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

DATE: February 2000

BUDGET ACTIVITY: 02 - Applied Research

PE NUMBER AND TITLE: 0602201F Aerospace Flight Dynamics

	COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
	Total Program Element (PE) Cost	60,746	45,594	48,775	55,436	62,802	66,285	66,056	Continuing	TBD
622401	Structures	16,730	19,398	47,489	54,751	60,606	64,159	63,665	Continuing	TBD
622402	Vehicle Equipment	10,957	3,739	0	0	0	0	0	Continuing	TBD
622403	Flight Controls and Pilot-Vehicle Interface	16,733	12,194	0	0	0	0	0	Continuing	TBD
622404	Aeromechanics and Integration	15,034	8,824	0	0	0	0	0	Continuing	TBD
624397	Air Base Technology	1,292	1,439	1,286	685	2,196	2,126	2,391	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0

Note: Beginning in FY 2001, Projects 622402, 622403, and 622404 are combined into Project 622401.

(U) A. Mission Description

This program determines the technical feasibility of aerospace vehicle technologies in aeromechanics, structures, flight control, air vehicle pilot interface, and air base technologies to reduce life cycle costs, improve the performance, and extend the life of legacy and future manned and unmanned aerospace vehicles, and increase the maintenance and survivability of air bases. The payoffs from these technology programs include decreased vulnerability, increased affordability, reliability, maintainability, and supportability of aerospace vehicles, and improved air base operations. Note: In FY 2000, Congress added $1.680 million for autonomous control technology, $1.680 million for virtual development and demonstration environment, and $0.960 million for extreme environment structures.

(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.

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

DATE: February 2000

BUDGET ACTIVITY: 02 - Applied Research

PE NUMBER AND TITLE: 0602201F Aerospace Flight Dynamics

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

		FY 1999	FY 2000	FY 2001	Total Cost
(U)	Previous President's Budget (FY 2000 PBR)	64,063	43,898	47,142	
(U)	Appropriated Value	64,932	45,718		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-869			
	b. Small Business Innovative Research	-696			
	c. Omnibus or Other Above Threshold Reprogram		-95		
	d. Below Threshold Reprogram	-2,281			
	e. Rescissions	-340	-29		
	f. Other				
(U)	Adjustments to Budget Years Since FY 2000 PBR			1,633	
(U)	Current Budget Submit/FY 2001 PBR	60,746	45,594	48,775	TBD

(U) Significant Program Changes:

Changes to this program since the previous President's Budget are due to increased funding for the unmanned air vehicle (UAV) program.

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

DATE: February 2000

BUDGET ACTIVITY: 02 - Applied Research

PE NUMBER AND TITLE: 0602201F Aerospace Flight Dynamics

PROJECT: 622401

COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
622401 Structures	16,730	19,398	47,489	54,751	60,606	64,159	63,665	Continuing	TBD

(U) A. Mission Description

This project develops aerospace vehicle technologies in aeromechanics, structures, flight control, air vehicle pilot interface, and design integration and analysis tools to reduce life cycle costs, improve the performance, and extend the life of legacy and future manned and unmanned aerospace vehicles. The payoffs from these technology programs include decreased vulnerability and increased affordability, reliability, maintainability, and supportability of aerospace vehicles.

(U) FY 1999 ($ in Thousands)

(U) $883 Continued design, development, and test of advanced structures that incorporate distributed vibration suppression technologies for life extension and exploit wing warping, camber shaping, and adaptive structures technologies that enhance air vehicle performance. Technologies under development included distributed vibration suppression techniques, and evaluation and assessment of wing twisting and control surface warping.

(U) $1,533 Developed composite structures that enhance affordability and survivability of future aircraft. Developed fail safe design criteria for translaminar reinforced composite structures to reduce inspection and repair costs. Integrated aerodynamics, flight control, and electromagnetics (radar/infrared) analyses into multi-disciplinary structural design methods to reduce design costs and improve accuracy.

