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

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603003A Aviation Advanced Technology

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	43509	33921	28810	41666	44869	74376	83074	Continuing	Continuing
D313 Advanced Rotary Wing Vehicle Technology	16167	23466	14635	27984	31054	61227	52137	Continuing	Continuing
D391 D391	914	0	0	0	0	0	0	0	7682
D435 Aircraft Weapons	0	1427	3677	1787	1290	0	11574	Continuing	Continuing
D436 Rotary-Wing Mission Equipment Package Integration	4909	2088	3599	5098	5759	6109	12001	Continuing	Continuing
D447 Aircraft Demonstration Engines	6291	6940	6899	6797	6766	7040	7362	Continuing	Continuing
DA38 Starstreak	15000	0	0	0	0	0	0	0	18185
DB97 Aircraft Avionics Equipment	228	0	0	0	0	0	0	0	1086

A. Mission Description and Justification: The objective of this program element (PE) is to conduct advanced technology development, integration, demonstration and transition of rotary wing vehicle (RWV) technologies to new and / or upgraded DoD / Army rotorcraft systems in support of Joint Vision 2010 and Army After 2010. RWVs offer practical solutions to many of the DoD / Army's current and future operational needs by their ability to accomplish tasks and missions which no other air or ground vehicle can perform (e.g., takeoff and land vertically, operate at or below tree-top level for Nap-of-the-Earth (NOE) missions). RWV configurations require significantly different analysis, integration and design challenges from traditional fixed wing vehicles that fly at higher altitudes. The Army Aviation Science and Technology program's functional organization, supported by the National Aeronautics and Space Administration (NASA) at three co-located activities, is the focal point for US efforts in rotorcraft technology. Technology areas for development / demonstration include aeromechanics, aerodynamics, structures, propulsion, reliability and maintainability, safety and survivability, mission support equipment integration, aircraft subsystems, advanced helicopter rotors and flight controls, flight simulation, aircrew-aircraft system integration, aircraft weapons integration for air-to-air / air-to-ground, aircraft avionics for command and control, communications, controls and displays, digital avionics and architectures, NOE navigation, mission planning, and air traffic management. These technologies are continuously being demonstrated for applications that will improve and correct deficiencies in current DoD / Army RWV systems, and to improve the capabilities of future rotorcraft. The PE focuses on demonstrating technologies to enable rotorcraft to operate affordably throughout the military spectrum from peacekeeping to combat missions. The work in this PE is consistent with the DoD Technology Area Plans, DoD Warfighting Science and Technology Master Plan, DoD Reliance Agreements (for which the Army is the lead service for the rotorcraft technology development) the Army Science and Technology Master Plan (ASTMP), the Army Modernization Plan and a coordinated government/industry/academia national RWV Technology Development Approach. Technology demonstrated in this PE will support the future DoD Joint Transport Rotorcraft (JTR) identified to potentially replace the aging Army CH/MH-47D/E Chinook and Navy CH-53 Super Stallion helicopters. Upgrade activities [as applicable] of Army systems such as the AH-64 Apache, RAH-66 Comanche,

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 2000
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603003A Aviation Advanced Technology

UH-60 Blackhawk, Navy SH-60 Seahawk and USMC AH-1 Cobra are supported as well. Work in this PE is performed by contractors including Georgia Institute of Technology, Atlanta, GA; Boeing Company, Mesa, AZ, St. Louis, MO; and Philadelphia, PA; Loral Western Development Laboratories, San Jose, CA; Bell Helicopter Textron Incorporated, Ft. Worth, TX; Lockheed-Martin, Atlanta, GA and Palmdale, CA; General Electric, Lynn, MA; Allied Signal Engines, Phoenix, AZ; Honeywell, Minneapolis, MN; Sikorsky Aircraft Division UTC, Stratford, CT; BDM International, Albuquerque, NM; MITRE, McLean, VA; Shorts Missile Systems, Belfast Northern Ireland; and CAE Electronics, Montreal, Canada.

