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

February 2003

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

	COST (In Thousands)	FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
	Total Program Element (PE) Cost	37290	41924	72083	70327	91734	108354	119501	122798
313	ADV ROTARYWING VEH TECH	16533	22161	60340	53147	77641	93724	89810	85679
435	AIRCRAFT WEAPONS	1473	2191	977	4116	4121	3334	4137	5091
436	ROTARYWING MEP INTEG	9291	7045	3849	5859	1945	2894	16960	23232
447	ACFT DEMO ENGINES	9993	6477	6917	7205	8027	8402	8594	8796
B97	A/C AVIONICS EQUIPMENT	0	4050	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 in support of the Objective Force and Joint Vision 2020. Based on the Army transformation, this PE is focused to demonstrate technologies applicable to unmanned systems, manned/unmanned teaming, and selected opportunities for manned systems. Unmanned rotary wing vehicles bring unprecedented agility, maneuverability, and lethality to the Objective Force while providing reduced signature and logistics. Within this PE, aviation technologies will be matured and integrated into realistic and robust demonstrations. Emphasis will be placed on maturing unmanned attack, reconnaissance, and lift capabilities and teaming them with Objective Force manned systems. Technologies that enable increased 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. This PE provides technical support and technology transition to Unmanned Aerial Vehicles (UAVs), to include the A-160 Hummingbird, the Unmanned Combat Armed Rotorcraft (UCAR), the Organic Air Vehicle (OAV), and the Micro Air Vehicle (MAV). This PE also supports the RAH-66 Comanche, and other Objective Force aviation systems. The cited work is consistent with the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan, and Project Reliance for which the Army is the lead service for the maturation of rotorcraft science and technology. Related applied research is conducted under PE 0602211A (Aviation 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). The program element contains no duplication with any effort within the Military Departments. The Aviation and Missile Research, Development and Engineering Center, Redstone Arsenal, AL performs work in this PE. This PE supports the Objective Force transition path of the Transformation Campaign Plan.

No Defense Emergency Response Funds have been provided to this program.

B. Program Change Summary	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget (FY 2003)	38496	45404	74754	83300
Current Budget (FY 2004/2005 PB)	37290	41924	72083	70327
Total Adjustments	-1206	-3480	-2671	-12973
Congressional program reductions		-6908		
Congressional rescissions		-1073		
Congressional increases		5850		
Reprogrammings	-198	-240		
SBIR/STTR Transfer	-1008	-1109		
Adjustments to Budget Years			-2671	-12973

Change Summary Explanation:

Significant Changes:
Funding - FY 2004: Funds added to this PE to conduct flight demonstrations of technologies necessary for the vertical manuever of the Objective Force.

Funding - FY 2004/2005: Funds realigned from this PE to PE 0602211A Aviation Technology to conduct applied research for increasing levels of autonomy for vertical takeoff and landing (VTOL) unmanned aerial vehicles (UAV).

FY03 Congressional Adds:
Unmanned Aerial Vehicle Data Links – Airborne Manned Unmanned System Technology (AMUST) , Project 436 ($1600); Radar Surveillance and Assimilation Network, Project B97 ($4250).

Project with no R-2A:
($4073), Radar Surveillance and Assimilation Network, Project B97. The objective of this one-year Congressional Add is to develop a detailed design for an advanced open systems mission avionics architecture for an advanced Army rotorcraft. No additional funding is required to complete this project.

