

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 2002	
BUDGET ACTIVITY 02 - Applied Research				PE NUMBER AND TITLE 0602201F Aerospace Vehicle Technologies					
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
Total Program Element (PE) Cost	51,909	98,785	78,789	108,212	106,663	109,238	109,540	Continuing	TBD
2401 Structures	47,859	32,791	26,292	42,354	42,999	43,266	42,766	Continuing	TBD
2403 Flight Controls and Pilot-Vehicle Interface	0	35,236	25,585	34,398	32,531	33,322	32,598	Continuing	TBD
2404 Aeromechanics and Integration	0	29,570	26,912	31,460	31,133	32,650	34,176	Continuing	TBD
4397 Air Base Technology	4,050	1,188	0	0	0	0	0	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	Continuing	TBD

Note: In FY 2002, selected efforts from Project 2401 have transferred into Projects 2403 and 2404 within this PE. In FY 2002, Project 4397 efforts transferred to PE 0602102F, Project 4915. In FY 2003, only the space-unique efforts in Project 2403 transferred to PE 0602500F, Project 5030, in conjunction with the Space Commission recommendation to consolidate all space unique activities.

(U) **A. Mission Description**
 This program investigates, develops, and analyzes aerospace vehicle technologies in the three primary areas of structures, controls, and aeromechanics. First, advanced structures concepts are explored and developed to exploit new materials, fabrication processes, and design techniques. Second, flight control technologies are developed and simulated for both manned and unmanned aerospace vehicles. Third, the aeromechanics of advanced aerodynamic vehicle configurations are developed and analyzed through simulations, experiments, and multidisciplinary analysis. Resulting technologies reduce life cycle costs and improve the performance of existing and future manned and unmanned aerospace vehicles. Note: In FY 2002, Congress added \$0.7 million for advanced comprehensive engineering simulator development and \$2.9 million for weapon systems logistics, deployed base systems technology, and force protection.

(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 aerospace vehicle technologies.

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BUDGET ACTIVITY		PE NUMBER AND TITLE			
02 - Applied Research		0602201F Aerospace Vehicle Technologies			
(U) <u>C. Program Change Summary (\$ in Thousands)</u>					
		<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>Total Cost</u>
(U)	Previous President's Budget	53,183	97,465	64,274	
(U)	Appropriated Value	53,675	99,415		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions		-630		
	b. Small Business Innovative Research	-1,274			
	c. Omnibus or Other Above Threshold Reprogram				
	d. Below Threshold Reprogram				
	e. Rescissions	-492			
(U)	Adjustments to Budget Years Since FY 2002 PBR			14,515	
(U)	Current Budget Submit/FY 2003 PBR	51,909	98,785	78,789	TBD
(U)	<u>Significant Program Changes:</u>				
	Changes to this program since the previous President's Budget are due to increased funding for technologies in space lift and next generation air vehicles for long range strike.				

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)								DATE February 2002		
BUDGET ACTIVITY 02 - Applied Research				PE NUMBER AND TITLE 0602201F Aerospace Vehicle Technologies				PROJECT 2401		
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
2401	Structures	47,859	32,791	26,292	42,354	42,999	43,266	42,766	Continuing	TBD
<p>(U) <u>A. Mission Description</u> This project develops advanced structures concepts to exploit new materials and fabrication processes and investigates new structural concepts and design techniques. Resulting technologies strengthen and extend the life of current and future manned and unmanned aerospace vehicle structures. Payoffs to the warfighter include reduced weight and cost, as well as improved operability and maintainability of aerospace vehicles.</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u></p> <p>(U) \$3,742 Developed methods to predict and to suppress structural damage due to high cycle fatigue that reduce operations and support costs and provide higher aircraft availability. Continued development of durability patches for structures experiencing premature failure due to high cycle fatigue. Continued technology improvements of airframe structural vibration suppression techniques which delay the onset of high cycle fatigue failures.</p> <p>(U) \$5,148 Developed and demonstrated new control techniques to enable safe, highly autonomous mixed-fleet and multi-unmanned air vehicle operations for increased combat effectiveness. Continued unmanned aerospace vehicle development to ensure safe operation and allow precision close operations of mixed manned and unmanned air vehicles. Developed adaptive flight control algorithms for autonomous vehicle operations. Initiated development of advanced system for automatic Unmanned Air Vehicle in-flight refueling.</p> <p>(U) \$1,828 Continued development of composite and metallic concepts that reduce manufacturing costs of future air vehicles. Initiated development of Analytical Certification Methodologies for unitized structures to ensure transition of advanced concepts and manufacturing processes to future airframe designs. Continued development of integrated multidisciplinary design methodologies that enhance affordability and decrease vulnerability of future aerospace vehicles.</p> <p>(U) \$3,163 Developed new flight control design methods and criteria that provide air combat advantage by increasing performance and decreasing vulnerability and cost. Initiated development of new intelligent/learning reconfigurable controller to enable continued air vehicle operation in event of damage or failure, and develop a new air vehicle flight control learning concept.</p> <p>(U) \$3,343 Developed advanced flight control technology to enable aircraft-like operations for affordable on-demand military access to space. Developed technology concepts for integration of vehicle management system with vehicle health management/prognostics. Completed aerospace vehicle requirements definition study and conceptual design.</p> <p>(U) \$2,879 Continued development of a signature-compatible, integrated high lift device that will improve aerodynamic performance and survivability</p>										
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2002
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
02 - Applied Research	0602201F Aerospace Vehicle Technologies	2401
(U) <u>A. Mission Description Continued</u>		
(U) <u>FY 2001 (\$ in Thousands) Continued</u>		
	with lower cost of ownership than conventional flight control devices. Performed analytical design of subscale aerospace vehicle model for future powered testing and analysis.	
