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

Exhibit R-2, RDT&E Budget Item Justification

DATE: February 2005

BUDGET ACTIVITY: 03 Advanced Technology Development (ATD)

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

	Cost ($ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
	Total Program Element (PE) Cost	59.655	64.905	36.714	43.162	38.382	41.531	42.305	42.983	Continuing	TBD
2100	Laser Hardened Materials	16.462	25.523	25.845	33.239	28.163	30.545	31.188	31.769	Continuing	TBD
3153	Non-Destructive Inspection Development	9.076	6.808	3.797	3.889	3.938	4.265	4.345	4.412	Continuing	TBD
3946	Materials Transition	23.415	25.768	4.863	3.755	3.972	4.216	4.215	4.197	Continuing	TBD
4918	Deployed Air Base Demonstrations	10.702	6.806	2.209	2.279	2.309	2.505	2.557	2.605	Continuing	TBD

(U) A. Mission Description and Budget Item Justification

This program develops and demonstrates materials technology for transition into Air Force systems. The program has four projects which develop: (1) hardened materials technologies for the protection of aircrews and sensors; (2) non-destructive inspection and evaluation technologies; (3) transition data on structural and non-structural materials for aerospace applications; and (4) airbase operations technologies including deployable base infrastructure, force protection, and fire fighting capabilities. Note: In FY 2005, Congress added $1.1 million for Advanced Polymer Technology for Agile Combat Support, $1.5 million for Transparent Conductive Polymer Technology Development, $7.5 million for the Metals Affordability Initiative, $1.2 million for Quantitative Inspection Techniques for Assessing Aging of Military Aircraft, $1.7 million for Plasma Enhanced Chemical Vapor Deposition for Advanced Laser Program, $1.5 million for Large Panel Sapphire Producability, $1.4 million for Advanced Composite Processes, $2.8 million for Fast Field Repair of Coated Aircraft and Equipment, $1.1 million for Materials Integrity Management Research, $3.5 million for Stealth RAM Coatings, $3.0 million for Titanium Matrix Composites, $3.4 million for Plasma Arc/Waste to Energy Production, and $0.5 million for Continuous Integrated Vehicle Health Monitoring System. An additional $1.4 million for Hybrid Bearing was appropriated to this program, but it was transferred to PE0602203F, Aerospace Propulsion, for execution. Likewise, $1.0 million for Ultra-Lightweight Composites for Ballistic and Bomb Protection was appropriated to PE0603205F, Flight Vehicle Technology, but it was tranferred to this program for execution. 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.

Exhibit R-2, RDT&E Budget Item Justification	DATE February 2005
BUDGET ACTIVITY 03 Advanced Technology Development (ATD)	PE NUMBER AND TITLE 0603112F Advanced Materials for Weapon Systems

(U) B. Program Change Summary ($ in Millions)

		FY 2004	FY 2005	FY 2006	FY 2007
(U)	Previous President's Budget	61.948	34.284	39.814	46.517
(U)	Current PBR/President's Budget	59.655	64.905	36.714	43.162
(U)	Total Adjustments	-2.293	30.621		
(U)	Congressional Program Reductions				
	Congressional Rescissions		-0.579		
	Congressional Increases		31.200		
	Reprogrammings	-0.767			
	SBIR/STTR Transfer	-1.526			

(U) Significant Program Changes:

Not Applicable.

C. Performance Metrics

Under Development.

Exhibit R-2a, RDT&E Project Justification

DATE: February 2005

BUDGET ACTIVITY: 03 Advanced Technology Development (ATD)

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

PROJECT NUMBER AND TITLE: 2100 Laser Hardened Materials

Cost ($ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
2100 Laser Hardened Materials	16.462	25.523	25.845	33.239	28.163	30.545	31.188	31.769	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

