ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2005

BUDGET ACTIVITY
3 - Advanced technology development

PE NUMBER AND TITLE
0603003A - AVIATION ADVANCED TECHNOLOGY

	COST (In Thousands)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
	Total Program Element (PE) Cost	73072	96465	48318	67154	93010	101133	108067	103719
313	ADV ROTARYWING VEH TECH	43737	50659	34828	53022	63819	64973	69717	65460
435	AIRCRAFT WEAPONS	937	3881	3916	3215	4077	4969	4877	4972
436	ROTARYWING MEP INTEG	4672	5618	1921	2841	16654	22606	23714	23165
447	ACFT DEMO ENGINES	6652	6877	7653	8076	8460	8585	9759	10122
B97	A/C AVIONICS EQUIPMENT	4329	0	0	0	0	0	0	0
BA7	AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)	7783	25692	0	0	0	0	0	0
BA8	VECTORED THRUST DUCTED PROPELLER (CA)	4962	3738	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: The Aviation Advanced Technology Development program element (PE) matures and demonstrates manned and unmanned rotary wing vehicle (RWV) technologies and systems in support of the Future Force and Joint Vision 2020, and, where feasible, exploits opportunities to enhance Current Force capabilities. Based on the Army Transformation, this PE investigates technologies applicable to all aviation systems, both manned and unmanned, while providing opportunities for technology insertion into the Current Force systems. Unmanned rotary wing vehicles bring unprecedented agility, maneuverability, and lethality to the Future Force while providing improved survivability and reduced sustainment costs. Within this PE, aviation technologies will be matured and integrated into realistic and robust demonstrations. Emphasis will be placed on maturing manned and unmanned teaming in combat and combat support operations for attack, reconnaissance, air assault, survivability, and command and control missions. Components and subsystems that enable increased system survivability, platform lift, maneuverability, agility, and endurance; autonomous flight; common mission equipment architecture; full spectrum effects; team-based intelligent mission operations; and manned / unmanned battlespace integration will be demonstrated. Major efforts within this PE include the A-160 Hummingbird component maturation and flight demonstrations; manned-unmanned system teaming demonstrations; manned-unmanned common architecture maturation; joint heavy lift concept exploration and full-spectrum aircraft survivability. This PE also supports the maturation and demonstration of major aviation subsystems in propulsion, drive-trains, aeromechanics and flight controls for future force manned and unmanned aviation systems in accordance with the Army Aviation Transformation Plan. Projects B97, BA7, and BA8 fund Congressional interest items. Upgrade activities of Department of Defense (DoD) systems such as the AH-64 Apache, UH-60 Black Hawk, CH-47 Chinook; the U.S. Navy SH-60 Seahawk; and U.S. Marine Corps V-22 Osprey, AH-1 Cobra and CH-53 Super Stallion are supported by this PE. Related applied research is conducted under PE 0602211A (Aviation Technology). Aircraft survivability efforts in this PE are coordinated with PE 0603313A (Missile and Rocket Advanced Technology) and PE 0603270A (Electronic Warfare Technology). Efforts under this PE transition to programs supported by PE 0603801A (Aviation - Advanced Development), PE 0604801A (Aviation - Engineering Development) and PE 0604270A

(Electronic Warfare Development). This PE does not duplicate any efforts within the Military Departments and supports Project Reliance for which the Army is the lead service for the maturation of rotorcraft science and technology. The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this PE is performed by the Aviation Applied Technology Directorate of the Aviation and Missile Research, Development and Engineering Center located at Fort Eustis, VA.

B. Program Change Summary	FY 2005	FY 2006	FY 2007
Previous President's Budget (FY 2005)	69549	90566	106966
Current Budget (FY 2006/2007 PB)	96465	48318	67154
Total Adjustments	26916	-42248	-39812
Net of Program/Database Changes			
Congressional Program Reductions	-1123		
Congressional Rescissions			
Congressional Increases	30700		
Reprogrammings			
SBIR/STTR Transfer	-2661		
Adjustments to Budget Years		-42248	-39812

Change Summary Explanation:
FY06 - Funds realigned ($42248K) to higher priority requirements.
FY07 - Funds realigned ($39812K) to higher priority requirements.

