Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army											Date: May 2017	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603003A *I Aviation Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	-	99.542	94.280	160.746	-	160.746	127.723	109.378	110.247	112.356	-	-
313: *Adv Rotarywing Veh Tech*	-	70.142	80.948	147.882	-	147.882	115.712	97.125	97.750	99.603	-	-
436: *Rotarywing MEP Integ*	-	8.109	8.385	6.767	-	6.767	5.857	5.976	6.095	6.220	-	-
447: *ACFT Demo Engines*	-	7.891	4.947	6.097	-	6.097	6.154	6.277	6.402	6.533	-	-
BA7: *AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)*	-	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-

A. Mission Description and Budget Item Justification

This Program Element (PE) matures and demonstrates manned and unmanned air vehicle technologies to enable Army aviation modernization. Within this PE, aviation technologies are advanced and integrated into realistic and robust demonstrations. Project 313 matures, demonstrates and integrates enabling component, subsystems and systems in the following areas: rotors, drive trains, structures and survivability. Project 436 matures, integrates and demonstrates air launched weapons systems and mission equipment packages to enable control of unmanned systems. Project 447 matures and demonstrates affordable and efficient engines. Focus areas include: engines & drive trains; rotors & vehicle management systems; platform design & structures; aircraft & occupant survivability; aircraft weapons & sensors; maintainability & sustainability; and unmanned & optionally manned systems. A major effort in this PE is the Joint Multi-Role (JMR) Technology Demonstrator.

Work in this PE contributes to the Army Science and Technology (S&T) Air Systems portfolio and is related to and fully coordinated with PE 0602211A (Aviation Technology), PE 0603313A (Missile and Rocket Advanced Technology), PE 0603710A (Night Vision Advanced technology), and PE 0603270A (Electronic Warfare Technology).

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering S&T focus areas and the Army Modernization Strategy.

Work in this PE is performed by the Army Aviation and Missile Research, Development, and Engineering Center(AMRDEC) with facilities located at Redstone Arsenal, AL; Joint Base Langley-Eustis, VA; and Moffett Field, CA.

Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Army					Date: May 2017
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*			R-1 Program Element (Number/Name) PE 0603003A *I Aviation Advanced Technology*		
B. Program Change Summary ($ in Millions)	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**
Previous President's Budget	103.136	94.280	100.731	-	100.731
Current President's Budget	99.542	94.280	160.746	-	160.746
Total Adjustments	-3.594	0.000	60.015	-	60.015
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-3.594	-			
• Adjustments to Budget Years	0.000	0.000	60.000	-	60.000
• Civ Pay Adjustment	0.000	0.000	0.015	-	0.015

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2016	FY 2017
Project: BA7: *AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)*		
Congressional Add: *Helicopter Seat Improvements*	3.400	-
Congressional Add: *Future Vertical Lift Research*	10.000	-
Congressional Add Subtotals for Project: BA7	13.400	-
Congressional Add Totals for all Projects	13.400	-

Change Summary Explanation

Fiscal Year (FY) 2018 increased funding for JMR Technology Demonstrator (TD) will be used to mature and demonstrate additional component technologies to better inform and reduce risk for the Future Vertical Lift program.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603003A / *Aviation Advanced Technology*	Project (Number/Name) 313 / *Adv Rotarywing Veh Tech*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
313: *Adv Rotarywing Veh Tech*	-	70.142	80.948	147.882	-	147.882	115.712	97.125	97.750	99.603	-	-

A. Mission Description and Budget Item Justification

This Project matures, demonstrates and integrates components, subsystems and systems for vertical lift and unmanned air systems that provide improved aircraft and occupant survivability, reduced maintenance and sustainment costs, and greater performance through improved rotors, drives, vehicle management systems and platform design and structures. Systems demonstrated include rotors, drive trains, robust airframe structures and integrated threat protection systems. A major effort in this project is the Joint Multi-Role (JMR) Technology Demonstrator (TD) in support of the Future Vertical Lift (FVL) family of aircraft.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation Development Directorate of the Army Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Joint Base Langley-Eustis, VA, and the System Simulation Development Directorate, AMRDEC, Redstone Arsenal, AL. Work in this project is coordinated with Program Executive Office Aviation (PEO Aviation) and PEO Intelligence, Electronic Warfare, and Sensors (PEO IEW&S).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Aircraft & Occupant Survivability Systems	6.117	9.073	9.196

Description: This effort increases rotorcraft survivability by reducing platform signatures, providing the means to more efficiently counter enemy detection and tracking systems, and also increases protection to the aircraft and aircrew against ballistic munitions, crash landings, and post-crash fire events. This effort enhances air crew situational awareness, allowing manned/ unmanned aircraft to avoid enemy air threats.