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

February 2003

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

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
313	ADV ROTARYWING VEH TECH	16533	22161	60340	53147	77641	93724	89810	85679

A. Mission Description and Budget Item Justification: The Advanced Rotary Wing Vehicle (RWV) Technology project matures and demonstrates rotary wing unmanned and manned platform technologies for the Objective Force. It is envisioned that the Objective Force will need unmanned and manned rotorcraft systems that have significantly increased/improved lift, range, survivability, and mission capability with an overall reduction in logistics and cost of operation. Key to this effort is the demonstration of vertical takeoff and landing (VTOL) UAVs for the Objective Force. The critical technologies to support these capabilities will be matured through Technology Demonstrations (TDs) of prototype UAVs, rotors, active controls, structures, drive train, integrated architecture and threat protection. The near term demo nstration of unmanned, VTOL UAVs will focus on the A-160 Hummingbird UAV and the Organic Air Vehicle (OAV), to include the Micro Air Vehicle variant, for Reconnaissance, Surveillance and Target Acquisition (RSTA) capability. The farther term demonstrations will focus on the Unmanned Combat Armed Rotorcraft (UCAR) teamed with manned and unmanned airframes, the RAH-66 Comanche and the A-160 Hummingbird. UCAR is a joint program with the Defense Advanced Research Projects Agency (DARPA) cost shared 50%-50%, and is planned to transition to Program Executive Officer Aviation at the completion of its 6.3 funded phases. These demonstrations will focus on military operations and the application of military specification on these maturing systems. The integration of technology into UAV manned teaming operations will be demonstrated through the merging common operating architecture and team survivability. The Survivable, Affordable, Reparable Airframe Program (SARAP) will reduce weight and increase the survivability for manned and unmanned systems. The Rotorcraft Drive Systems for the 21st Century (RDS21) TD will provide a 35% increase in power-to-weight ratio, 20% reduction in both production and operating and support 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 Objective Force capability and will enable a 40% increase in payload for the AH-64 Apache, a 33% increase in payload for the RAH-66 Comanche, a 20% increase in range for the UH-60 Black Hawk, and over a 25% increase in range for the CH-47 Chinook. The 20% reduction in production cost and operating and support costs would result in savings of $153M and $117M respectively for a 300 A/C fleet of advanced cargo rotorcraft. The Helicopter Active Control Technology (HACT) TD will contribute to a 50-100% increase in payload, 100-200% increase in range and 50-65% improvement in maneuverability / agility when integrated with the RWV system. Work in this project is performed by contractors including: Boeing Company, Mesa, AZ, St. Louis, MO and Philadelphia, PA; Bell Helicopter Textron Incorporated, Ft. Worth, TX; Lockheed Martin, Atlanta, GA; Sikorsky Aircraft Corporation, Stratford, CT; Raytheon Company, Arlington, VA; and United Technologies Research Center, Hartford, CT. This system supports the Objective Force transition path of the Transformation Campaign Plan.

No Defense Emergency Response Funds have been provided to this project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
Integrated UAV Operations – In FY02, developed intelligent agent architecture to permit cooperative/collaborative exchange of survivability data between tactical vehicles. Analyzed current and future manned and unmanned rotorcraft mission avionics requirements and updated the Rotorcraft Technical Architecture. In FY03, integrate architecture on Lot 7 AH-64D Longbow Apache and Army Airborne Command and Control System (A2C2S) UH-60 Black Hawk. Conduct test on hot bench to ensure proper function on operational processors and with aircraft communications system. Design embedded mission avionics architecture for use on manned and unmanned rotorcraft based on market driven commercial-off-the-shelf electronics and well supported open systems specifications and standards. In FY04, complete architecture detailed designs and system integration tests, and initiate flight-test of the manned-unmanned architecture on both the AH-64D Longbow Apache and A2C2S UH-60 Black Hawk, individually and jointly. Conduct system level demonstration of common architecture between manned and unmanned rotorcraft. Conduct data analysis of demonstration results. FY05, complete flight tests and data analysis, publish systems architectures, and coordinate updates to the Joint Technical Architecture-Army as appropriate.	4221	8482	10896	2000
A-160 Hummingbird - In FY03, conduct initial A-160 functional/environmental ground-test of Phase I subsystems. Perform continuous flight tests with first two (Phase 0) A-160s. In FY04, conduct system flight-testing to test-fix-test of airframe and components at gross weights up to 4,000 pounds and altitudes up to 20,000 feet. Continue environmental testing in ice, sand and salt. Review A-160 flight test results, including initial mission equipment package (MEP) integration with electro-optic/infra-red (EO/IR) sub-systems. Conduct functional and environmental ground-test results for Phase I subsystems and Ground Control Station. Validate baseline Phase I configuration and capabilities. In FY05, conduct continuous air vehicle system flight tests at gross weights up to 5,000 pounds, altitudes up to 30,000 feet, and rotor speed up to 100%. Continues refinement of the Ground Control Station, airframe and mission equipment package, to include EO/IR flight demonstration with four A-160s (two Phase 0 and two Phase I). Validate revised Phase I configuration and capabilities.	0	5000	10000	15000