(U) $1,647 Developed multifunctional adaptive structures that sense aeromechanical loads, control structural response, and integrated subsystem functionality to reduce system level manufacturing costs and increase tactical performance of aerospace vehicles.

(U) $11,392 Extended usable structural lives and/or reduced costs of aging aircraft with technologies that account for life, risk, repairs, and dynamic loads. Structural lives were extended by development of bonded composite repairs of metallic structures and evaluation of techniques to assess risk of failure of structural components due to corrosion and widespread fatigue damage.

(U) $1,275 Improved durability for existing and future aerospace vehicle structures by developing technologies that incorporated 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. Durability technologies included advanced thermal protection systems and an integrated thermal energy management/structure design.

(U) $16,730 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
02 - Applied Research	0602201F Aerospace Flight Dynamics	622401

(U) A. Mission Description Continued

(U) FY 2000 ($ in Thousands)

(U)	$1,566	Continue design, development, and test of advanced structures that incorporate distributed vibration suppression technologies for life extension and exploit wing warping, camber shaping, and adaptive structures technologies that enhance aerospace vehicle performance. Continue development of distributed vibration suppression techniques, and the evaluation and assessment of wing twisting and control surface warping of manned and unmanned aerospace vehicles.
(U)	$1,411	Develop unitized composite and metallic concepts that reduce manufacturing costs of future aerospace vehicles. Verify design criteria for translaminar reinforced composites to reduce inspection and repair costs. Develop integrated multidisciplinary design methods to reduce design time.
(U)	$1,579	Continue development 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. Test advanced airframe structural integration concepts to detect widespread fatigue and corrosion.
(U)	$2,713	Continue durability improvements for existing and future aerospace structures by developing concepts that incorporate advanced materials as well as passive and active cooling to withstand the extreme environments of high temperatures, cryogenic temperatures, vibrations, and acoustic noise to reduce cost and increase life of aerospace vehicle structures. Durability technologies include advanced thermal protection systems, high temperature composite structures, and integrated thermal subsystems/structures. Develops turbine engine nozzles that are structurally integrated with the airframe for future aerospace operating vehicles.
(U)	$10,425	Extend usable structural lives and/or reduce costs of aging aircraft and unmanned aerospace vehicles with technologies that account for life, risk, repairs, and dynamic loads. Structural lives can be extended by development of bonded composite repairs of metallic structures and evaluation of techniques to assess risk of failure of structural components. Dynamic loads can be reduced through active suppression techniques.
(U)	$1,704	Develops an advanced technology assessment capability which serves Air Force with leadership in identifying, prioritizing, developing, and demonstrating next-generation aerospace vehicle concepts. Facilitates web-based design environment process by bringing the best ideas to a design without the constraint of time and space.
(U)	$19,398	Total

(U) FY 2001 ($ in Thousands)

(U)	$3,850	Develop methods to predict and to suppress structural damage due to high cycle fatigue that reduce operations and support costs and provide higher aircraft availability. Continue development of durability patches for structures experiencing premature failure due to high cycle fatigue. Continue technology improvements of airframe structual vibration suppression techniques which delay the onset of high cycle fatigue failures.
(U)	$5,448	Develop and demonstrate new control techniques to enable safe, highly autonomous mixed-fleet and multi-unmanned air vehicle operations for increased combat effectiveness. Continue unmanned aerospace vehicle development to ensure safe operation and allow precision close

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 02 - Applied Research	PE NUMBER AND TITLE 0602201F Aerospace Flight Dynamics	PROJECT 622401

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

operations of mixed manned and unmanned air vehicles. Develop adaptive flight control algorithms for autonomous vehicle operations. Initiate development of advanced system for automatic Unmanned Air Vehcile (UAV) in-flight refueling.

(U) $1,828 Continue development of composite and metallic concepts that reduce manufacturing costs of future air vehicles. Initiate development of Analytical Certification Methodologies for unitized structures to ensure transition of advanced concepts and manufacturing processes to future airframe designs. Continue development of integrated multidisciplinary design methodologies that enhance affordability and decrease vulnerability of future aerospace vehicles.