This project develops and demonstrates advanced materials technologies that enhance protection for Air Force aircrews to ensure safety and to enable aircrews to perform required missions in threat environments. Advanced materials technologies are also developed and demonstrated to enhance protection for Air Force sensor systems to ensure safety, survivability, and operability in threat environments.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007
(U) MAJOR THRUST/CONGRESSIONAL ADD: Develop and demonstrate advanced materials technologies that enhance hardening for sensors, avionics, and components to increase survivability and mission effectiveness of aerospace systems. Note: Increase in FY 2005 is due to an increased emphasis on sensor protection. This effort includes Congressional Add funding of $1.5 million in FY 2005 for Large Panel Sapphire Producability.	4.100	14.143	21.457	29.252
(U) In FY 2004: Developed hardening options for replacement sensors selected for the electro-optical sensor system. Demonstrated image intensifier tube hardening. Evaluated hardening options for charge coupled device (CCD) imaging systems.				
(U) In FY 2005: Demonstrate hardening options that can be incorporated into selected electro-optical sensor systems. Initiate hardening development for multispectral and hyperspectral sensor systems.				
(U) In FY 2006: Develop a mid-wavelength infrared testbed based on a candidate optical system. Evaluate solid state limiter materials having potential for dual band operation. Evaluate jamming and damage phenomenologies for large format CCDs.				
(U) In FY 2007: Mature hardening technology and develop a hardened candidate system. Develop candidate dual band limiter materials. Develop protection strategies for large format CCDs.				
(U)				
(U) MAJOR THRUST/CONGRESSIONAL ADD: Develop and demonstrate advanced materials technologies that enhance protection for Air Force aircrews to ensure safety and to enable aircrews to perform required missions in a threat environment. Note: This effort includes Congressional Add funding of $1.7 million in FY 2004 and $1.7 million in FY 2005 for Plasma Enhanced Chemical Vapor Deposition for Advanced Laser Program.	12.362	11.380	4.388	3.987
(U) In FY 2004: Identified next generation technology advancements to improve performance of tristimulus filter technology. Transitioned in-band interim agile protection for night vision goggles. Characterized tunable filter technology in a representative panoramic night vision goggle demonstrator. Developed				

Exhibit R-2a, RDT&E Project Justification		DATE February 2005
BUDGET ACTIVITY **03 Advanced Technology Development (ATD)**	PE NUMBER AND TITLE **0603112F Advanced Materials for Weapon Systems**	PROJECT NUMBER AND TITLE **2100 Laser Hardened Materials**

optical limiter devices to protect eyes from agile threats.

(U) In FY 2005: Transition candidate materials technology advancements to improve performance of daytime statistical filter technology. Demonstrate night vision goggle (NVG) compatible peripheral protection eyewear. Characterize the performance of breadboard panoramic NVG (PNVG)/NVG systems incorporating agile filter technology. Continue to develop agile filter and optical limiter technologies.

(U) In FY 2006: Develop and characterize an NVG brassboard system using state-of-the-art agile filters and optical power limiters. Continue to develop agile filter and optical limiter technologies.

(U) In FY 2007: Demonstrate brassboard performance using state-of-the-art agile filters and optical power limiters. Characterize and incorporate agile filter and optical limiter technologies into devices for Air Force applications.

(U) Total Cost	16.462	25.523	25.845	33.239

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

	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(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 0603500F, Multi-Disciplinary Advanced Development Space Technology.										
(U) PE 0604706F, Life Support Systems.										
(U) This project has been coordinated through the Tri-Service Laser Hardened Materials and Structures Group and the Joint Service										

Exhibit R-2a, RDT&E Project Justification		DATE February 2005
BUDGET ACTIVITY 03 Advanced Technology Development (ATD)	PE NUMBER AND TITLE 0603112F Advanced Materials for Weapon Systems	PROJECT NUMBER AND TITLE 2100 Laser Hardened Materials

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

(U) Agile Laser Eye Protection Program. This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

Exhibit R-2a, RDT&E Project Justification

DATE: February 2005

BUDGET ACTIVITY: 03 Advanced Technology Development (ATD)

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

PROJECT NUMBER AND TITLE: 3153 Non-Destructive Inspection Development

Cost ($ in Millions)		FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
3153	Non-Destructive Inspection Development	9.076	6.808	3.797	3.889	3.938	4.265	4.345	4.412	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