Accomplishments/Planned Program (continued)	FY 2002	FY 2003	FY 2004	FY 2005
Unmanned Combat Armed Rotorcraft (UCAR) - The UCAR program goal is to demonstrate an armed VTOL UAV that is survivable; can identify targets at 6-10 km and can recognize dismounted infantry at 2-6 km; has a flyaway cost that is 20%-40% of Comanche; and has an operating and sustainment cost that is 20%-50% of Apache. Applied Research for UCAR was conducted in FY02 and FY03 in PE 0602211A Aviation Technology. In FY04, complete UCAR Phase II, Preliminary Design. Industry teams will identify best technical approach considering mission effectiveness, lethality, system performance, and autonomous operations/command & control. In FY04, begin UCAR Phase III, Development and Test. Industry teams conduct detail design of best technical approach, and execute critical design review. Conduct bench testing of critical systems/subsystems as identified in the Risk Management and Mitigation Plan. Define design characteristics/attributes as required to satisfy system performance requirements. In FY05, industry teams conduct bench testing and design support testing of critical UCAR system components. Fabricate two full-scale system demonstrators. Develop an air or ground based control console. Conduct UCAR ground and initial tie-down and light testing to demonstrate and characterize system performance.	0	0	14000	20000
Drive Train - Rotorcraft Drive System for the 21st Century (RDS21). In FY02, conducted detailed design/analysis of RDS-21 key technologies (face gears, high speed clutch, composite housings). In FY03, conduct rig testing to establish Face Gear design and durability of high speed clutch . In FY04, fabricate full-scale test hardware and full-scale RDS-21 split torque/face gear demonstration hardware and composite housing. In FY05, conduct goal demonstration testing (weight/durability/noise) of RDS-21 demonstrator.	3361	4886	4955	5942
Rotorcraft Controls - Helicopter Active Control Technology (HACT). In FY02, flew advanced flight controls to demonstrate improved rotorcraft control, handling qualities and mission effectiveness. Flight demonstrated the program goals of 65% improve pointing accuracy, 35% reduction flight test development time, and 40% increase in precision hover.	7000	0	0	0

Accomplishments/Planned Program (continued)	FY 2002	FY 2003	FY 2004	FY 2005
Rotorcraft Structures - Survivable, Affordable Repairable Airframe Program (SARAP). In FY02, identified composite structures technologies for maturation and demonstration to improve rotary-wing airframe weight, cost, supportability, and survivability. In FY03, incorporate composite structures technologies into manned / unmanned prototype designs to improve rotary -wing airframe weight, cost, supportability, and survivability. Enhance non-developmental items (NDI) and repair methods for advanced composite structures. Mature low-cost, lightweight structural concepts and draft damage tolerance certification methodology for fatigue critical composite components. In FY04, conduct major effort of the SARAP program with manned / unmanned rotary-wing virtual prototype (VP) models and simulations that improve airframe weight 25% and cost 40%. Validate damage tolerance methodology through hardware test for 5% weight reduction in fatigue sensitive composite components. Fabricate VP validation hardware for live fire, static, and crash testing. In FY05, validate manned / unmanned virtual prototype models and simulations with full-scale hardware fabrication and test to improve weight, cost, supportability, and survivability. Conduct full-scale hardware live fire, static, fatigue, and crash testing to validate virtual prototype models and simulations. Transition composite structural technologies, concepts, and methodologies to developmental manned and unmanned RW systems such as A-160 and UCAR.	1951	3793	9960	4083