(U) $3,163 Develop new flight control design methods and criteria that provide air combat advantage by increasing performance and decreasing vulnerability and cost. Initiate 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.

(U) $3,343 Develop advanced flight control technology to enable aircraft-like operations for affordable on-demand military access to space. Develop technology concepts for integration of vehicle management system with vehicle health management/prognostics. Complete aerospace vehicle requirements definition study and conceptual design.

(U) $2,879 Continue development of a signature-compatible, integrated high lift device that will improve aerodynamic performance and survivability with lower cost of ownership than conventional flight control devices. Perform analytical design of subscale aerospace vehicle model for future powered testing and analysis.

(U) $3,786 Develop computational tools and techniques for predicting and optimizing aerodynamic and structural performance of advanced manned and unmanned aerospace vehicles. Continue development of next generation, multi-disciplinary optimization computer design code integrating aerodynamics, structures, thermal mangement, signatures, and flight controls. Complete 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 UAVs.

(U) $5,107 Develop and demonstrate affordable aerospace vehicle aerodynamic technologies that increase aerospace vehicle peformance. Initiate 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 Evaluate 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. Initiate development of full wing span structurally integrated with a low frequency multifunctional antenna to increase radio frequency performance and reduce weight.

(U) $3,155 Improve 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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 02 - Applied Research	PE NUMBER AND TITLE 0602201F Aerospace Flight Dynamics	PROJECT 622401

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

life of aerospace vehicle structures. Concepts under development consist of design, fabrication, and assessment of high temperature composite and metallic aerospace vehicle structures.

(U) $9,236 Investigate modification and repair techniques to retrofit fail-safety into aging aircraft to increase availability and reduce operations and support costs. Develop composite and metallic bonded repair techniques which provide for damage tolerance where none now exists. Investigate low-cost structrual modifications to aging systems which provide fail-safety in critical areas of the aircraft.

(U) $2,996 Develop advanced analytical methods for analysis of unitized structures and certification of structural components which reduce development time and cost of aircraft. Initiate exploration of damage initiation and propagation models for unitized metallic structure. Develop analytical methods for certification of aging aircraft repairs and structural modifications.

(U) $47,489 Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:
(U) PE 0602102F, Materials
(U) PE 0602269F, Hypersonic Technology Development.
(U) PE 0603211F, Aerospace Structures
(U) PE 0603112F, Advanced Materials for Weapon Systems
(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: February 2000

BUDGET ACTIVITY: 02 - Applied Research

PE NUMBER AND TITLE: 0602201F Aerospace Flight Dynamics

PROJECT: 622402

COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
622402 Vehicle Equipment	10,957	3,739	0	0	0	0	0	Continuing	TBD

(U) A. Mission Description

This project develops technologies to reduce subsystem and component life cycle costs in operational environments and improves subsystem performance for current and future manned and unmanned aerospace vehicles.

(U) FY 1999 ($ in Thousands)

(U) $2,590 Developed and assessed component combat damage repair technologies, deflagration suppression techniques, and hydrodynamic ram tolerance techniques that decrease aerospace vehicle vulnerability. Techniques developed include analytical tools to define and reduce vulnerability to missile and ballistic threats on critical components. Developed and validated new criteria for selecting deflagration suppression techniques in internal munitions bays and engine nacelles.

(U) $1,788 Developed and evaluated affordable subsystem technologies that enhance aerospace vehicle safety and reliability, and reduce cost. Completed a study to assess the feasibility of applying electric actuation to utility subsystems to reduce aircraft maintenance costs. Initiated a program to develop technologies required to apply electric actuation to manned and unmanned aerospace vehicles.

(U) $4,502 Developed and evaluated designs for affordable structural life for an increase in maintenance/durability of existing and future aerospace vehicles. Designs included noise suppression techniques as well as development of composite repair process for damaged or cracked components.

(U) $2,077 Developed and assessed technologies for aerospace vehicle internal energy management systems to reduce cost and weight. Completed development of a full-scale advanced composite material heat exchanger to demonstrate a 50% reduction in heat exchanger weight.