This project develops and demonstrates advanced nondestructive 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 design, manufacturing, and maintenance practices. This project provides technology to satisfy Air Force requirements to extend the lifetime 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.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007
(U) MAJOR THRUST: Develop and demonstrate advanced technologies to improve capabilities to inspect for cracks and other damage to extend the total safe life of turbine engines.	1.825	1.582	1.060	0.918
(U) In FY 2004: Characterized enhanced NDI/E approaches to extend the life of fracture-critical gas turbine engine components and established protocols for component inspections.				
(U) In FY 2005: Develop methods to detect and characterize damage in repaired (linear friction welded) turbine engine components. Demonstrate enhanced NDI/E approaches to extend the life of fracture-critical gas turbine engine components.				
(U) In FY 2006: Demonstrate methods to detect and characterize damage in repaired (linear friction welded) turbine engine components. Validate enhanced NDI/E approaches to extend the life of fracture-critical gas turbine engine components.				
(U) In FY 2007: Transition methods to detect and characterize damage in repaired (linear friction welded) turbine engine components. Transition enhanced NDI/E approaches to extend the life of fracture-critical gas turbine engine components.				
(U)				
(U) MAJOR THRUST: Develop and demonstrate advanced inspection technologies supporting low-observable (LO) systems to enhance affordability and ensure full performance and survivability.	0.000	0.823	0.633	0.651
(U) In FY 2004: Not Applicable.				
(U) In FY 2005: Initiate the development of a portable diagnostic probe that is broadband and will provide complex electromagnetic material properties. Initiate development of a portable, multifunctional, multi-platform diagnostics tool for use in battle damage repair of LO materials and structures.				
(U) In FY 2006: Develop and demonstrate a portable, multifunctional, multi-platform diagnostics tool for use in battle damage assessment and repair of LO materials and structures.				

Exhibit R-2a, RDT&E Project Justification			DATE: February 2005
BUDGET ACTIVITY: 03 Advanced Technology Development (ATD)	PE NUMBER AND TITLE: 0603112F Advanced Materials for Weapon Systems	PROJECT NUMBER AND TITLE: 3153 Non-Destructive Inspection Development	

(U)	In FY 2007: Transition a portable, multifunctional, multi-platform diagnostics tool for use in battle damage assessment and repair of LO materials and structures. Initiate development of advanced sensors and computational algorithms to trace LO material defects and degradation to signature impact.				
(U)					
(U)	MAJOR THRUST/CONGRESSIONAL ADD: Develop and demonstrate advanced technologies for improved capabilities in materials corrosion, fatigue monitoring, and testing of aging aircraft to reduce operations and maintenance costs. These technologies will contribute to full operability and safety of the aircraft fleet. Note: This effort includes Congressional Add funding of $3.6 million in FY 2004 and $1.2 million in FY 2005 for Quantitative Inspection Techniques for Assessing Aging of Military Aircraft.	4.811	2.340	1.229	1.382
(U)	In FY 2004: Demonstrated and validated pulsed eddy current automated scanner technology for improved capabilities in detection and characterization of corrosion of joints in aging aircraft. Validated low-frequency electromagnetic probe methods to detect cracks in multiple layers in order to meet aging aircraft life extension requirements.				
(U)	In FY 2005: Transition advanced technologies for improved capabilities in detection and characterization of corrosion of joints in aging aircraft. Demonstrate advanced methods such as magneto-resistive arrays to detect cracks in multiple layers to meet aging aircraft life extension requirements.				
(U)	In FY 2006: Transition advanced electromagnetic techniques to detect cracks in multiple layers to meet aging aircraft life extension requirements. Identify and develop application-focused NDI/E technologies to meet emerging inspection requirements for aging aircraft.				
(U)	In FY 2007: Demonstrate application-focused NDI/E technologies to meet emerging inspection requirements for aging aircraft.				
(U)					
(U)	MAJOR THRUST/CONGRESSIONAL ADD: Develop and demonstrate advanced systems status monitoring technologies to provide on-board and embedded sensing to gain continuous awareness of the state of key subsystems. Note: This effort includes Congressional Add funding of $1.4 million and a Congressional Reduction of $0.7 million in FY 2004 and Congressional Add funding of $1.6 million in FY 2005 ($1.1 million for Materials Integrity Management Research and $0.5 million for Continuous Integrated Vehicle Health Monitoring System).	2.440	2.063	0.875	0.938
(U)	In FY 2004: Developed optimal approaches and methodologies to address the continuous monitoring of materials integrity and status for critical elements of structures/airframes, propulsion systems, high temperature protection, tankage, and wiring.				
(U)	In FY 2005: Initiate development of sensors to monitor real-time health of high-temperature protection systems. Initiate development of smart sensor technologies for wiring health analysis. Initiate development of novel field-level inspection tools for assessing the structural health of airframes.				

Exhibit R-2a, RDT&E Project Justification		DATE February 2005
BUDGET ACTIVITY **03 Advanced Technology Development (ATD)**	PE NUMBER AND TITLE **0603112F Advanced Materials for Weapon Systems**	PROJECT NUMBER AND TITLE **3153 Non-Destructive Inspection Development**

(U) In FY 2006: Continue development of sensors to monitor real-time health of high-temperature protection systems. Continue development of smart sensor technologies for wiring health analysis. Continue development of field-level inspection tools for assessing the structural health of airframes.