FY 2016 Accomplishments:

Completed full scale demonstration of Combat Tempered Platform Technology. Conducted platform system trades of vehicle hardening and aircraft/occupant protection technologies with threat detection and route optimization for complex visual environments to optimize the total survivability of FVL concepts and mature integrated technology solution through analysis and incremental tests.

FY 2017 Plans:

Will continue platform system trades to develop an integrated platform solution optimized for improved survivability effectiveness, operational availability, weight, and cost. Will mature integrated technology solutions that encompass susceptibility reduction, vulnerability reduction, operational durability, and reparability. Will provide initial concepts for aircraft integration and system level demonstrations. Will continue to incorporate aircraft dynamic radar cross-section (RCS) signature information in real time

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603003A / *Aviation Advanced Technology*	**Project (Number/Name)** 313 / *Adv Rotarywing Veh Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
route planner to fully exploit modern threat radar signal processing; will integrate open systems architecture compliant route planner software in a UH-60 Blackhawk and AH-64 Apache aircraft; will demonstrate route planner software in appropriate threat environment. Demonstration will include human-in-the-loop for assessing route planner aural detection algorithms and assessments using simulated radar threat systems. ***FY 2018 Plans:*** Will continue maturation of individual technologies that comprise the Aircraft and Aircrew Protection solution. Will establish a virtual prototype of the integrated Aircraft and Aircrew Protection solution and initiate incremental verification testing. Will refine aircraft integration and system level demonstration strategies. Will continue the demonstration of efficient, low drag rotor and hub designs and technologies to allow for high speed flight. Will mature rotorcraft threat protection capabilities including self-protection and engagement technologies.			
Title: Rotors & Vehicle Management Systems ***Description:*** This effort demonstrates the performance benefits of advanced rotors through the assessment of alternative designs aimed to satisfy future force capability needs for increased system durability, speed, range and payload. This effort also integrates advanced flight controls with real-time aircraft state information into vehicle management systems to enable safe, low-effort maneuvering and real-time adaptation to aircraft state changes (degradation, damage, mission, etc.) ***FY 2016 Accomplishments:*** Demonstrated integrated Rotors and Vehicle Management Technologies developed in PE 0602211A to reduce rotor loads, reduce hub and airframe drag, improve performance and validate high-fidelity computational models of complete rotorcraft for aerodynamics and structural dynamics in whirl stands and wind tunnels. Conducted flight test demonstration of dual-lift control. ***FY 2017 Plans:*** Will complete system trades and begin development of modernized Rotorcraft Aircrew Systems Concepts Airborne Laboratory (RASCAL), enabling integration and flight demonstration of cutting-edge vehicle management and flight control concepts and architectures for advanced rotorcraft configurations and operation in complex environments. Will integrate and demonstrate efficient, low drag rotor and hub designs and technologies that mitigate the interactional aerodynamics issue affecting high speed operation. ***FY 2018 Plans:*** Will complete detailed design of a new Research Flight Control Computer Assembly for the modernized RASCAL and conduct a thorough government evaluation through a comprehensive technical review.	1.444	4.098	3.172
Title: Platform Design & Structures Systems	55.488	55.476	120.355

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603003A / *Aviation Advanced Technology*	**Project (Number/Name)** 313 / *Adv Rotarywing Veh Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018

Description: Provide demonstration of advanced vertical lift aircraft system configurations that address FVL capability needs. Determine optimum vehicle attributes that meet future force capability needs for increased system speed, range, payload, and reduced operating costs, facilitating preliminary detailed system design of multiple candidate systems. Flight demonstrate operational capability of FVL technology demonstrators. Demonstrate an architecture standard and toolset that enables robust, effective, affordable and enduring mission system solutions for the FVL family of systems.