Eight FY05 Congressional adds totaling $30700 were added to this PE.

FY05 Congressional Adds with no R-2A:
($5754) Excaliber Tact UCAV, Project BA7: The purpose of this one year Congressional add is to fund research on the Excaliber Tact UCAV.

No additional funds are required to complete this project.

($2876) Locust USA Heavy Fuel Burning Engines for UAVs, Project BA7: The purpose of this one year Congressional add is to mature a small heavy fuel engine for UAV application and to further address scalability of the design. No additional funding is required to complete this project.

($5754) Process Technologies for Replacement Part Production, Project BA7: The purpose of this one year Congressional add is to fund research on process technologies for replacement part production.

($1247) Reconfiguration Tooling System, Project BA7: The purpose of this one year Congressional add is to demonstrate a reconfigurable tooling system capable of delivering a complete composite repair system that incorporates tool creation and composite curing for rapid repair and replacement of mission critical parts at the depot level. No additional funding is required to complete this project.

($4700) UAV and Micro Air Vehicle Dynamometer, Project BA7: The purpose of this one year Congressional add is to modify the current air dynamometer designs to enable testing of UAV engines on the Army's existing equipment and to explore alternative compression systems for dynamometer / engine applications. No additional funding is required to complete this project.

($3739) Vectored Thrust Ducted Propeller (VTDP) Compound Helicopter Program, Project BA8: The purpose of this one year Congressional add is to assess the potential for a VTDP helicopter to improve the speed, range and survivability of a UH-60 Black Hawk helicopter while reducing ownership cost. No additional funding is required to complete this project.

($4123) Wideband Network Enhancement for Joint Ground Force Interoperability, Project BA7: The purpose of this one year Congressional add is to fund research on a wideband network enhancement for joint ground force interoperability. No additional funds are required to complete this project.

($1247) Wiring Traceout for Joint Aviation Technical Data Integration, Project BA7: The purpose of this one year Congressional add is to fund research on a wiring traceout for joint aviation technical data integration. No additional funds are required to complete this project.

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603003A - AVIATION ADVANCED TECHNOLOGY**	**313**

COST (In Thousands)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
313 ADV ROTARYWING VEH TECH	43737	50659	34828	53022	63819	64973	69717	65460

A. Mission Description and Budget Item Justification: The Advanced Rotary Wing Vehicle (RWV) Technology project matures and demonstrates rotary wing manned and unmanned platform technologies for the Future Force, and, where feasible, exploits opportunities to enhance Current Force capabilities. It is envisioned that the Future Force will require rotorcraft systems that have significantly increased / improved lift, range, survivability, and mission capability with an overall reduction in logistics and cost of operation. The critical technologies to support these capabilities will be matured through demonstration of prototype UAVs, rotors, active controls, structures, drive-train, integrated architecture and threat protection. The near-term demonstration of VTOL UAVs will focus on the A-160 Hummingbird for Reconnaissance, Surveillance and Target Acquisition (RSTA) capability. The A-160 Hummingbird program is a collaborative effort between the Army, the Defense Advanced Research Projects Agency (DARPA), and the U.S. Special Operations Command. These demonstrations will focus on military operations and achieving military specifications for these maturing systems. The integration of technology into UAV and manned teaming operations will be demonstrated through the merging of common operating architecture and team survivability. The Manned Unmanned Common Architecture Program (MCAP) will enable the manned and unmanned teams to use low cost modular, commercial-off-the-shelf electronics and open systems interface standards for advanced mission processing. The Survivable, Affordable, Reparable Airframe Program (SARAP) will reduce weight and increase the survivability for both manned and unmanned systems. The Rotorcraft Drive Systems for the 21st Century (RDS21) program will provide a 35% increase in power-to-weight ratio, 20% reduction in both production and Operating and Support (O&S) costs and a 12 decibel (dB) reduction in noise for the drive-systems of both manned and unmanned rotorcraft. These technologies are a significant contributor to Future Force capability and will enable a 40% increase in payload for the AH-64 Apache, a 20% increase in range for the UH-60 Black Hawk, and over a 25% increase in range for the CH-47 Chinook. The Active/Passive Aircraft Survivability program will reduce infrared signatures by up to 75%, incorporate innovative directional IR jamming, small arms and RPG hostile fire warning, threat location cueing and eye-safe visual dazzler components to improve aircraft survivability by at least 50% against small arms, RPG and MANPADS threats. This project also supports Concept Exploration of a Joint Heavy Lift platform. This effort will assess the technologies and system design trades to enable FCS vertical maneuver and Naval sea-basing. The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this project is performed by the Aviation Applied Technology Directorate of the Aviation and Missile Research, Development and Engineering Center located at Fort Eustis, VA.

Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
Integrated UAV Operations – [Includes the Airborne Manned Unmanned System Technology (AMUST), the Manned Unmanned Common Architecture Program (MCAP), and the Unmanned Autonomous Collaborative Operations (UACO) program] - AMUST: In FY04, completed detailed decision aiding and UAV control designs on both the AH-64D Longbow Apache and Army Airborne Command and Control System (A2C2S) UH-60 Black Hawk. Completed development of UAV control capability in both aircraft and conduct flight tests. MCAP: In FY04, completed detailed architecture designs on the AH-64D Longbow Apache. Initiated system level demonstrations of common architecture between manned and unmanned rotorcraft. Conducted flight tests and performed data analysis and published systems architecture documentation. In FY05, complete software development environment, mission processing architecture, avionics integration laboratory at the contractor facility, on-aircraft ground tests, and flight tests on an AH-64D Apache Longbow. Conduct laboratory tests of the unmanned air vehicle embedded mission processing architecture in a Shadow 200 and complete software architecture design and development. In FY06, will publish final architecture design documentation. UACO: In FY04, completed Concept Definition study for Class II UAVs and UGVs to support cooperative engagement. In FY05, award UACO contract and begin development of advanced autonomy and collaboration algorithms for UAVs. Design demonstration system and integrate and test mission equipment hardware and autonomy/collaboration enabling software. In FY06, will complete development of UAV advanced autonomy and collaboration algorithms. Will also complete Control Stations and Vehicle Systems integration, checkout and preliminary flight evaluation. In FY07, will complete final demonstration of Air-Ground Cooperative Engagement using multiple autonomous UAVs and UGVs at the McKenna MOUT site.	12891	7585	6135	1874