(U) In FY 2007: Validate optimal sensing approaches for real-time health monitoring of high-temperature protection systems and characterize power scavenging and signal transmission issues. Validate smart sensor technologies for wiring health analysis. Validate field-level inspection tools for assessing the structural health of airframes.

(U) Total Cost	9.076	6.808	3.797	3.889

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

	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost

(U) Related Activities:

(U) PE 0602102F, Materials. This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

Exhibit R-2a, RDT&E Project Justification

DATE: February 2005

BUDGET ACTIVITY: 03 Advanced Technology Development (ATD)

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

PROJECT NUMBER AND TITLE: 3946 Materials Transition

Cost ($ in Millions)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
3946 Materials Transition	23.415	25.768	4.863	3.755	3.972	4.216	4.215	4.197	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

This project develops and demonstrates advanced materials and processing technologies for fielded and planned Air Force weapon, airframe, and propulsion 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. These design and scale-up data improve the overall affordability of promising materials and processing technologies, providing needed initial incentives for their industrial development.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007
(U) MAJOR THRUST/CONGRESSIONAL ADD: 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. Note: This effort includes Congressional Add funding of $13.3 million and a Congressional Reduction of $0.3 million in FY 2004 and Congressional Add funding of $17.9 million in FY 2005 ($7.5 million for the Metals Affordability Initiative, $1.4 million for Advanced Composite Processes, $1.5 million for Transparent Conductive Polymer Technology Development, $3.0 million for Titanium Matrix Composites, $3.5 million for Stealth RAM Coatings, and $1.0 million for Ultra-Lightweight Composites for Ballistic and Bomb Protection).	21.862	22.638	4.596	3.420

(U) In FY 2004: Developed an affordable high-temperature composite process that enables the fabrication of turbine engine components for future air vehicles to meet cost and performance criteria. Demonstrated fabrication processes and properties of ceramic composite materials for turbine engine exhaust components. Identified materials and their properties for a mid-infrared laser source enabling aircraft infrared countermeasures. Demonstrated improved materials and inspection tools/processes to enhance reliability and maintainability of LO platforms. Developed and evaluated advanced fluids, lubricants, and surface treatments for combined cycle engine components in high-speed vehicle applications. Developed and assessed advanced metallic materials and processing technologies for weapon system development and sustainment, and for application to cryogenic structures and scramjet and combined-cycle engine components and structures. Accelerated the development of advanced bearing materials for gas turbine engines. Demonstrated the capability of injection molded aircraft transparencies loaded with various levels of carbon nanotubes to replace the conductivity currently provided by brittle exterior coatings.

(U) In FY 2005: Develop and demonstrate reliable life extension capabilities for turbine engine rotors. Demonstrate a high temperature composite for turbine engine components. Validate performance of

Exhibit R-2a, RDT&E Project Justification		DATE February 2005
BUDGET ACTIVITY **03 Advanced Technology Development (ATD)**	PE NUMBER AND TITLE **0603112F Advanced Materials for Weapon Systems**	PROJECT NUMBER AND TITLE **3946 Materials Transition**

ceramic composite materials for exhaust components in a turbine engine environment. Develop and characterize advanced materials and materials process capabilities for ultra-lightweight, ultra-high power generation for airborne directed energy weapons. Develop materials and their suitability for a mid-infrared laser source enabling aircraft infrared countermeasures. Validate and transition improved materials and inspection tools/processes for LO systems to enable higher mission capable rates.

(U) In FY 2006: Develop materials-damage predictive approaches for engine health determination and life extension capability. Transition reliable life extension capability for turbine engine rotors. Continue development and demonstration of high temperature composites for turbine engine applications and initiate transition of these materials to relevant platforms. Scale-up advanced materials and initiate scale-up of fabrication processes to increase the capabilities of coated conductors for ultra-lightweight, ultra-high power generation for airborne directed energy weapons. Evaluate materials properties for a mid-infrared laser source enabling aircraft countermeasures and integrate best material improvement methods. Investigate primer/sealer material for improved durability of LO materials in fluid contaminated areas on emerging fighter aircraft. Develop flexible/lightweight conductive gap filler for LO aircraft. Develop processes for removal of radar absorbing material on large aircraft areas. Develop hot-melt conductive fastener fill. Improve processing of room-temperature-storable radar absorbing structure repair materials. Develop nondestructive evaluation tool for limited access areas on aircraft.