(U) \$3,786	Developed computational tools and techniques for predicting and optimizing aerodynamic and structural performance of advanced manned and unmanned aerospace vehicles. Continued development of next generation, multi-disciplinary optimization computer design code integrating aerodynamics, structures, thermal management, signatures, and flight controls. Completed development of fully associative object-oriented multi-disciplinary design architecture and demonstrate capability to employ high fidelity analyses earlier in aircraft design to rapidly synthesize and evaluate cost of advanced configurations for unmanned air vehicles.	
(U) \$4,831	Developed and demonstrated affordable aerospace vehicle aerodynamic technologies that increase aerospace vehicle performance. Initiated investigation into techniques to generate and control plasma flow field over hypersonic vehicles. This will improve hypersonic maneuverability of transatmospheric vehicles and save weight over traditional reaction control and aerodynamic control surface approaches.	
(U) \$2,698	Evaluated the integration of multifunctional structures that tailor structural response and integrate subsystem functionality to reduce system level manufacturing costs and increase tactical performance of future aerospace vehicles. Initiated development of full wing span structurally integrated with a low frequency multifunctional antenna to increase radio frequency performance and reduce weight.	
(U) \$3,155	Improved durability of existing and future aerospace vehicle structures by developing technologies that incorporate advanced materials as well as passive and active cooling to withstand the extreme environments of high temperatures, vibrations, and acoustic noise to reduce cost and increase life of aerospace vehicle structures. Concepts under development consisted of design, fabrication, and assessment of high temperature composite and metallic aerospace vehicle structures.	
(U) \$8,290	Investigated modification and repair techniques to retrofit fail-safety into aging aircraft to increase availability and reduce operations and support costs. Developed composite and metallic bonded repair techniques which provide for damage tolerance where none now exists. Investigated low-cost structural modifications to aging systems which provide fail-safety in critical areas of the aircraft.	
(U) \$2,996	Developed advanced analytical methods for analysis of unitized structures and certification of structural components which reduce development time and cost of aircraft. Initiated exploration of damage initiation and propagation models for unitized metallic structure. Developed analytical methods for certification of aging aircraft repairs and structural modifications.	
(U) \$2,000	Expanded aeronautical research efforts to focus on developing technologies for integrated design solutions for optimal signature, aerodynamics, and sensor performance of future aircraft.	
(U) \$47,859	Total	
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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
02 - Applied Research	0602201F Aerospace Vehicle Technologies	2401
(U) <u>A. Mission Description Continued</u>		
(U) <u>FY 2002 (\$ in Thousands)</u>		
(U) \$2,859	Develop economic service life analysis for current and future aircraft, enhancing capability, component replacement, and technology direction. Continue development of unitized structural concepts and multidisciplinary optimization methodologies that enhance affordability and decrease vulnerability for current and future aerospace vehicles. Incorporate newly developed analysis tools into life prediction and failure analysis software.	
(U) \$5,080	Develop analytical certification methodologies for the incorporation of advanced methods, concepts, and manufacturing technologies into legacy aircraft components and future airframe designs. Improve the air-worthiness certification process for aircraft subjected to dynamic aeroelastic loads with high fidelity models.	