Accomplishments/Planned Program (continued)	FY 2004	FY 2005	FY 2006	FY 2007
A-160 Hummingbird - In FY04, conducted system flight-testing to test-fix-test airframe and components at gross weights up to 4,000 pounds and altitudes up to 5,000 feet. Conducted component level environmental testing. Reviewed A-160 flight test results, including initial mission equipment package (MEP) integration with electro optical and infrared (EO/IR) sub-systems. Validated A-160 baseline configuration and capabilities by showing results are consistent with performance predictions. In FY05, conduct A-160 continuous air vehicle system flight tests at gross weights up to 5,000 pounds, altitudes up to 20,000 feet, and up to 100% rotor speeds. Integrate Commercial-Off-The-Shelf turbine engine. Refine the A-160 Ground Control Station, airframe and mission equipment packages, to include EO/IR flight demonstrations with up to four A-160 vehicles. Define parameters for increased system and airframe autonomy. Investigate A-160 flight and performance parameters through full scale wind tunnel testing and evaluation. Validate that A-160 revised configuration and capabilities meets performance predictions. Testing will include approximately 600 flight test hours. In FY06, will expand A-160 flight envelope and improve vehicle reliability, with flights of 10-20 hours in duration at an increased operational tempo (OPTEMPO). Will demonstrate flight with turbine engine; establish a baseline configuration for Army user; refine and integrate existing design; and conduct extensive flight tests using A-160 Ground Control Station. Testing will include approximately 700 flight test hours. In FY07, will fly A-160 vehicle in OPTEMPO consistent with goals of 3 flights per week with of about 8 hours per flight. Will conduct flights over 20 hours endurance. Will conduct extensive flight-testing of Army baseline model and multiple vehicles under single ground station control. Will demonstrate representative MEP. Testing will include approximately 700 flight test hours.	10000	22829	17193	34768
Active / Passive Aircraft Survivability program - In FY05, design and ground demonstrate, on a full-scale engine test stand, an adaptive IR suppressor system that reduces engine signatures by 75% while providing an additional 3% increase in engine performance relative to current IR suppressor systems. A 3% power increase on an AH-64 Apache helicopter translates into approximately 530 lbs of additional lift capability. In FY06, will integrate and demonstrate adaptive IR suppressors, super lightweight thermal insulation and multi-spectral coatings to achieve up to 75% reduction in total aircraft IR signature. In FY07, will design and flight demonstrate an integrated hostile fire warning, visual cueing and visual dazzler system that reduces small arms and RPG pointing accuracy by 50%.	0	2000	4500	8000

Accomplishments/Planned Program (continued)	FY 2004	FY 2005	FY 2006	FY 2007
Rotorcraft Structures [Includes the Survivable, Affordable Repairable Airframe Program (SARAP)] - In FY04, conducted major effort of SARAP with manned and unmanned rotary-wing virtual prototype models and simulations. Implemented predictive risk management process to select highest payoff technologies for full-scale development and demonstration. Validated probabilistic building block qualification methodology. Modeled and simulated ballistic and rocket propelled grenade (RPG) threats and structure vulnerability. In FY05, fabricate virtual prototype (full digital definition and simulations/models) validation hardware for ballistic, static, and crash testing. Validate manned and unmanned virtual prototype models and simulations with full-scale hardware fabrication and test to improve weight, cost, supportability, and survivability. Conduct full-scale hardware ballistic, static, fatigue, and crash testing to validate virtual prototype models and simulations. In FY06, will transition SARAP structural technologies, concepts, and methodologies to current and developmental manned and unmanned rotary wing systems such as UH-60 Black Hawk, CH-47 Chinook, CH-53 Super Stallion, and A-160 Hummingbird.	9891	4193	1000	0
Drive Train [Includes the Rotorcraft Drive System for the 21st Century (RDS21) program] - In FY04, fabricated full-scale test hardware and full-scale RDS21 split torque/face gear demonstration hardware and composite housing. Assembled gear box in preparation for goal demonstration. Conducted preliminary rig tests of component hardware and gears. In FY05, conduct goal demonstration testing (weight/durability/noise) of RDS21 demonstrator at two industry test sites. Complete design, advanced materials research and manufacturing techniques evaluation. Provide RDS21 technologies for potential integration onto AH-64D Apache Block III.	4955	6052	0	0
Drive Train [Includes the Enhanced Rotorcraft Drive System program] - In FY07, will develop baseline design of the Enhanced Rotorcraft Drive System applicable to the Joint Heavy Lift aircraft, as well as for upgrades to the Armed Reconnaissance Helicopter, UH-60 and the Mission Enhanced Little Bird, with goals of 40% increase in power to weight ratio, 15dB reduction in transmission noise, and 30% reduction in operating and sustainment costs.	0	0	0	2380
Slowed Rotor Demonstration. In FY04, demonstrated the principle of a slowed main rotor that is optimized for minimum drag, utilizing a vertical takeoff and landing gyro-copter.	1800	0	0	0

