advanced rapid deployment airbase technologies that reduce airlift, setup times, manpower requirements, and sustainment costs in support of Air Expeditionary Forces (AEF) technologies. Develop deployable shelters/heat pump, power, and rapid airfield assessment technologies that improve air mobile systems performance and reduce airlift requirements in support of AEF. Develop advanced aircraft fire fighting agents and equipment. Demonstrate highly effective, deployable crash/rescue technologies based on three-dimensional foam technology to support AEF operations.

(U) $108 Demonstrate and transition affordable, rapid deployment technologies that ensure military readiness, maintain aerospace missions, support advanced weapon systems, and enable peacetime training operations. Develop advanced waste reactor technologies to support deployed waste management systems. Develop full-scale design and fabricate rapidly deployable mixed-base hydrogen peroxide production plant for airborne

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
03 - Advanced Technology Development	0603112F Advanced Materials for Weapon Systems	4918

(U) A. Mission Description Continued

(U) FY 2002 ($ in Thousands) Continued

laser operations.

(U) $750 Demonstrate and transition efficient and cost-effective technologies to provide physical protection technologies to Air Expeditionary Forces (AEF) deployed warfighters and infraststructure. Develop deployable protective and reactive blast suppression technologies to protect deployed warfighters. Develop autonomous ground vehicles to support Air Force operational requirements for unexploded ordnance clearance and active range operations.

(U) $1,414 Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0602102F, Materials

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

(U) D. Acquisition Strategy

Not Applicable.

(U) E. Schedule Profile

(U) Not Applicable.