Primary in-house developers of the technology under this program element include: Aviation and Missile Command (AMCOM), Redstone Arsenal, AL; Aeroflightdynamics Directorate, AMCOM, NASA Ames Research Center, Moffett Field, CA; Aviation Applied Technology Directorate, AMCOM, Ft. Eustis, VA; Vehicle Technology Directorate, Army Research Laboratory (ARL), NASA Langley Research Center, Hampton, VA; and Vehicle Technology Directorate, ARL, NASA Lewis Research Center, Cleveland, OH. Related activities are performed by NASA.

This program adheres to DoD Reliance Agreements on Aeropropulsion and Air Vehicles (Rotary Wing). 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). In addition, this PE's deliverables provide technical support and technology transition to PE 0604223A (RAH-66 Comanche), PE 0604816A (Longbow), and PE 0203744A (Aircraft Modifications/Product Improvement).

The Army participates in and with the following groups, organizations and programs for total coordination: the DoD Tri-Service Joint Technical Coordination Group for Munitions Development and Aircraft Survivability; Aircraft Instruments and Aircrew Station Working Group; the Joint Integrated Avionics Working Group (JIAWG); Integrated High Performance Turbine Engine Technology (IHPTET) Steering Committee; and the Air Armament Working Party of NATO. This participation enables the gathering of technical information and assets in determining the joint use and standardization of airborne weaponization items. The Army Munitions Research and Development Committee, Office of the Secretary of Defense, functions to establish Joint Service requirements and the development of air munitions. International related activities are The Technical Cooperation Programs (TTCP) with Australian, Canadian and United Kingdom governments, and Defense Development Share Plans. Formal Memoranda of Understanding (MOUs) and Data Exchange Agreements (DEAs) with various friendly nations are pursued to allow technology information exchange.

B. Program Change Summary	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 2000/2001 PB)	44834	34167	38388
Appropriated Value	45048	34167	
Adjustments to Appropriated Value			
a. Congressional General Reductions	-214		
b. SBIR / STTR	-687		
c. Omnibus or Other Above Threshold Reductions			
d. Below Threshold Reprogramming	-518	-133	
e. Rescissions		-113	
Adjustments to Budget Years Since FY 2000/2001 PB	-120		
New Army Transformation Adjustments			-9578
Current Budget Submit (FY 2001 PB)	43509	33921	28810

Funding – FY01: Projects 313 and 435 were adjusted to reflect the new Army Transformation

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

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603003A Aviation Advanced Technology

PROJECT: D313

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
D313 Advanced Rotary Wing Vehicle Technology	16167	23466	14635	27984	31054	61227	52137	Continuing	Continuing

Mission Description and Justification: The objective of this project is to develop and demonstrate advanced technologies that increase strategic / tactical mobility, increase maneuverability / agility; increase reliability through improved maintainability / sustainability, and reduce acquisition and operational cost. RWV technology areas supported by this project are advanced rotors / controls, flight controls, airframes / structures, crew / vehicle survivability, drive-train and subsystems. The Rotary Wing Structures Technology (RWST), Survivable, Affordable, Repairable Airframe Program (SARAP) and Full Spectrum Threat Protection (FSTP) technology demonstrations (TD) will increase the survivability and reduce weight, manufacturing and operational costs of the rotorcraft fuselages and wing subsystems. The Advanced Rotorcraft Transmission Phase II (ART-II) and Rotorcraft Drive Systems for the 21st Century (RDS21) TDs will provide a 35% reduction in weight and 15dB reduction in noise for advanced drivesystems. The Helicopter Active Control Technology (HACT) and Variable Geometry Advanced Rotor Demonstration (VGARD) TDs will contribute to a 2X increase in payload, 4X increase in range and 65% improvement in maneuverability / agility when integrated with the RWV system. These programs will focus on the demonstration and transition of advanced technology to the JTR program to meet the cargo / transport and commuter needs of the military and civilian sectors, as well as technology insertion for other DOD legacy rotorcraft systems. The funding profile supports these technology demonstrations that have been approved in Army modernization plans for rotorcraft. These plans include the development of the future DoD JTR, identified to potentially replace the aging Army CH-47D Chinook and Navy CH-53 Super Stallion helicopters.