Accomplishments/Planned Program (continued)	FY 2004	FY 2005	FY 2006	FY 2007
Unmanned Combat Armed Rotorcraft (UCAR) - The UCAR program goal was to demonstrate an armed survivable VTOL UAV that could recognize dismounted infantry at >2 km; had a flyaway cost of $4-8M; and an operating and sustainment cost that was 20%-40% of Apache. Applied Research for UCAR was conducted in FY02 and FY03 within PE 0602211A Aviation Technology, at which point the effort transitioned into PE 0603003A. In FY04, completed UCAR Phase II, Preliminary Design. Industry teams identified best technical approaches considering mission effectiveness, lethality, system performance, autonomous operations, and command and control. Program was terminated upon completion of Phase II due to higher priorities.	4200	0	0	0
Joint Heavy Lift (JHL) - In FY05, will initiate Joint Concept of Operations Refinement and Aerial System Concept Design Analysis. Formulate Joint Integrated Product Teams for programmatic, technology, and requirements support. Will award up to four contracts to industry to explore design concepts. In FY06, will develop initial concept designs and assess performance characteristics relative to evolving joint requirements. Initiate a Joint Analysis of Alternatives (AoA). In FY07, will complete Concept Design Analysis and Configuration Assessments. Will complete the Joint AoA and develop a draft Capabilities Development Document.	0	8000	6000	6000
Totals	43737	50659	34828	53022

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3 - Advanced technology development	**0603003A - AVIATION ADVANCED TECHNOLOGY**	**435**

COST (In Thousands)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
435 AIRCRAFT WEAPONS	937	3881	3916	3215	4077	4969	4877	4972

A. Mission Description and Budget Item Justification: The Aircraft Weapons project matures manned and unmanned rotorcraft sensor and weaponization technologies for Future Force air-to-air and air-to-ground application, and, where feasible, exploits opportunities to enhance Current Force capabilities. This project supports the Future Force and Joint Vision 2020 by providing mature technologies to focus combat power on multiple targets. The technologies will provide precision engagement capabilities to meet the demands of Military Operations in Urban Terrain (MOUT), force protection, and other asymmetrical threats. This project includes integration of advanced missiles, rockets, guns, fire control, advanced target acquisition and pilotage sensors, and directed energy weapons, including non-lethal capabilities onto existing and developing airframes. These capabilities are evaluated to assure compatibility and demonstrate timely, precision engagement capabilities and the full spectrum effectiveness of the manned and unmanned team. Technology integration issues concerning on-board systems, vehicle flight characteristics and weapon system will be matured and demonstrated. The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this project is performed by the Aviation Applied Technology Directorate of the Aviation and Missile Research, Development and Engineering Center located at Fort Eustis, VA.

Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
Weapons Integration. [Includes the Aerial Delivery of Effects from Lightweight Aircraft (ADELA) program] - In FY04, provided support to Hunter Standoff Killer Team Advanced Concept Technology Demonstration to mature an Integrated Operational Picture system architecture for actively tasking sensor platforms and weapons. In FY05, initiate the Unmanned Light Armed Reconnaissance Testbed (ULART) program that leverages industry to convert a small helicopter into a robust VTOL UAV testbed with robust weapons potential and an on-board safety pilot as a safety backup. The ULART program will investigate: precision targeting and weapons delivery, limited coupling of weapon systems with vehicle management, understanding operator weapons interface issues, and manned/unmanned aircraft teaming. In FY06, ULART will investigate unmanned teaming and cueing for collaborative engagements and demonstrate integration of a variety of existing low-cost, lightweight sensors and weapons on small UAV platforms to aid in the delivery of full spectrum of effects in complex terrain under close support conditions. In FY07, will demonstrate tactical fire control, team situational awareness, modular weapon and sensor payloads, human-in-the-loop protocols and collaborative, teams-based weapons and precision targeting processes to demonstrate a Revenge Kill capability on small UAV platforms.	937	3881	3916	3215
Totals	937	3881	3916	3215