(U) $10,957 Total

(U) FY 2000 ($ in Thousands)

(U) $1,035 Develop and assess component combat damage repair technologies, deflagration suppression techniques, and hydrodynamic ram tolerance techniques that decrease aerospace vehicle vulnerability. Techniques to be developed include analytical tools to define and model hydrodynamic ram effects on composite fuel tanks.

(U) $767 Develop and evaluate process for affordable structural life for an increase in maintenance/durability of existing and future aerospace vehicles. Process includes noise suppression techniques as well as development of a composite repair process for damaged or cracked components.

(U) $153 Develop and assess affordable subsystem technologies that enhance aerospace vehicle safety and reliability and reduce cost. Continue to develop and assess technologies required to apply electric actuation to manned and unmanned aerospace vehicles.

(U) $1,784 Develop and assess technologies for aerospace vehicle energy management systems and components to reduce vehicle size and weight by

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 02 - Applied Research	PE NUMBER AND TITLE 0602201F Aerospace Flight Dynamics	PROJECT 622402

(U) A. Mission Description Continued

(U) FY 2000 ($ in Thousands) Continued

developing high efficiency, lightweight thermal energy components and advanced heat transport techniques.

(U) $3,739 Total

(U) FY 2001 ($ in Thousands)

(U) $0 Effort moved to Project 622401.

(U) $0 Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0603106F, Logistics Systems Technology.

(U) PE 0603205F, Flight Vehicle Technology.

(U) PE 0603245F, Flight Vehicle Technology Integration.

(U) PE 0604212F, Aircraft Equipment Development.

(U) PE 0604609F, Reliability and Maintainability Technology Insertion 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: February 2000

BUDGET ACTIVITY: 02 - Applied Research

PE NUMBER AND TITLE: 0602201F Aerospace Flight Dynamics

PROJECT: 622403

COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
622403 Flight Controls and Pilot-Vehicle Interface	16,733	12,194	0	0	0	0	0	Continuing	TBD

(U) A. Mission Description

This project develops technology to enable the pilot to obtain maximum performance from aerospace vehicles under all conditions, provide the pilot with the display of information from on-board subsystems and off-board intelligence sources for increased situational awareness leading to enhanced mission performance and flight safety, provide robust capability to control aircraft after damage and failures, and network synthetic environments for evaluation of advanced concepts. This project develops flight control technologies for both manned and unmanned aerospace vehicles.

(U) FY 1999 ($ in Thousands)

(U) $4,254 Developed and demonstrated advanced flight control techniques for manned and unmanned aerospace vehicles to provide air combat advantage by increasing performance while decreasing vulnerability, cost, and supportability requirements. Continued to develop flight test hardware of optical air data system that eliminates need for non-stealthy, expensive air data probes, vanes, and ports. Initiated development of advanced vehicle management system that exploits photonics to improve manned and unmanned aerospace vehicles subsystem communication data rates and life cycle upgrade potential.

(U) $4,345 Developed new flight control design methods and criteria that provide air combat advantage by increasing performance and decreasing vulnerability and cost. Completed algorithm development for battle-damage resistant flight control system for manned and unmanned aerospace vehicles and initiated development of unsteady aerodynamic modeling techniques for use in flight control system design.

(U) $1,938 Developed enhanced vehicle-pilot integration technologies to improve overall weapon systems performance and exploit real-time on-board/off-board data for human-machine technology interface. Specific technologies included advanced pilot air-to-air situation awareness and integrated technologies for in-flight mission planning and automated low-level flight.

(U) $3,318 Developed capabilities to evaluate technologies for increased aerospace vehicle performance, decreased vulnerability and cost, and improved probability of mission success. Initiated simulations to assess new unmanned aerospace vehicle technologies and confirm mission effectiveness and flight safety.

(U) $2,878 Initiated areodynamic control technology development that addresses the automatic maneuvering of unmanned aerospace vehicles in the terminal area to improve flight safety and combat effectiveness.