(U) \$6,941	Continue development of structural concepts and design and analysis methods that enable the integration of structure with other airframe functions to reduce cost and increase the survivability of future systems. Concepts include adaptive structures for varying moldline, subsystems hardware, and antennae contained within loadbearing structure.	
(U) \$17,911	Develop technologies that incorporate advanced materials as well as passive and active cooling to withstand extreme flight environments. Technologies will improve durability of existing and future aerospace vehicle structures resulting in reduced cost and increased life. Concepts include advanced, durable, all-weather thermal protection systems, attachment techniques, vehicle health monitoring and health management, integrated thermal protection systems, hot primary structures, hybrid structures, unitized structures, joining concepts, and cryogenic/non-cryogenic tank structures.	
(U) \$32,791	Total	
(U) <u>FY 2003 (\$ in Thousands)</u>		
(U) \$6,896	Develop economic service life analysis for current and future aircraft, enhancing capability, component replacement, and technology direction. Continue development of unitized structural concepts and multidisciplinary optimization methodologies that enhance affordability and decrease vulnerability for current and future aerospace vehicles. Incorporate newly developed analysis tools into life prediction and failure analysis software.	
(U) \$2,373	Develop analytical certification methodologies for the incorporation of advanced methods, concepts, and manufacturing technologies into legacy aircraft components and future vehicle designs. Improve the air-worthiness certification process for aircraft subjected to dynamic aeroelastic loads with high fidelity models.	
(U) \$2,292	Continue development of structural concepts and design and analysis methods that enable the integration of structure with other airframe functions to reduce cost and increase survivability of future systems. Concepts include adaptive structures for varying moldline, subsystems	
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BUDGET ACTIVITY		PROJECT
02 - Applied Research	0602201F Aerospace Vehicle Technologies	February 2002 2401
<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2003 (\$ in Thousands) Continued</u></p> <p>(U) \$14,731 hardware, and antennae contained within loadbearing structures. Develop technologies that incorporate advanced materials as well as passive and active cooling to withstand extreme flight environments. Technologies will improve durability of existing and future aerospace vehicle structures resulting in reduced cost and increased life. Concepts include advanced, durable, all-weather primary structures, hybrid structures, unitized structures, joining concepts, and cryogenic/non-cryogenic tank structures.</p> <p>(U) \$26,292 Total</p> <p>(U) <u>B. Project Change Summary</u> Not Applicable.</p> <p>(U) <u>C. Other Program Funding Summary (\$ in Thousands)</u></p> <p>(U) Related Activities:</p> <p>(U) PE 0602102F, Materials</p> <p>(U) PE 0603112F, Advanced Materials for Weapon Systems</p> <p>(U) PE 0603211F, Aerospace Technology Dev/Demo</p> <p>(U) PE 0603333F, Unmanned Air Vehicle Dev/Demo</p> <p>(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</p> <p>(U) <u>D. Acquisition Strategy</u> Not Applicable.</p> <p>(U) <u>E. Schedule Profile</u></p> <p>(U) Not Applicable.</p>		
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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)								DATE February 2002			
BUDGET ACTIVITY 02 - Applied Research				PE NUMBER AND TITLE 0602201F Aerospace Vehicle Technologies				PROJECT 2403			
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	
2403	Flight Controls and Pilot-Vehicle Interface	0	35,236	25,585	34,398	32,531	33,322	32,598	Continuing	TBD	
<p>Note: Beginning in FY 2002, selected efforts from Project 2401 have been moved into Projects 2403 and 2404. In FY 2003, the space unique tasks in Project 2403 will be transferred to PE 0602500F, Project 5030, in conjunction with the Space Commission recommendation to consolidate all space unique activities.</p> <p>(U) <u>A. Mission Description</u> This project develops technology to enable maximum affordable capability from manned and unmanned aerospace vehicles. Advanced flight control technologies are developed for maximum vehicle performance throughout the flight envelope and simulated in virtual environments. Resulting technologies contribute significantly towards the development of reliable autonomous unmanned air vehicles, space access systems with aircraft-like operations, and extended-life legacy aircraft. Payoffs to the warfighter include enhanced mission effectiveness; optimized flight safety; increased survivability; improved maintenance; and decreased size, weight, and cost. Leverages a network of synthetic environments for evaluation of advanced concepts. Note: In FY 2002, Congress added \$.7 million for advanced comprehensive engineering simulator.