FY 1999 Accomplishments:

- 8052 - Completed fabrication of ART II demonstrator hardware.
  - Fabricated diamond-like carbon coated gears, ring gear isolation, low noise bevel pinion, advanced bearing materials, heat exchangers, and seal hardware for reduced weight and increased durability when applied to upgraded UH-60 Blackhawk and AH-64 Apache helicopter transmissions.
- 3267 - Developed baseline helicopter active flight control system designs; evaluated design methodologies; conducted engineering modeling, simulation, analysis, and evaluated candidate active control system designs.
- 4848 - Conducted detailed designs of structural concepts using virtual prototyping which will reduce developmental and manufacturing risk of demonstration fuselage assemblies and reduce detail design cycle time to half the normal time.

Total 16167

FY 2000 Planned Program:

- 7000 - Conduct component testing of ART II positive engagement overrunning clutch.
  - Complete initial assembly of ART II demonstrator hardware
  - Conduct development testing of ART II Demonstrator consisting of fit and function, oil management, gear tooth and bearing pattern verification, split torque path load sharing assessment, 50 hour endurance run, and gear tooth scoring testing for initial performance and cost assessment.
  - Conduct ART II endurance testing for demonstration of 25 % increase in power-to-weight and 2X increase in transmission durability.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603003A Aviation Advanced Technology
	PROJECT D313

FY 2000 Planned Program: (continued)

- Conduct ART II noise testing to demonstrate a -10dB reduction in transmission noise.
- Perform endurance testing of diamond-like carbon coated gears, ring gear isolation, low noise bevel pinion, advanced bearing materials, heat exchangers, and seal hardware for reduced weight and increased durability when applied to upgraded UH-60 Blackhawk and AH-64 Apache helicopter transmissions.

•	8970	- Conduct detailed design of active flight control system for demonstration. - Develop active flight control engineering models, and piloted and hardware in-the-loop simulation to support flight demonstration. - Determine reduction in flight control design and development costs.
•	6326	- Fabricate rotary wing structural demonstrator fuselage sections comprised of advanced structural concepts demonstrating reduced weight and manufacturing cost, and conduct full scale-crash testing of demonstrator fuselage.
•	574	- Conduct review & analysis of JTR scenarios, missions, and performance characteristics - Perform parametric analysis & Preliminary Design (PD) of potential JTR concepts. - Construct computer models which integrate advanced technologies (advanced transmissions, active flight controls, turbine engine, rotors, airframes/structures and signature management) for defining JTR configuration alternatives. Conduct simulation runs to support analysis & PD. - Perform initial cost & technology assessments and down-select to contractor(s) recommended "best" JTR preliminary configuration.
•	596	- Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR) Program
Total	23466	

FY 2001 Planned Program:

•	1388	- Conduct RDS21 preliminary design for 35% increase in power-to-weight, -15dB noise reduction, 2X increase in durability and 25% reduction in production cost.
•	7630	- Integrate hardware and software into demonstration rotorcraft. - Conduct flight control subsystems flight tests. - Refine helicopter active flight controls engineering models and simulation.
•	2617	- Conduct full-scale static testing of rotary wing structural demonstrator fuselage sections demonstrating weight, cost and development cycle time reductions.
•	3000	- Analyze & model attributes of selected JTR PD concepts. - Create virtual prototypes (VP) and assess performance & operational impact of JTR on virtual battlefield. - Use VP to analyze development, production and O&S costs considering Cost As Independent Variable (CAIV). - Analyze JTR derivatives and service unique requirements to assess best approach(es) for commonality. - Conduct technology & program risk assessment. Determine JTR System Specification and sizing criteria for critical subsystem technology demonstrations. - Conduct final simulation demonstration of VP(s).
Total	14635	

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

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603003A Aviation Advanced Technology

PROJECT: D435

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
D435 Aircraft Weapons	0	1427	3677	1787	1290	0	11574	Continuing	Continuing

Mission Description and Justification: This project demonstrates rotorcraft weaponization technologies for air-to-ground and air-to-air application. Integration of advanced missiles (Air-to-Air / Air-to-Ground), rockets, guns, fire control and advanced target acquisition are evaluated and demonstrated on rotorcraft platforms to assure compatibility of the weapon system with the rotorcraft. Technology integration issues with on-board systems, vehicle flight characteristics and weapon system are investigated and evaluated. The project will integrate Low Cost Precision Kill (LCPK) rocket system using a 2.75 rocket with a laser seeker sensor and will evaluate other technologies for providing rotorcraft air combat enhancements, including a lightweight, electric turret for a 20% increase in air-to-air accuracy.