(U) $16,733 Total

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 02 - Applied Research	PE NUMBER AND TITLE 0602201F Aerospace Flight Dynamics	PROJECT 622403

(U) A. Mission Description Continued

(U) FY 2000 ($ in Thousands)

(U)	$3,197	Develop and demonstrate advanced flight control techniques for manned and unmanned aerospace vehicles to provide air combat advantage by increasing performance while decreasing vulnerability, cost, and supportability requirements. Complete flight demonstration of optical air data system and transition the capability to user. Continue development of advanced vehicle management system architecture concepts and identify key component demonstrations.
(U)	$2,813	Develop new flight control design methods and criteria that provide air combat advantage by increasing performance and decreasing vulnerability and cost. Complete algorithm development for on-board pilot-induced oscillation prevention.
(U)	$2,451	Develop capabilities to evaluate technologies for increased aerospace vehicle performance and decreased vulnerability and cost, and improved probability of mission success. Conduct mission technology assessments for manned vehicles and unmanned aerospace vehicles; determine design guides for effective mission management systems. Conduct aerospace vehicle technology simulations and identify controllability boundaries for safe aerospace vehicles flight.
(U)	$3,733	Continue to develop control technology for the autonomous maneuvering of unmanned aerospace vehicles in the terminal area to improve flight safety and combat effectiveness. Develop and integrate high integrity, four-dimensional precision trajectory generation and control algorithms. Continue autonomous flight control research in automated air collision avoidance, key laboratory demonstrations of lightweight photonic technologies, and identification of transatmospheric and aerospace vehicle control technologies for aircraft-like operations.
(U)	$12,194	Total

(U) FY 2001 ($ in Thousands)

(U)	$0	Effort moved to Project 622401.
(U)	$0	Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:
(U) PE 0602202F, Human Effectiveness Applied Research.
(U) PE 0602204F, Aerospace Sensors
(U) PE 0603205F, Flight Vehicle Technology.
(U) PE 0603245F, Flight Vehicle Technology Integration.
(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE
	February 2000

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
02 - Applied Research	0602201F Aerospace Flight Dynamics	622403

(U) D. Acquisition Strategy

Not Applicable.

(U) E. Schedule Profile

(U) Not Applicable.

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

DATE: February 2000

BUDGET ACTIVITY: 02 - Applied Research

PE NUMBER AND TITLE: 0602201F Aerospace Flight Dynamics

PROJECT: 622404

COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
622404 Aeromechanics and Integration	15,034	8,824	0	0	0	0	0	Continuing	TBD

(U) A. Mission Description

This project develops aerodynamic design integration technologies for current and future manned and unmanned aerospace flight vehicles, focusing on speed regimes ranging from low to high Mach. These technologies have potential to reduce costs, improve range to yield enhanced global force projection, improve maneuverability, and reduce observability. This project evaluates and develops technologies for manned and unmanned aerospace vehicles and aerospace vehicle design assessment and analysis tools.

(U) FY 1999 ($ in Thousands)

(U) $4,324 Conducted aerodynamic design, analysis, test, and performance assessments of advanced manned and unmanned aerospace vehicles consistent with signature and cost constraints. Performed validation tests of innovative aerodynamic control concepts for low signature, manned and unmanned aerospace vehicles.

(U) $3,788 Developed computational tools and techniques for predicting and optimizing aerodynamic and structural performance of advanced manned and unmanned aerospace vehicles. Continued development of computer design code addressing fluid/structural interactions. Initiated development of next generation, multi-disciplinary optimization computer design code integrating aerodynamic, structural, signature, and other scientific disciplines.

(U) $4,299 Developed and demonstrated affordable fixed-wing vehicle aerodynamic technologies to increase aerospace vehicle performance and decreased vulnerability. Initiated development of aerodynamic and structural integration including flow control in payload bays.

(U) $2,623 Developed conceptual designs and assessed technologies to determine impacts of integrating directed energy systems such as high power microwaves, high energy lasers, and kinetic energy weapons into aerospace vehicles.