Accomplishments/Planned Program (continued)	FY 2002	FY 2003	FY 2004	FY 2005
Next Generation Organic Air Vehicle (OAV) - Vehicle mounted and manpack [Micro Air Vehicle (MAV)] Lift Augmented Ducted Fan UAVs for reconnaissance, surveillance, target acquisition. In FY04, expand OAV operational and performance envelopes through tests, experiments, and operational demos utilizing military operators supported by developers and testers. Perform testing to determine OAV acoustic signature and associated detectability. Incorporate and demonstrate noise reduction features, primarily in the propulsion and lift/drive areas, determine reductions in signature and vulnerability. Develop and demonstrate the OAV Autonomous Control Level (ACL) to a level of 3-4 (Fault/Event Adaptive Vehicle), supports growth to an objective ACL of 9-10, (fully autonomous) through the process of spiral development, supports the DoD/DARPA Intelligent Autonomy initiative. Develop models, perform constructive and virtual simulations to support concept development, operational effectiveness testing, lethality and survivability determination. Characterize and assess flight control impact of manned system flow fields for OAV launch and recovery. In FY05, incorporate any necessary "fixes" and system improvements, e.g., heavy fuel propulsion, acoustics, and mission equipment (sensors, processors, and architectures). Develop/advance OAV autonomy levels and teaming capability, and participate in combined DoD Intelligent Autonomy demonstration. Demonstrate capability to acquire and identify targets, ability to engage same with lethal mechanism identified in concept development effort. Conduct demonstration of automatic obstacle avoidance capability. Identify and evaluate alternate OAV launch and recovery concepts and perform design and fabrication.	0	0	4068	6122
Heavy Lift Demonstration for Objective Force Air Manuever. In FY04, conduct demonstration to characterize the technology attributes neccesary for a vertical takeoff with a 40,000 pound (20 ton) cargo load in a single, commercially available, helicopter at sea level conditions.	0	0	4615	0
Slowed Rotor Demonstration. In FY04, demonstrate the principle of a slowed main rotor which is optimized for minimum drag, utilizing a vertical takeoff and landing gyro-copter.	0	0	1846	0
Totals	16533	22161	60340	53147

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

February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603003A - AVIATION ADVANCED TECHNOLOGY**	**435**

COST (In Thousands)	FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
435 AIRCRAFT WEAPONS	1473	2191	977	4116	4121	3334	4137	5091

A. Mission Description and Budget Item Justification: The Aircraft Weapons project matures manned and unmanned rotorcraft sensor and weaponization technologies for air-to-air and air-to-ground application. This project supports the Objective 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. Integration of advanced missiles, rockets, guns, fire control, advanced target acquisition and pilotage sensors, and directed energy weapons, including non-lethal capabilities, are evaluated to assure compatibility and demonstrate timely, precision engagement capabilities and the full spectrum effectiveness of the manned/unmanned team. Technology integration issues with on-board systems, vehicle flight characteristics and weapon system are matured and demonstrated. The project will mature Low Cost Precision Kill (LCPK) rocket system using a 2.75-inch rocket with a laser seeker sensor and the project will evaluate other technologies for providing rotorcraft combat enhancements. Work in this project is performed by contractors including: Boeing Company, Mesa, AZ and Philadelphia, PA; Lockheed Martin, Orlando, FL and Atlanta, GA; Northrop Grumman, Baltimore, MD and Raytheon Company, Dallas, TX and Arlington, VA. This project supports the Objective Force transition path of the Transformation Campaign Plan.