FY 1999 Accomplishments: Project not funded in FY99.

FY 2000 Planned Program:

•	1389	- Conduct AH-64 Longbow Apache aircraft preliminary integration design for Low Cost Precision Kill (LCPK) guided rocket system . - Conduct AH-64 Longbow Apache aircraft preliminary design for integration of Multi-Role Aviation Weapon System (MRAWS) lightweight, electric turret.
	38	- Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR) Program
Total	1427	

FY 2001 Planned Program:

•	3677	- Complete LCPK aircraft integration design and fabricate flight hardware for Apache Longbow to support airborne evaluation of the LCPK guided rocket.
Total	3677	

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

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603003A Aviation Advanced Technology

PROJECT: D436

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
D436 Rotary-Wing Mission Equipment Package Integration	4909	2088	3599	5098	5759	6109	12001	Continuing	Continuing

Mission Description and Justification: The objective of this project is to demonstrate man-machine integration and mission equipment technology to provide enhanced helicopter pilotage capability, improved crew workload distribution and improve overall mission execution. It provides for the demonstration of rotorcraft crew stations utilizing knowledge-based information systems to develop Cognitive Decision Aiding (CDA) for crews. Advanced integration technology in information management, sensors, displays, and controls will be demonstrated to maximize combat helicopter mission effectiveness and survivability for day / night adverse weather operations. The Rotorcraft Pilot's Associate (RPA) program demonstrated significant capabilities in data fusion, battlefield assessment, route, reconnaissance, survivability and sensor planning, and cockpit information management, attack planning and crew intent estimation for dual crew operations. Virtual prototyping capability is used as the foundation for evaluating combined rotorcraft control and crew performance. The Airborne Manned/Unmanned System Technology (AMUST) program integrates advanced technologies in sensors, displays, communication and controls necessary to team airborne manned and unmanned vehicle to maximize the teams' lethality, survivability, and operational tempo in support of the maneuver commander. The manned/unmanned team will be capable of performing scout and reconnaissance assignments and alerting manned rotorcraft of "just ahead" tactical situation awareness. State-of-the-art approaches in artificial intelligence, intelligent agents, sensors, avionics, communications, pilot vehicle interfaces, and autonomous assistants will result in an integrated team that enhances Army aviation battlefield effectiveness.

FY 1999 Accomplishments:

•	4909	- Conducted RPA flight test including operationally relevant scenarios and threats which will be subject to the same tactical environments used in the virtual simulations; performed data reduction, analysis, final report / briefing and transitioned technology and lessons learned to fielded / development systems. - Completed virtual simulation tests which serves as final effort to measure exit criteria.
Total	4909	

FY 2000 Planned Program:

•	2034	- Develop and demonstrate AMUST teaming using a AH-64D with basic payload and rudimentary navigation control of a Hunter Unmanned Aerial Vehicle. - Define advanced AMUST configuration and interfaces for manned (AH-64D and other manned systems) and unmanned (family of military UAVs) teams.
•	54	- Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR) Program
Total	2088	

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603003A Aviation Advanced Technology
	PROJECT D436

FY 2001 Planned Program:

•	3599	- Develop AMUST algorithms to support critical operational functions. - Construct engineering simulation to support preliminary development and engineering evaluation of the system. - Conduct knowledge acquisition collection and refinement for scout / attack and Special Operations aviation forces' mission teams composed of manned and unmanned systems.
Total	3599	

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

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603003A Aviation Advanced Technology

PROJECT: D447

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
D447 Aircraft Demonstration Engines	6291	6940	6899	6797	6766	7040	7362	Continuing	Continuing

Mission Description and Justification: The objective of this project is to competitively perform design, fabrication and test of advanced technology engines and integrated components to demonstrate achievable improved performance levels for current and future DoD RWV emphasizing Army unique requirements. The current/planned Joint Turbine Advanced Gas Generator (JTAGG) efforts are all fully coordinated / aligned with the phases / goals of the DoD 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 current fleet upgrades and for future new rotorcraft with significant Operation and Support cost savings.