(U) In FY 2007: Develop materials-damage predictive approaches for engine health determination and life extension capability. Complete transition of high-temperature organic matrix composites for turbine engine components. Characterize advanced materials and materials process capabilities for scaled-up processing techniques and assess process repeatability for power generation materials for airborne directed energy weapons. Demonstrate functionality of integrated methods for a mid-infrared laser source enabling aircraft countermeasures. Demonstrate flexible/lightweight conductive gap filler. Evaluate processes for removal of radar absorbing material on large aircraft areas. Demonstrate primer/sealer material for improved durability of LO materials in fluid contaminated areas on emerging fighter aircraft. Evaluate improved processing of room-temperature-storable radar absorbing structure repair materials. Demonstrate nondestructive evaluation tool for limited access areas on aircraft.

(U)

(U) MAJOR THRUST/CONGRESSIONAL ADD: Develop and demonstrate advanced materials and processing technologies to enhance the sustainability of Air Force aerospace systems by lowering operations and maintenance costs and ensuring the full operability and safety of systems and personnel. Note: This effort includes Congressional Add funding of $2.8 million in FY 2005 for Fast Field Repair of Coated Aircraft and Equipment. 0.487 3.130 0.267 0.335

(U) In FY 2004: Evaluated corrosion resistant coatings and corrosion prevention compounds for aging

Exhibit R-2a, RDT&E Project Justification		DATE February 2005
BUDGET ACTIVITY **03 Advanced Technology Development (ATD)**	PE NUMBER AND TITLE **0603112F Advanced Materials for Weapon Systems**	PROJECT NUMBER AND TITLE **3946 Materials Transition**

aircraft structures applications. Initiated effort to determine durability and failure mechanisms of hybrid structures in unmanned air vehicles (UAV).

(U) In FY 2005: Demonstrate corrosion resistant coatings and corrosion prevention compounds for aging aircraft structures applications. Develop test methodologies and evaluation techniques to determine durability and characterize failure mechanisms of hybrid structures in UAVs.

(U) In FY 2006: Develop test methodologies and evaluation techniques to facilitate transition of emerging materials and processes for sustainment of Air Force systems.

(U) In FY 2007: Continue to develop test methodologies and evaluation techniques to facilitate transition of emerging materials and processes for sustainment of Air Force systems.

(U)

(U) CONGRESSIONAL ADD: Educate 21st Century Information Operations (IO) Workforce.	1.066	0.000	0.000	0.000

(U) In FY 2004: Established an Information Operations curriculum at New Mexico State University to educate graduate and undergraduate students.

(U) In FY 2005: Not Applicable.

(U) In FY 2006: Not Applicable.

(U) In FY 2007: Not Applicable.

(U) Total Cost	23.415	25.768	4.863	3.755

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

	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U) Related Activities:										
(U) PE 0602102F, Materials.										
(U) PE 0603203F, Advanced Aerospace Sensors.										
(U) PE 0603211F, Aerospace Technology Dev/Demo.										
(U) PE 0603216F, Aerospace Propulsion and Power Technology.										
(U) PE 0603500F, Multi-Disciplinary Advanced Development Space Technology.										

Exhibit R-2a, RDT&E Project Justification		DATE February 2005
BUDGET ACTIVITY **03 Advanced Technology Development (ATD)**	PE NUMBER AND TITLE **0603112F Advanced Materials for Weapon Systems**	PROJECT NUMBER AND TITLE **3946 Materials Transition**

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

This project has been coordinated through the

(U) Reliance process to harmonize efforts and eliminate duplication.

(U) D. Acquisition Strategy

Not Applicable.

Exhibit R-2a, RDT&E Project Justification

DATE: February 2005

BUDGET ACTIVITY: 03 Advanced Technology Development (ATD)

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

PROJECT NUMBER AND TITLE: 4918 Deployed Air Base Demonstrations

Cost ($ in Millions)		FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total
4918	Deployed Air Base Demonstrations	10.702	6.806	2.209	2.279	2.309	2.505	2.557	2.605	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

This project develops and demonstrates advanced, rapidly deployable airbase technologies that reduce airlift and manpower requirements, setup times, and sustainment costs, and improve protection and survivability of deployed Air Expeditionary Force (AEF) warfighters. Affordable, efficient technologies are developed and demonstrated to provide deployable infrastructure, advanced weapon system support, force protection, and fire fighting capability for deployed AEF operations.