FY 2016 Accomplishments:
Continued execution of the following for the JMR TD Program: Air Vehicle demonstration efforts, Joint Common Architecture (JCA) standard validation and implementation demonstrations, and Mission System Architecture Demo (MSAD) efforts. Specific tasks for the Air Vehicle effort included (for both flight vehicles): completed fabrication of major air vehicle components; continue flight vehicle assembly; completed scaled wind tunnel tests and continue data reduction activities; development and submittal of subsystem test plans, air vehicle ground test plan, and critical analytical results in support of the on-going airworthiness evaluation; completed fabrication of full scale subsystem test fixtures; initiated tests to reduce risks and develop airworthiness data; and develop and exercise flight control software in simulations and system integration labs (SILs). Specific tasks for the MSAD effort included: issuance of Requests for Information (RFI) to refine the scope of the implementation demonstrations; continued development of the JCA standard including the functional decomposition of subsystem modules using both government and industry experts and government laboratory facilities; support the development of the model-based software tool with the System Architecture Virtual Integration effort; and conducted mission systems architecture implementation process demonstrations designed to mature tools, processes and technologies required for affordable and effective mission systems.

FY 2017 Plans:
Continue execution of the JMR TD air vehicle demonstration including air vehicle fabrication and assembly; subsystem, system, and full scale ground testing; and first flights. Continue execution of MSAD including the Architecture Implementation Process Demo (AIPD) and initial efforts of the Capstone Demo to prove and develop the standards, processes, methods, and strategies required to produce an efficient, effective, and enduring open system architecture in future aircraft.

FY 2018 Plans:
JMR TD air vehicle demonstration: Will continue flight demonstrations of two technology demonstrator aircraft to collect data and assess the capabilities of advanced rotary-wing configurations (an advanced tilt rotor and lift-offset, co-axial helicopter with a pusher prop) and enabling component technologies. Will begin design and build of a test stand and test articles (hardware and software) for a Single Rotor Tiedown (SRT) test of the two-speed gearbox, Independent Blade Control (IBC) and rotors critical to realizing the performance capabilities of an Optimum Speed Tilt Rotor (OSTR). Will complete analysis and modeling of interactional aerodynamics and piloted simulations of a Compound Co-Axial Helicopter (CCH) configuration. Mission Systems Architecture Demonstration: Continued development JCA v2.0. Release of JCA v2.0, including a functional model,

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603003A / *Aviation Advanced Technology*	**Project (Number/Name)** 313 / *Adv Rotarywing Veh Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
data model, supporting documentation and tools. Will continue development of model-based engineering processes and tools for the development and analysis of mission systems architectures as part of Development, Architecture Centric Virtual Integration Process (ACVIP). Will release of a Broad Area Announcement (BAA) for the Mission System Architecture Capstone Demonstration, seeking the development of a mission systems architecture from a representative architecture specification using JCA, model-based engineering tools, virtual integration methods and open systems architecture. Completion of source selection activities for the Capstone Demonstration and agreement awards to multiple vendors. Will begin Mission System Architecture Capstone Demonstration.			
Title: Rotorcraft Drive Systems ***Description:*** This effort demonstrates advanced rotorcraft drive technologies with the potential to: increase the horsepower-to-weight ratio; reduce drive system noise; reduce production, operating and support costs; and provide automatic component impending failure detection. The drive system demonstrators for this effort will be applicable to current platforms and Future Vertical Lift platforms. ***FY 2017 Plans:*** Will mature and demonstrate design of advanced multi-speed drive train for advanced aircraft configurations under the Next Generation Rotorcraft Transmission program. Maturation will enable greater aircraft speeds in platforms such as Future Vertical Lift. ***FY 2018 Plans:*** Will complete design of advanced multi-speed drive train for advanced aircraft configurations under the Next Generation Rotorcraft Transmission program and initiate fabrication of demonstrator hardware.	-	1.013	2.262
Title: Maintainability & Sustainability Systems ***Description:*** Mature and demonstrate technologies that improve the operational availability of rotorcraft while reducing operating and support (maintenance) costs. Efforts include component sensing, diagnostics, prognostics, and control systems. Far-term objective is to enable transition to an ultra-reliable, low maintenance design approach that significantly reduces unscheduled maintenance, inspections, and operating and sustainment costs. ***FY 2016 Accomplishments:*** Matured wireless sensors for on-component processing of part health and usage history; demonstrate methodologies to allow for probability of failure predictions based on vehicle current state and anticipated mission; matured technologies to enable lighter weight designs through loads monitoring of critical components; mature and demonstrate technologies for component self-assessment, usage tracking and embedded history; and mature embedded multifunctional sensors with built-in processing and	3.242	3.785	3.897

