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

DATE: June 2001

BUDGET ACTIVITY: 03 - Advanced Technology Development

PE NUMBER AND TITLE: 0603202F Aerospace Propulsion Subsystems Integration

PROJECT: 668A

COST ($ in Thousands)		FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
668A	Aircraft Propulsion Subsystem Integration	18,912	34,619	0	0	0	0	0	0	Continuing	TBD
	Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

Note: In FY 2002, the efforts performed under this program will be shifted to PE 0603216F, Aerospace Propulsion and Power Technology, Project 4921, in order to align projects with the Air Force Research Laboratory organization.

(U) A. Mission Description

This project develops and demonstrates gas turbine propulsion technologies applicable to a broad range of aircraft. The Aircraft Propulsion Subsystem Integration (APSI) project includes demonstrator engines such as the Joint Technology Demonstrator Engine for manned systems and the Joint Expendable Turbine Engine Concept for unmanned air vehicle and cruise missile applications. The APSI demonstrator engines integrate the core (high-pressure spool) technology developed under the Advanced Turbine Engine Gas Generator with the engine (low-pressure spool) technology such as fans, turbines, engine controls, and exhaust nozzles. This project also focuses on integration aspects of inlets, nozzles, engine/airframe compatibility, and low-observable technologies. APSI will provide enabling technology for increasing aircraft range and cruise speed with lower specific fuel consumption; surge power for successful engagements; high sortie rates with reduced maintenance; reduced life cycle cost; and improved survivability resulting in increased mission effectiveness. The APSI project supports the goals of the Integrated High Performance Turbine Engine Technology (IHPTET) program, which is focused on doubling 1987 turbine engine propulsion capabilities by 2005 while reducing cost of ownership. The IHPTET program provides continuous technology transition for military turbine engine upgrades and derivatives, and has the added dual-use benefit of enhancing the United States turbine engine industry's international competitiveness. Technology innovations developed in this project are applicable to current and future Air Force turbine engines. Note: In FY 2001, Congress added $0.5 million for IHPTET.

(U) FY 2000 ($ in Thousands)

(U) $4,200 Designed, fabricated, and demonstrated durability and integration technologies for turbofan/turbojet engines for improved supportability and affordability of current and future Air Force aircraft. Initiated engine testing in support of the national High Cycle Fatigue (HCF) program including fan blade damage tolerance, frangible bearings, prognostics and health management, and turbine engine explosive blade out concept demonstration.

(U) $11,225 Designed, fabricated, and tested advanced component technologies for improved performance and fuel consumption of turbofan/turbojet engines for fighters, bombers, and transports. Completed advanced engine designs for fixed inlet guide vanes and Moderate Aspect Ratio (MAR) rotor, Integrally Bladed Rotor (IBR) repair, fan rim damper, high cycle fatigue (HCF) mistuning technologies, vaneless counterrotating high/low

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(U) A. Mission Description Continued

(U) FY 2000 ($ in Thousands) Continued

pressure turbine (LPT), probabilistic rotor system design, gamma titanium aluminide LPT coverplate, sprayform cast hardware, and Ceramic Matrix Composite (CMC) technologies. Initiated advanced engine designs for High Cycle Fatigue (HCF) robust front frame, two-stage forward swept fan, tiled low pressure turbine (LPT) blade, uncooled CMC LPT blade, and model-based control with diagnostics. All of these technology innovations are applicable to a significant part of the current Air Force inventory as well as future turbine engines.

(U) $3,487 Designed, fabricated, and tested advanced component technologies for improved performance, durability, and affordability of engines for missile and uninhabited air vehicle applications. Completed engine testing of shrouded forward swept fan, low-cost ceramic hot section, low-cost rapid prototyping and high-speed machining, hybrid ceramic bearings, and high temperature transpiration cooled combustor. Initiated design of Organic Matrix Composite (OMC) fan, high stage loading splittered fan, uncooled ceramic high/low pressure turbine, and slinger combustor.

(U) $18,912 Total

(U) FY 2001 ($ in Thousands)

(U) $5,310 Design, fabricate, and demonstrate durability and integration technologies for turbofan/turbojet engines for improved supportability and affordability of current and future Air Force aircraft. Complete engine testing in support of the national HCF program, including fan blade damage tolerance, frangible bearings, prognostics and health management, and turbine engine explosive blade out concept demonstration.

(U) $22,109 Design, fabricate, and test advanced component technologies for improved performance and fuel consumption of turbofan/turbojet engines for fighters, bombers, and transports. Fabricate and full-demonstrator engine test fixed inlet guide vanes and moderate aspect ratio rotor, Integrally Bladed Rotor (IBR) repair, fan rim damper, HCF mistuning technologies, vaneless counterrotating high/low pressure turbine, probabilistic rotor system design, gamma titanium aluminide LPT coverplate, sprayform cast hardware, and CMC technologies. Continue advanced engine designs for HCF robust front frame, two-stage forward swept fan, tiled LPT blade, uncooled CMC LPT blade, and model-based control with diagnostics. All of these technologies are applicable to a significant part of the current Air Force inventory as well as future turbine engines.

(U) $4,695 Design, fabricate, and test advanced component technologies for improved performance, durability, and affordability of engines for missile and uninhabited air vehicle applications. Continue design of OMC fan, high stage loading splittered fan, uncooled ceramic high/low pressure turbine, and slinger combustor.

(U) $2,005 Design, develop, and test integrated propulsion designs to demonstrate performance and durability of advanced hypersonic propulsion concepts in support of Defense Advanced Research Projects Agency (DARPA) missile demonstration. Fabricate and test flight type scramjet engine. Document engine performance and structural durability.

(U) $500 Design a low volume, high temperature and pressure combustor. Evaluate performance in cruise missile or uninhabited air vehicle applications.

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(U) A. Mission Description Continued

(U) FY 2001 ($ in Thousands) Continued
(U) $34,619 Total

(U) FY 2002 ($ in Thousands)
(U) $0 Efforts moved to PE 0603216F, Project 4921.
(U) $0 Total

(U) B. Budget Activity Justification

This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing system upgrades and/or new system developments that have military utility and address warfighter needs.

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

		FY 2000	FY 2001	FY 2002	Total Cost
(U)	Previous President's Budget (FY 2001 PBR)	19,586	34,440	32,161	
(U)	Appropriated Value	19,825	34,940		
(U)	Adjustments to Appropriated Value				
	a. Congressional/General Reductions	-2			
	b. Small Business Innovative Research	-467			
	c. Omnibus or Other Above Threshold Reprogram				
	d. Below Threshold Reprogram	-237			
	e. Rescissions	-207	-321		
(U)	Adjustments to Budget Years Since FY 2001 PBR			-32,161	
(U)	Current Budget Submit/FY 2002 PBR	18,912	34,619	0	TBD

(U) Significant Program Changes:

Note: In FY 2002, the efforts performed under this program will be shifted to PE 0603216F, Aerospace Propulsion and Power Technology, Project 4921.

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

(U) Related Activities:
(U) PE 0602203F, Aerospace Propulsion.
(U) PE 0603112F, Advanced Materials for Weapon Systems
(U) PE 0603216F, Aerospace Propulsion and Power Technology.
(U) PE 0602122N, Aircraft Technology
(U) PE 0603217N, Air Systems Advanced Technology Demonstration.
(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) E. Acquisition Strategy

Not Applicable.

(U) F. Schedule Profile

(U) Not Applicable.