</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u> (U) \$0 Effort moved to Project 2401. (U) \$0 Total</p> <p>(U) <u>FY 2002 (\$ in Thousands)</u> (U) \$3,982 Develop and assess advanced control mechanization technologies to provide highly reliable operation for manned and unmanned systems at significantly reduced size, weight, and cost. Complete laboratory demonstrations of fiber optic-based vehicle management system and optical air data system components. Develop validation and verification techniques for complex, adaptive, and autonomous control software. Assess control mechanization technologies for extending the effective life of legacy aircraft. (U) \$8,938 Develop and assess control automation techniques and algorithms to enable the safe and interoperable application for formations of manned and unmanned vehicle systems. Concepts will also provide mission responsiveness and adaptability for improved operational effectiveness of manned and unmanned systems. Continue development and test of intelligent-agent software providing package-level coordination and health monitoring and management for aerospace vehicles. Continue the simulation analysis of automated aerial refueling system technologies. Complete analysis and specification of on-board sensor suite for safe operation of unmanned vehicles in proximity of other manned and unmanned air vehicles.</p>											
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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
02 - Applied Research	0602201F Aerospace Vehicle Technologies	2403
(U) <u>A. Mission Description Continued</u>		
(U) <u>FY 2002 (\$ in Thousands) Continued</u>		
(U) \$6,657	Develop new flight control design methods and criteria that provide air combat advantage by increasing performance and decreasing vulnerability and cost. Continue development of new intelligent/learning reconfigurable controller to enable continued air vehicle operation in the event of damage or failure. Integrate with on-line route planner and systems diagnostics for unmanned vehicle fault tolerant, autonomous operations. Develop integrated adaptive guidance and control systems for high and ultra-high speed aerospace vehicles.	
(U) \$6,199	Develop advanced flight control technology to enable aircraft-like operations for affordable on-demand military access to space. Continue development and analysis of affordable, lightweight vehicle/health monitoring and management systems, integrated with critical guidance and navigation algorithms for high and ultra-high speed aerospace vehicles. Develop parameters for health monitoring and management data collection, and develop prognostic algorithms.	
(U) \$8,717	Assess the value of air vehicle technologies to future aerospace systems through the development and utilization of in-house tools, systems, and processes for simulation-based research and development. Continue development of virtual simulations for unmanned air vehicles (UAVs) used in validating autonomous control algorithms for mixed manned and UAV operations. Enhance simulation and analysis capabilities to project life cycle cost impacts. Develop the capability to virtually simulate mission utility of next generation aerospace vehicles for long range strike.	
(U) \$743	Initiate Congressional directed effort for advanced comprehensive engineering simulator.	
(U) \$35,236	Total	
(U) <u>FY 2003 (\$ in Thousands)</u>		
(U) \$5,289	Develop and assess advanced control mechanization to provide highly reliable operation for manned and unmanned systems at significantly reduced size, weight, and cost. Demonstrate validation and verification techniques for complex, adaptive, and autonomous control software. Assess micro-effector technologies for lightweight, long endurance air vehicle applications. Develop real-time fault compensation using an integrated prognostic health management system.	
(U) \$6,411	Develop and assess novel control automation techniques and algorithms to enable the safe and interoperable application of unmanned vehicle systems. Concepts will also provide mission responsiveness and adaptability for improved operational effectiveness of manned and unmanned systems as well as mixed air vehicle operations. Conduct feasibility assessments of automated refueling systems concept. Develop reliability and performance analysis of self-organizing, distributed control of multi-unmanned vehicle packages.	