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603003A / *Aviation Advanced Technology*	**Project (Number/Name)** 313 / *Adv Rotarywing Veh Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
communications. Conducted developmental testing of system health and fault recognition algorithms, sensors and structural global health models. ***FY 2017 Plans:*** Will complete demonstration of technologies and methodologies to enable more efficient designs and reduce the maintenance burden for future and current fleet vertical lift aircraft. Demonstrations will improve system components' reliability, inevitably improving overall system reliability. Will complete demonstration of on-engine, adaptive engine controls to optimize performance, component life and maintenance schedule based on engine health. Will complete demonstration of in-flight, real-time, automated methods to adjust rotor system track and balance to reduce aircraft vibration and loads. Will complete demonstration of improved failure detection within a planetary system, a reduced size and weight impact of advanced sensor technologies, and a methodology to allow operations above maximum continuous rating for limited periods of time. Will complete demonstration of an autonomous condition assessment process for a composite airframe, and provide decision support for repair decisions with a repair integrity assessment approach. Will optimize a comprehensive integrated aircraft wide electrical system capability for diagnostics, fault isolation, and generate trendable health indicators. Will improve the reliability criteria for design tools, methodologies, and materials to facilitate the optimization of future rotorcraft designs. ***FY 2018 Plans:*** Will initiate effort to develop an embedded and networked rotorcraft sustainment capability. Will mature integrated health management technologies in a SIL environment to demonstrate: an aircraft level sustainment network; embedded health assessment, adaptive aircraft control inputs, and component self-assessment; usage tracking; and embedded history data interfaces with mission planning and enterprise logistics systems. Will identify and select hardware and software for integration into a sustainment rig and/or SIL test.			
Title: Survivability for Degraded Visual Environment (DVE) Operations	3.851	7.503	9.000
Description: Develop and mature advanced sensor cueing and flight controls to provide ability to maintain terrain and obstacle situational awareness during all DVEs both aircraft induced(brown-out & white-out) and environmentally induced (fog, rain, snow etc.). Flight testing on fleet aircraft is an integral component of the demonstration. Work in this area is being done in coordination with efforts at United States (U.S.) Army Communications-Electronics Research, Development, and Engineering Center (CERDEC), Program Element (PE) 0603710A, Night Vision Advanced Technology. The program presents an opportunity to North Atlantic Treaty Organization (NATO) nations, global industry, and academia to participate with their own assets in order to foster information exchange and collaboration. ***FY 2016 Accomplishments:*** Conducted the first major milestone event of the DVE Mitigation (DVE-M) Demonstration Program, the DVE-M Flight Trials at Yuma Proving Ground, AZ. The demonstration was executed with a UH-60 aircraft that hosted program developed modernized			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603003A / *Aviation Advanced Technology*	**Project (Number/Name)** 313 / *Adv Rotarywing Veh Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
control laws (MCLAWS version 3), multi-modality sensor suites (two) and advanced cueing elements. All modes of flight were tested (take-off, en-route, landing) and numerous obstacle fields were presented to the flight crew in order to assess overall DVE system performance, system capability and pilot workload. ***FY 2017 Plans:*** Will conduct second flight trial at NATO DVE Flight Trials event at Manching, GE. Test events to develop DVE knowledge in other critical environments such as rain, snow, and fog. Complex computing will leverage ongoing adjacent projects, particularly the Joint Common Architecture demonstration (JCA Demo); Will mature a government SIL that can test configurations prior to aircraft integration. Will optimize integration of 3D aural and haptic cues with visual cues; will optimize distribution of visual cues between Panel Mounted Displays and Helmet Mounted Displays; will integrate cueing with sensors and flight controls for holistic DVE pilotage capability. ***FY 2018 Plans:*** Will continue to refine Integrated Cueing Environment (ICE) design and to integrate new technology, including spatial aural cues and experiment in the flight environment. Will conduct limited flight test of real time enroute path guidance from sensor data using Obstacle Field Navigation (OFN) algorithms.			
Accomplishments/Planned Programs Subtotals	70.142	80.948	147.882

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603003A / *Aviation Advanced Technology*	Project (Number/Name) 436 / *Rotarywing MEP Integ*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
436: *Rotarywing MEP Integ*	-	8.109	8.385	6.767	-	6.767	5.857	5.976	6.095	6.220	-	-