No Defense Emergency Response Funds have been provided to this project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
Weapons Integration. Includes Low Cost Precision Kill (LCPK), a laser guided 70MM (2.75 inch) folding fin aerial rocket, and Loitering Electronic Warfare Killer (LEWK). In FY02, conducted LCPK Advanced Technology Demonstration AH-64D aircraft integration. In FY03, perform airborne evaluation of the LCPK guided rocket. Conduct AH-64D airborne evaluation of the LCPK guided rocket. Provide technical support to LEWK ACTD. In FY04, provide support to LEWK ACTD. In FY05, investigate precision location of threat radar systems from UAVs. Will conduct initial prototype design of integrated, autonomous engagement systems. Will investigate unmanned teaming and cueing for collaborative engagements.	1473	2191	977	4116
Totals	1473	2191	977	4116

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February 2003

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

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
436	ROTARYWING MEP INTEG	9291	7045	3849	5859	1945	2894	16960	23232

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. This project improves the overall mission execution by demonstrating Manned/Unmanned System teaming, enhanced helicopter pilotage capability and improved crew workload distribution. This project supports the Objective Force and Joint Vision 2020 by providing mature technology to enhance near-real time situational awareness for unmanned and manned rotary wing vehicles. The Airborne Manned/Unmanned System Technology (AMUST) program 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 an manned-unmanned team that enhances Army aviation battlefield effectiveness. This project supports the Hunter Standoff Killer Team (HSKT) Advanced Concepts Technology Demonstration (ACTD). 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 will be matured to maximize 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. Work in this project is performed by contractors including: Boeing Company, Mesa, AZ and Philadelphia, PA, Lockheed Martin, Atlanta, GA, Raytheon Company, Arlington, VA, L3 Communications, Salt Lake City, UT, TRW Systems and Information, San Diego, CA, PhotoTelesis Corporation, San Antonio, TX, Northrop Grumman Information Technology, San Diego, CA, and Integrated Defense Technologies, Buffalo, NY. This project supports the Objective Force transition path of the Transformation Campaign Plan.

No Defense Emergency Response Funds have been provided to this project.

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
Airborne Manned and Unmanned System Technology (AMUST), UAV Network Teaming and Hunter Standoff Killer Team (HSKT) Advanced Concepts Technology Demonstration (ACTD). In FY02, integrated UAV control techniques with decision aiding capability to enable effective manned/unmanned teaming. Developed Warfighter's Aid and Mobile Commander's Aid for application to the AH-64D Longbow Apache and the Army Airborne Command and Control System (A2C2S) UH-60 Black Hawk. Expanded AMUST teaming technology to develop a multiple, simultaneous UAV control capability. In FY03, integrate Tactical Common Data Link into manned and unmanned platforms to enable common control. Flight test AMUST teaming technology on AH-64D Longbow Apache, A2C2S UH-60 Black Hawk and Hunter UAV as part of HSKT ACTD. Develop interface control documents to integrate HSKT hardware in a System of Systems construct for AH-64 Apache, Hunter UAV, A2C2S UH-60 Black Hawk and F/A-18. Mature, with user, tactics, techniques, and procedures (TTPs) and training concepts for HSKT System of Systems. Test and evaluate wideband radio frequency network as possible airspace management aid. Will enable technology transition to Objective Force systems. In FY04, develop an Integrated Operational Picture system architecture for actively tasking sensor platforms and systems to build and maintain an Integrated Operational Picture that supports targeting and situation awareness among commanders and warfighters. In FY05, conduct, in simulation, the architecture and algorithms to build an Integrated Operational Picture. Develop TTPs in simulation to formulate a sensor-to-shooter solution for time-critical targets at desired sensor resolution.	9291	5445	3849	5859
UAV Data Link. The objective of this one-year Congressional Add is to develop a Wideband Wireless Network to support AMUST. No additional funding is required to complete this project.	0	1600	0	0
Totals	9291	7045	3849	5859