(U) \$3,658	Develop improved flight control design methods and criteria that provide air combat advantage by increasing performance and decreasing vulnerability and cost. Complete development of adaptive guidance and control architectures for high-speed vehicles. Develop cooperative	
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		February 2002
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
02 - Applied Research	0602201F Aerospace Vehicle Technologies	2403
<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2003 (\$ in Thousands) Continued</u></p> <p>(U) \$10,227 control theory to optimize multi-ship trajectories. Assess the value of air vehicle technologies to future aerospace systems, through the development and utilization of in-house tools, systems and processes for simulation-based research and development. Complete the development of virtual simulation for unmanned air vehicles used in validating autonomous control algorithms for mixed manned and unmanned air vehicle operations. Continue to enhance simulation and analysis capabilities through incorporation of cost models to determine the affordability of new technologies. Continue development of capability to virtually simulate future strike aircraft.</p> <p>(U) \$25,585 Total</p> <p>(U) <u>B. Project Change Summary</u> Not Applicable.</p> <p>(U) <u>C. Other Program Funding Summary (\$ in Thousands)</u></p> <p>(U) Related Activities:</p> <p>(U) PE 0602202F, Human Effectiveness Applied Research.</p> <p>(U) PE 0602204F, Aerospace Sensors.</p> <p>(U) PE 0603211F, Aerospace Technology Dev/Demo.</p> <p>(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</p> <p>(U) <u>D. Acquisition Strategy</u> Not Applicable.</p> <p>(U) <u>E. Schedule Profile</u></p> <p>(U) Not Applicable.</p>		
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BUDGET ACTIVITY 02 - Applied Research				PE NUMBER AND TITLE 0602201F Aerospace Vehicle Technologies				PROJECT 2404	
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
2404 Aeromechanics and Integration	0	29,570	26,912	31,460	31,133	32,650	34,176	Continuing	TBD
<p>Note: Beginning in FY 2002, selected efforts from Project 2401 have moved into Projects 2403 and 2404.</p> <p>(U) <u>A. Mission Description</u> This project develops aerodynamic configurations of a broad range of revolutionary, affordable air vehicles. It matures and applies modeling and numerical simulation methods for fast and affordable aerodynamics prediction; and integrates and demonstrates multidisciplinary advances in airframe-propulsion, airframe-weapon, and air vehicle control integration. Technologies developed will greatly enhance warfighter capability in aircraft, missiles, and high-speed aerospace vehicles. The payoffs from these technology programs include lower vehicle costs (both production, and operations and support costs), increased payload and range capability, and improved supportability, safety, and survivability of aerospace vehicles.</p> <p>(U) <u>FY 2001 (\$ in Thousands)</u> (U) \$0 Effort moved to Project 2401. (U) \$0 Total</p> <p>(U) <u>FY 2002 (\$ in Thousands)</u> (U) \$11,137 Develop and assess aeronautical technologies that enable broad use of unmanned air vehicles in future missions to reduce life cycle cost and decrease human risk. Complete development of tools and techniques for predicting and optimizing aerodynamic performance and survivability of long duration unmanned aerospace vehicles. Continue preliminary development of conformal inlet designs that improve airflow to engines while providing low signature for increased survivability. Continue development of signature compatible, high lift wings for long duration surveillance missions.</p> <p>(U) \$3,794 Develop design tools that permit quicker and more affordable certification of aerodynamic enhancements to extend the operational life of the current fleet. Continue development of analysis tools to accelerate the aerodynamic integration of new and existing weapons with current aircraft to enhance their warfighting ability. Continue to enhance computer design and analysis code that reduces the need for expensive flight-testing.</p> <p>(U) \$10,045 Develop and assess aerospace technologies that enable ultra-high speed flight and low-cost access to orbit to permit global reach. Complete comparative analyses of aerospace vehicle configurations for next generation long range strike to project global power from CONUS bases. Explore integrated airframe concepts for high-speed aerospace vehicles. Continue investigation into techniques to generate and control plasma</p>									
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BUDGET ACTIVITY		PROJECT
02 - Applied Research	0602201F Aerospace Vehicle Technologies	February 2002 2404
(U) <u>A. Mission Description Continued</u>		
(U) <u>FY 2002 (\$ in Thousands) Continued</u>		
	flow field over high-speed vehicles to significantly reduce drag. Develop computational, multidisciplinary, experimental and analytical tools to simulate and control the flow fields around advanced concepts for ultra-high speed aerospace vehicles in extreme flight environments. Continue development of complex configurations that mitigate the extreme thermal environment under which high speed aerospace vehicles operate. Develop techniques to carry and deploy weapons from high speed aerospace vehicles.	
(U) \$4,594	Develop and evaluate critical aeronautical technologies that enable directed energy weapons to be carried on future air vehicles to improve combat effectiveness. Complete analyses of integration of directed energy weapons on the total air vehicle system identifying impacts to the flight control system, secondary power subsystem, and aerodynamic configuration. Complete development of tools that establish the military impact of directed energy weapons when installed on viable air platforms on future engagements. Develop aircraft techniques to enhance energy beam transmission through the complex, turbulent aerodynamic environment surrounding aircraft enabling the use of directed energy weapons from high-speed, maneuvering aircraft.	
(U) \$29,570	Total	
(U) <u>FY 2003 (\$ in Thousands)</u>		
(U) \$8,768	Develop and assess aeronautical technologies that enable broad use of unmanned air vehicles in future missions to reduce life cycle costs and decrease human risk. Continue preliminary development of conformal inlet designs that improve airflow to engines while providing low signature for increased survivability. Continue development of signature compatible, high lift wings for long duration surveillance missions.	