(U) $15,034 Total

(U) FY 2000 ($ in Thousands)

(U) $1,331 Conduct aerodynamic design, analysis, test, and performance assessments of advanced tactical transport aircraft and aerospace vehicles consistent with signature and cost constraints.

(U) $3,386 Develop computational tools and techniques for predicting and optimizing aerodynamic and structural performance of advanced manned and unmanned aerospace vehicles. Complete development of computer design code addressing fluid/structural interactions. Continue development of next generation, multi-disciplinary optimization computer design code integrating aerodynamic, structural, signature, and other scientific disciplines

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 02 - Applied Research	PE NUMBER AND TITLE 0602201F Aerospace Flight Dynamics	PROJECT 622404

(U) A. Mission Description Continued

(U) FY 2000 ($ in Thousands) Continued

(U)	$4,107	Develop and demonstrate affordable fixed-wing vehicle aerodynamic technologies to increase aerospace performance and decrease vulnerability. Continue development of aerodynamic and structural integration including flow control in payload bays.
(U)	$8,824	Total

(U) FY 2001 ($ in Thousands)

(U)	$0	Effort moved to Project 622401.
(U)	$0	Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:
(U) PE 0603205F, Flight Vehicle Technology.
(U) PE 0603260F, Hypersonic Technology Development
(U) PE 0603245F, Flight Vehicle Technology Integration.
(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: February 2000

BUDGET ACTIVITY: 02 - Applied Research

PE NUMBER AND TITLE: 0602201F Aerospace Flight Dynamics

PROJECT: 624397

COST ($ in Thousands)	FY 1999 Actual	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
624397 Air Base Technology	1,292	1,439	1,286	685	2,196	2,126	2,391	Continuing	TBD

(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 1999 ($ in Thousands)

(U) $568 Developed aircraft and air base fire fighting technologies (e.g., clean, environmentally safe fire fighting agents, vehicles, equipment, personnel protective clothing, fire risk assessment technologies, and fire fighting training systems) and improved fire fighting rescue technology with infrared imaging.

(U) $543 Developed utility and shelter technologies that improve air mobility systems performance and reduce airlift requirements. Developed a waste management system, in support of Air Expeditionary Force (AEF) operations.

(U) $181 Evaluated and developed air transportable shelters that are lightweight and suitable for AEF operations.

(U) $1,292 Total

(U) FY 2000 ($ in Thousands)

(U) $579 Develop aircraft and air base fire fighting technologies to improve fire fighting rescue using infrared sensor technology. Test safe fire fighting agents. Develop protective clothing, fire risk assessment technologies, and fire fighting training systems.

(U) $742 Develop utilities and shelters technologies that improve air mobility systems performance and reduce airlift requirements. Develop advanced waste management technologies that are lightweight and support of AEF operations.

(U) $118 Evaluate air transportable shelters that are lightweight and suitable for AEF operations. Develop air transportable shelter technologies for aircraft and flightline personnel.

(U) $1,439 Total

(U) FY 2001 ($ in Thousands)

(U) $526 Develop aircraft and air base fire fighting technologies to improve fire fighting rescue. Test new fire fighting agents that are non-corrosive and are not harmful to fire fighting personnel. Continue testing of advanced autonomous technologies for use in flightline fire fighting trucks.

(U) $672 Develop utilities, automation, and waste management technologies that reduce airlift requirements and improve air base operations and survivability for agile combat support. Begin evaluation of new ground power generation concepts that are highly efficient and lightweight.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)		DATE February 2000
BUDGET ACTIVITY 02 - Applied Research	PE NUMBER AND TITLE 0602201F Aerospace Flight Dynamics	PROJECT 624397

(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued

(U)	$88	Evaluate air transportable protective shelter technologies that are lightweight, structurally strong, and are affordable and suitable for Air Expeditionary Force operations. Continue technology demonstration program for lightweight air inflatable shelters for aircraft and flightline personnel.
(U)	$1,286	Total

(U) B. Project Change Summary

Not Applicable.

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

(U) Related Activities:

(U) PE 0603205F, Flight Vehicle Technology.

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