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February 2003

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603003A - AVIATION ADVANCED TECHNOLOGY**	**447**

COST (In Thousands)		FY 2002 Actual	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
447	ACFT DEMO ENGINES	9993	6477	6917	7205	8027	8402	8594	8796

A. Mission Description and Budget Item Justification: The Aircraft Demonstration Engines project matures power system technologies through competitively performed design, fabrication and test of advanced material technologies, engines and integrated components. This project supports the Objective 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 Joint Turbine Advanced Gas Generator (JTAGG) efforts are all fully coordinated / aligned with the phases / goals of the DoD Integrated High Performance Turbine Engine Technology (IHPTET) program and industry. IHPTET / JTAGG 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. This provides significantly increased range and payload capabilities for future unmanned and manned rotorcraft and sustainment upgrades for current engines, with significant Operation and Support cost savings. The Small UAV Turbo Shaft Engine effort is focusing on providing affordable, efficient heavy fuel capability to unmanned vehicles requiring horsepower ranging from 70 to 150. The Heavy Fuel Engine program is focusing on developing and demonstrating advanced, affordable turbine engine technology in the 500 horsepower class. Significant improvements in specific fuel consumption and power-to-weight ratio will provide a heavy fuel engine capability for applications such as the A-160 and Future Combat System (FCS). A 50% endurance increase and 30% payload increase relative to current available turbine engines is possible for UAV applications such as A-160. Transition of IHPTET / JTAGG technology also results in significant increase in payload / range capability for the CH-47 Chinook and RAH-66 Comanche helicopters. Typical payoffs are a 33% increase in payload and a 50% reduction in fuel consumption for a CH-47 Chinook cargo mission and a 33% payload improvement and 28% range increase for a RAH-66 Comanche mission. Work in this PE is performed by contractors including: General Electric Aircraft Engines, Lynn, MA; Honeywell Engines and Systems, Phoenix, AZ; Rolls-Royce/Allison Advanced Development Company, Indianapolis, IN; Pratt & Whitney, Hartford, CT; Williams International, Walled Lake, MI; Teledyne Continental Motors, Toledo, OH; and Locust USA, Miami, FL. This project supports the Objective Force transition path of the Transformation Campaign Plan.

No Defense Emergency Response Funds have been provided to this project.

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

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
3 - Advanced technology development	**0603003A - AVIATION ADVANCED TECHNOLOGY**	**447**

Accomplishments/Planned Program	FY 2002	FY 2003	FY 2004	FY 2005
Joint Turbine Advanced Gas Generator (JTAGG) - In FY02, completed testing of the final core engine build in support of the JTAGG II goals of 80% increase in shaft horsepower to weight ratio, 30% decrease in Specific Fuel Consumption (SFC) and 20% reduction in production and maintenance costs. Fabricated and tested components in support of JTAGG III gas generator builds. In FY03, conduct testing of JTAGG III initial gas generator build, which includes a forward swept rotor, a split-inducer impeller, a ceramic matrix composite combustor liner and un-cooled ceramic low pressure turbine blades. Conduct testing of JTAGG III second gas generator build, which introduces a ceramic nozzle in the high-pressure turbine. Affirm in testing the JTAGG III goals of 120% increase in shaft horsepower to weight ratio, 40% decrease in SFC, and 35% reduction in production and maintenance costs with the addition of magnetic bearings and component aerodynamic improvements.	6617	6477	200	0
Small UAV Turbo Shaft Engine - In FY02, conducted a demonstartaion of a UAV turboshaft engine.	3376	0	0	0
Heavy Fuel Turbine Engine - In FY04, design a 500 horsepower class engine demonstrator with goals of: -20% SFC, +50% horsepower to weight ratio, and 35% cost reduction. In FY05, design, build and test components of 500 horsepower class heavy fuel turbine engine.	0	0	6717	7205
Totals	9993	6477	6917	7205