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603003A - AVIATION ADVANCED TECHNOLOGY**	**436**

COST (In Thousands)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
436 ROTARYWING MEP INTEG	4672	5618	1921	2841	16654	22606	23714	23165

A. Mission Description and Budget Item Justification: The Rotary Wing Mission Equipment Package Integration project matures and validates man-machine integration and mission equipment technologies in support of the Future Force, and, where feasible, exploits opportunities to enhance Current Force capabilities. This project improves the overall mission execution by demonstrating manned and unmanned system teaming, enhanced helicopter pilotage capability and improved crew workload distribution. This project supports the Future Force and Joint Vision 2020 by providing mature technology to enhance near-real time situational awareness for manned and unmanned rotary wing vehicles. This project supports the completion of the Hunter Standoff Killer Team through the Airborne Manned and Unmanned System Technology program that provides intelligent software and integrates advanced technologies in sensors, displays, communication and controls necessary to team airborne manned and unmanned vehicles to maximize the teams' lethality, survivability, and operational tempo in support of the maneuver commander. The manned / unmanned team will be capable of performing reconnaissance, surveillance, target acquisition and attack while maintaining constant tactical situation awareness. Integration of state-of-the-art approaches in artificial intelligence, intelligent agents, sensors, avionics, communications, pilot vehicle interfaces, and autonomous assistants will enable a manned-unmanned team that enhances Army aviation battlefield effectiveness. This project provides Cognitive Decision Aiding (CDA) tools for crews by maturing knowledge-based information systems. Advanced integration technology in information management, sensors, displays, and controls is optimized for combat helicopter mission effectiveness and survivability for day / night adverse weather operations. Virtual prototyping capability is used as the foundation for evaluating combined rotorcraft control and crew performance. The cited work is consistent with the Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this project is performed by the Aviation Applied Technology Directorate of the Aviation and Missile Research, Development and Engineering Center located at Fort Eustis, VA.

Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
Airborne Manned and Unmanned System Technology (AMUST) [Includes the Hunter Standoff Killer Team (HSKT) Advanced Concepts Technology Demonstration (ACTD)] - In FY04, matured system architecture for actively tasking UAV sensor platforms and systems from manned aircraft that supports targeting and situation awareness among commanders and warfighters. In FY05, conduct operational demonstration of AMUST/HSKT system on AH-64D Longbow Apache, Army Airborne Command & Control System (A2C2S) Black Hawk, and Hunter UAV. Mature tactics, techniques and procedures in simulation to formulate a sensor-to-shooter solution for time-critical targets at desired sensor resolution.	3709	5618	0	0
Networked UAV System Demonstration - This program captures the results of the AMUST and Unmanned Autonomous Collaborative Operation (UACO) program. In FY06, will lay the groundwork for a coordinated flight demonstration program for the integration of multiple S&T tools developed under several separate Army Technology Objectives (ATOs). Will evaluate component technologies from decision aiding, autonomy, collaboration, networking, and architecture technologies from Rotorcraft Pilots Associate, Hunter Standoff Killer Team/Airborne Manned Unmanned System Technology-Demonstration, UACO, Manned Unmanned Common Architecture Picture, Survivability Planner Associate Re-router, Aerial Delivery of Effects from Lightweight Aircraft, Joint Architecture for Unmanned Systems, and Air Force Research Laboratory/Naval Research Laboratory/Defense Advanced Research Projects Agency/industry/academia efforts. Will determine, in terms of maturation and benefit, potential for application to UAVs and manned aircraft. Will formulate acquisition strategy, enter agreements with other Government agencies/industry/academia as appropriate. Will coordinate with The Technical Cooperation Program for coalition co-operation opportunities for UAV demonstration of operation with manned air and ground systems. Will prepare Request for Proposals and evaluate proposals. In FY07, will award contract(s) and begin development of decision aiding, collaboration, and networking technologies and architectures for application to manned helicopters and autonomy, collaboration, networking technologies and architectures for application to UAVs.	0	0	1921	2841
Airborne Manned/Unmmanned Systems Technology (AMUST) - This one year Congressional Add completed the development and testing of the RF network for the AMUST program. No additional funding is required to complete this project	963	0	0	0
Totals	4672	5618	1921	2841