FY 1999 Accomplishments:

- 6291 - Completed JTAGG III components initial detail design including axial rotors and impeller, ceramic matrix composite combustor liners, turbine airfoils, and mechanical components for JTAGG III initial build.
  - Procured long-lead JTAGG III hardware.
  - Conducted initial component testing in support of JTAGG III initial gas generator build.

Total 6291

FY 2000 Planned Program:

- 6757 - Demonstrate in testing, the JTAGG II goals of 80% increase in shaft horsepower to weight ratio, 30% decrease in SFC and 20% reduction in acquisition and maintenance costs.
  - Fabricate / procure hardware for JTAGG III initial gas generator build.
  - Continue initial component testing in support of JTAGG III initial gas generator build.
  - Evaluate JTAGG III component design modifications in support of gas generator build.
- 183 - Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR) Program

Total 6940

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 2000
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603003A Aviation Advanced Technology
	PROJECT D447

FY 2001 Planned Program:

•	6899	- Complete initial gas generator hardware fabrication and component testing. - Conduct testing of JTAGG III initial gas generator build in support of 120% increase in shaft horsepower to weight, 40% decrease in SFC, and 35% reduction in acquisition and maintenance costs. - Complete design modifications and fabricate / procure hardware for second gas generator build. - Conduct component testing in support of second gas generator build. - Perform JTAGG III component design modifications in support of final gas generator build for goal demonstration.
Total	6899	

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

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603003A Aviation Advanced Technology

PROJECT: DA38

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
DA38 Starstreak	15000	0	0	0	0	0	0	0	18185

Mission Description and Justification: This project supports a congressionally directed program to investigate air-to-air (ATA) applications of the Starstreak missile on rotary wing platforms. The effort explored the integration of the Air-to-Air Starstreak (ATASK) missile on the AH-64D Apache Longbow helicopter in preparation for a potential follow-on side-by-side comparison with the Air-to-Air Stinger (ATAS) missile. This effort follows a two-phased effort (FY95-FY97) in which the technical feasibility, safety and preliminary worth of the Starstreak (ATASK) was assessed as an air-to-air self defense weapon for the AH-64 Apache helicopter.

Public Law 105-262, dated 17 Oct 99, requires the Secretary of the Army to certify, in writing, that side-by-side, air-to-air tests between the Starstreak and Stinger missiles can be fired safely at AH-64D Apache helicopter air speeds consistent with normal operating limits and survivability of the aircraft and missile performance standards. Due to Starstreak missile blast overpressure and launch debris damage during earlier congressionally directed ATASK testing, no certification has been possible. FY99 accomplishments for this congressionally directed program, therefore, are pending resolution of these technical and safety issues associated with the Starstreak missile design.

FY 1999 Accomplishments:

- 15000 - The FY99 funds are intended to accomplish the following activities:
  - Development of system integration design requirements
  - Missile performance envelope expansion via simulation
  - Initial effort to integrate the Starstreak missile on the AH-64D Longbow Apache
  - Initial fabrication of hardware to support system integration on the AH-64D
  - Initial planning for test activities
  - Program Management

  - No FY99 funds have been obligated or expended as of Dec 99, but are intended for execution in FY00.

Total 15000

FY 2000 Planned Program: Project not funded in FY 2000.

FY 2001 Planned Program: Project not funded in FY 2001.

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

DATE: February 2000

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603003A Aviation Advanced Technology

PROJECT: DB97

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
DB97 Aircraft Avionics Equipment	228	0	0	0	0	0	0	0	1086

Mission Description and Justification: This project supports development and demonstration of advanced, integrated avionics equipment in support of aviation integration into the digitized battlefield. Evolving concepts in digital avionics will provide new functional capability in the areas of situational awareness, flight path guidance, position reporting and digital data transfer. Work in this project supports the Rotorcraft Pilot's Associate (RPA) program.

FY 1999 Accomplishments:

- 228 - Completed RPA mission equipment integration support in the areas of communication, navigation, Advanced Helicopter Pilotage (AHP), voice recognition, controls and displays, and artificial intelligence, during the flight test program.

Total 228

FY 2000 Planned Program: Project not funded in FY00.

FY 2001 Planned Program: Project not funded in FY01.