(U) \$4,087	Develop design tools that permit quicker and more affordable certification of aerodynamic enhancements to extend the operational life of the current fleet. Continue development of analysis tools to accelerate the aerodynamic integration of new and existing weapons with the current aircraft to enhance their warfighting ability.	
(U) \$12,363	Develop and assess aerospace technologies that enable high-speed flight to permit global reach. Develop experimental capability to generate and control plasma flows. Develop analytic methods for modeling the plasma flow field over high-speed vehicles to significantly reduce drag. Continue development of complex configurations that mitigate the extreme thermal environment under which high-speed aerospace vehicles operate. Continue development of techniques to carry and deploy weapons from aerospace vehicles operating at high speeds and high temperatures.	
(U) \$1,694	Develop and evaluate critical aeronautical technologies that enable directed energy weapons to be carried on future air vehicles to improve combat effectiveness. Continue development of aircraft techniques to enhance energy beam transmission through the complex, turbulent aerodynamic environment surrounding aircraft enabling the use of directed energy weapons from high-speed, maneuvering aircraft.	
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02 - Applied Research	0602201F Aerospace Vehicle Technologies	February 2002 2404
<p>(U) <u>A. Mission Description Continued</u></p> <p>(U) <u>FY 2003 (\$ in Thousands) Continued</u></p> <p>(U) \$26,912 Total</p> <p>(U) <u>B. Project Change Summary</u> Not Applicable.</p> <p>(U) <u>C. Other Program Funding Summary (\$ in Thousands)</u></p> <p>(U) Related Activities:</p> <p>(U) PE 0603211F, Aerospace Technology Dev/Demo.</p> <p>(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</p> <p>(U) <u>D. Acquisition Strategy</u> Not Applicable.</p> <p>(U) <u>E. Schedule Profile</u> Not Applicable.</p>		
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BUDGET ACTIVITY 02 - Applied Research				PE NUMBER AND TITLE 0602201F Aerospace Vehicle Technologies				PROJECT 4397	
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
4397 Air Base Technology	4,050	1,188	0	0	0	0	0	Continuing	TBD
In FY 2002, Project 4397, efforts transferred to PE 0602102F, Project 4915.									
(U) A. Mission Description									
This project develops air base technologies for fixed and bare base operations, including airfield pavements, energy systems, air base survivability, air base recovery, protective shelter systems, airfield fire protection, and crash rescue. Payoffs include air base support operations that are affordable, easily transportable, and with increased survivability of personnel and facilities.									
(U) FY 2001 (\$ in Thousands)									
(U) \$526	Developed aircraft and air base fire fighting technologies to improve fire fighting rescue. Tested new fire fighting agents that are non-corrosive and are not harmful to fire fighting personnel. Continued testing of advanced autonomous technologies for use in flightline fire fighting trucks.								
(U) \$536	Developed utilities, automation, and waste management technologies that reduce airlift requirements and improve air base operations and survivability for agile combat support. Began evaluation of new ground power generation concepts that are highly efficient and lightweight.								
(U) \$88	Evaluated air transportable protective shelter technologies that are lightweight, structurally strong, and are affordable and suitable for Aerospace Expeditionary Force operations. Continued technology demonstration program for lightweight air inflatable shelters for aircraft and flightline personnel.								
(U) \$2,900	Initiated Congressionally directed effort in weapon systems logistics, deployed base systems technology, and force protection.								
(U) \$4,050	Total								
(U) FY 2002 (\$ in Thousands)									
(U) \$1,188	Continue Congressionally directed effort for weapon systems logistics, deployed base systems technology, and force protection.								
(U) \$1,188	Total								
(U) FY 2003 (\$ in Thousands)									
(U) \$0	No Activity								
(U) \$0	Total								
(U) B. Project Change Summary									
Not Applicable.									
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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
02 - Applied Research	0602201F Aerospace Vehicle Technologies	4397
<p>(U) <u>C. Other Program Funding Summary (\$ in Thousands)</u></p> <p>(U) Related Activities:</p> <p>(U) PE 0603211F, Aerospace Structures.</p> <p>(U) PE 0603231F, Crew Systems and Personnel Protection Technology.</p> <p>(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.</p> <p>(U) <u>D. Acquisition Strategy</u></p> <p>Not Applicable.</p> <p>(U) <u>E. Schedule Profile</u></p> <p>(U) Not Applicable.</p>		
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