(U) B. Accomplishments/Planned Program ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007
(U) MAJOR THRUST/CONGRESSIONAL ADD: Demonstrate and transition advanced rapidly deployable airbase infrastructure technologies that reduce airlift and manpower requirements, setup times, and sustainment costs in support of AEF operations. Note: This effort includes Congressional Add funding of $4.8 million in FY 2004 and $4.5 million in FY 2005 ($3.4 million for Plasma Arc/Waste to Energy Production and $1.1 million for Advanced Polymer Technology for Agile Combat Support).	6.265	5.872	1.105	1.139

(U) In FY 2004: Transitioned air-inflatable shelter technology to support logistics footprint reduction in AEF operations. Developed 10 kW fuel cell power system that improves deployable power system performance and reduces airlift requirements for AEF operations. Demonstrated rapid airfield assessment and repair technologies that improve performance and enhance AEF operations support.

(U) In FY 2005: Continue development of a 10 kW fuel cell power system that improves deployable power systems performance and reduces airlift requirements for support of AEF operations. Demonstrate rapid airfield assessment technologies that improve deployable systems performance and reduce airlift requirements for support of AEF operations.

(U) In FY 2006: Demonstrate a 10 kW fuel cell power system that improves deployable power systems performance. Demonstrate packed bed fuel treatment technology to remove sulfur and integrate with both proton exchange membrane fuel cell and solid oxide fuel cell stacks. Develop advanced integrated shelter power/heating, ventilation, and air conditioning concepts that will integrate fuel cell, solar, and heat pump technologies into a highly efficient compact system that can provide total energy and air conditioning requirements for individual deployable shelters. Develop continuous load deflection technology and improved crater/spall repair materials and methodologies for improved airfield assessment and rapid repair.

(U) In FY 2007: Demonstrate a 10 kW fuel cell power system that improves deployable power systems performance. Demonstrate packed bed fuel treatment technology. Demonstrate advanced integrated shelter power/heating, ventilation, and air conditioning concept. Continue to develop continuous load

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BUDGET ACTIVITY 03 Advanced Technology Development (ATD)	PE NUMBER AND TITLE 0603112F Advanced Materials for Weapon Systems	PROJECT NUMBER AND TITLE 4918 Deployed Air Base Demonstrations

	deflection technology and improved crater/spall repair materials and methodologies for improved airfield assessment and rapid repair.				
(U)					
(U)	MAJOR THRUST/CONGRESSIONAL ADD: Demonstrate and transition affordable, efficient technologies to provide force protection and fire fighting capability for deployed AEF operations. Note: This effort includes Congressional Add funding of $4.5 million in FY 2004.	4.437	0.934	1.104	1.140
(U)	In FY 2004: Demonstrated deployable protective and advanced blast suppression technologies to protect deployed warfighters. Developed a reduced-size full-capability fire fighting vehicle for deployed operations. Developed self-sterilizing coatings and laminates for expeditionary structures. Demonstrated system to integrate threat sensor data for airbase protection. Evaluated molecular tagging technology for explosive materials.				
(U)	In FY 2005: Demonstrate deployable protective and advanced blast suppression technologies to protect deployed warfighters. Demonstrate a reduced-size full-capability fire fighting vehicle for deployed operations. Develop improved fire fighter safety technologies. Develop advanced air filtration technologies for expeditionary structures.				
(U)	In FY 2006: Demonstrate improved blast suppression technologies and fragmentation protection materials for new and existing structures. Initiate demonstration of explosive storage protective technologies. Demonstrate improved fire fighter safety technologies. Continue development of advanced air filtration technologies for expeditionary structures.				
(U)	In FY 2007: Continue demonstrating improved blast suppression technologies and fragmentation protection materials for new and existing structures and for explosive storage facilities. Complete demonstration of improved fire fighter safety technologies and transition technology to operational units. Initiate an integrated crash/rescue fire fighting demonstration. Integrate air filtration technologies into demonstration for expeditionary structures.				
(U)	Total Cost	10.702	6.806	2.209	2.279

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

	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	Cost to Complete	Total Cost
(U) Related Activities:										
(U) PE 0602102F, Materials.										
(U) PE 0603287F, Physical Security Equipment.										
(U) PE 0604617F, Agile Combat										

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BUDGET ACTIVITY 03 Advanced Technology Development (ATD)	PE NUMBER AND TITLE 0603112F Advanced Materials for Weapon Systems	PROJECT NUMBER AND TITLE 4918 Deployed Air Base Demonstrations

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

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

(U) D. Acquisition Strategy

Not Applicable.