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3 - Advanced technology development	**0603003A - AVIATION ADVANCED TECHNOLOGY**	**447**

COST (In Thousands)	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
447 ACFT DEMO ENGINES	6652	6877	7653	8076	8460	8585	9759	10122

A. Mission Description and Budget Item Justification: The Aircraft Demonstration Engines project matures power system technologies for use in the Future Force through competitively performed design, fabrication and test of advanced material technologies, engines and integrated components, and, wherever feasible, exploits opportunities to enhance Current Force turbine engines. This project supports the Future Force and Joint Vision 2020 by providing mature technologies for lighter turbine engines that provide more power, can go farther, and are easier for the warfighter to maintain and sustain. This will improve tactical mobility, reduce the logistics footprint, and increase survivability for rotary wing vehicles. The Small Heavy Fuel Engine (SHFE) program is fully coordinated / aligned with the phases / goals of the Department of Defense (DoD) Versatile Advanced Affordable Turbine Engine (VAATE) program. VAATE goals focus on reducing specific fuel consumption (SFC) and increasing the power-to-weight (P/W) ratio of turboshaft engines while decreasing production and maintenance costs. SHFE provides significantly increased range and payload capabilities for future manned and unmanned rotorcraft and sustainment upgrades for current engines. This will include significant Operation and Support cost savings and a significantly reduced logistics footprint. The SHFE program is focusing on maturing and demonstrating advanced, affordable turbine engine technology in the 700 horsepower (HP) class engine. The SHFE will result in significant improvements in SFC and P/W ratio that will enable a heavy fuel (JP-8) engine capability for applications such as the A-160 Hummingbird, AH/MH-6 Mission Enhanced Little Bird, FireScout Unmanned Aerial Vehicle, and Future Combat Systems (FCS) ground and aerial vehicles. The cited work is consistent with Strategic Planning Guidance, the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and the Defense Technology Area Plan (DTAP). Work in this project is performed by the Aviation Applied Technology Directorate of the Aviation and Missile Research, Development and Engineering Center located at Fort Eustis, VA.

Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
Joint Turbine Advanced Gas Generator (JTAGG) and Integrated High Performance Turbine Engine Technology (IHPTET) - In FY04, completed fabrication of test hardware and performed integrated engine component demonstration for program goal achievement.	200	0	0	0

Accomplishments/Planned Program (continued)	FY 2004	FY 2005	FY 2006	FY 2007
Small Heavy Fuel Turbine Engine (SHFE) - In FY04, began SHFE program with a goal to demonstrate a 700 HP engine with: 20% reduction in specific fuel consumption (SFC), 50% increase in HP to weight ratio, and 35% cost reduction. Program will use sequential design and fabrication iterations to mature demonstrator. Began engine component fabrication to support rig tests and full engine demonstration. In FY05, procure parts, build and rig test components of 700 HP engine, including the combustor, mechanical components, spin validation, and turbine validation. Complete Build 1A core testing and Build 1B engine testing. In FY06, will incorporate design improvements of the compressor, combustor, and power turbines, mechanical components, and control and accessories into Builds 2 and 3. Will complete the fabrication of redesigned components for engine Build 2. Will conduct rig test on redesigned combustor and mechanical systems. In FY07, will complete engine testing of Build 2 and rig test optimized components. Will complete the fabrication of components for engine Build 3. Will conduct final engine test for Build 3 to demonstrate program goal achievement.	6452	6877	7653	8076
Totals	6652	6877	7653	8076