A. Mission Description and Budget Item Justification

This Project matures and validates man-machine integration and mission equipment software and hardware technologies for unmanned and optionally manned aircraft systems. Efforts focus on artificial intelligence, intelligent agents, cognitive decision aiding, sensors, avionics, communications, and pilot vehicle interfaces. This Project improves the overall mission execution by demonstrating manned and unmanned system teaming, enhanced aircraft pilotage capability, improved crew workload distribution, and new capabilities for both manned and unmanned aircraft. This Project supports Army transformation by providing mature technology to greatly expand the capabilities of unmanned aircraft, in current operating roles and future unmanned wingman roles. This Project also develops, demonstrates and integrates manned and unmanned sensor and weaponization technologies such as advanced missiles, guns, fire controls, advanced target acquisition and pilotage sensors into Army aviation platforms. Efforts are directed toward reducing the integrated weight of weapons, increasing engagement ranges, providing selectable effects on a variety of threats, and enabling cost-effective integration across multiple aviation platforms.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation Development Directorate of the Army Aviation and Missile Research, Development and Engineering Center (AMRDEC), Joint Base Langley-Eustis, VA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Unmanned and Optionally Manned Systems	8.109	8.385	6.767
Description: Mature and apply tactical behavior algorithms and safe-flight technologies to enable unmanned and optionally manned aircraft to maintain safe, responsive, flexible, and tactical formation flight with manned helicopters for unmanned wingman applications in re-supply, reconnaissance, surveillance and attack missions. Develop, mature, apply, and integrate advanced decision aiding, autonomy, and human-machine interface technologies to enable the helicopter flight crew to make full use of the capabilities of an unmanned aerial system (UAS) without requiring continuous attention. Efforts include development of intelligent algorithms that aid decisions and actions in order to increase situation awareness, maximize use of on-board and off-board sensors, efficiently manage a team of manned and unmanned vehicles and their mission systems, and develop and execute effective and appropriate offensive and defensive responses.			
FY 2016 Accomplishments: Demonstrated advanced autonomous behaviors in a virtual battle space to be integrated into a simulation facility to evaluate Manned/Unmanned Teaming (MUM-T). Integrated close proximity flight in a simulated environment and mature technology in preparation for a simulation demonstration. Matured and demonstrated data fusion technologies of both on and off board sensors			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603003A / *Aviation Advanced Technology*	**Project (Number/Name)** 436 / *Rotarywing MEP Integ*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
in a simulation environment. Demonstrated advanced decision aiding technologies to aid an airborne mission commander to control both his or her own ship and a team of unmanned systems. Implemented Future Airborne Capability Environment (FACE) conformance requirements to allow for ease of portability. ***FY 2017 Plans:*** Will mature advanced autonomous behaviors for UAS, such as sensor guided flight. Plan to transition technology to Program Management (PM) UAS. This increased autonomy enables the UAS to perform functions that manned operators had to complete manually. Will demonstrate the implementation of autonomous multi-UAS reconnaissance mission planning and execution. Will continue to mature and demonstrate human machine interface and decision aiding to support MUM-T and allow the pilot to perform mission planning and control of multiple UAS aircraft, and the mission. ***FY 2018 Plans:*** Will integrate and demonstrate third party vendor pilot aiding software and advanced human machine interface technologies in simulations to inform cockpit development programs for both legacy fleet aircraft upgrades and future aircraft procurements. Will demonstrate software integration within an open systems, modular architecture based system.			
Accomplishments/Planned Programs Subtotals	8.109	8.385	6.767

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603003A / *Aviation Advanced Technology*	Project (Number/Name) 447 / *ACFT Demo Engines*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
447: *ACFT Demo Engines*	-	7.891	4.947	6.097	-	6.097	6.154	6.277	6.402	6.533	-	-

A. Mission Description and Budget Item Justification

This Project matures and demonstrates power system technologies through design, fabrication, and evaluation of advanced engine components in order to improve the performance of turbine engines for vertical lift aircraft. This Project supports Army modernization by demonstrating mature technologies for lighter turbine engines that provide increased power, increased fuel efficiency, improved sustainability and reduced maintenance. These advanced engine designs will significantly improve the overall aircraft performance characteristics and reduce the logistical footprint of vertical lift aircraft.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this Project is performed by the Aviation Development Directorate of the Army Aviation and Missile Research, Development, and Engineering Center (AMRDEC), at Joint Base Langley-Eustis, VA.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: Future Affordable Turbine Engine (FATE)	7.891	-	-
Description: Demonstrate an advanced, innovative 7000 horsepower class gas turbine engine that provides significant improvement in operational capability for current and future rotorcraft. FATE uses sequential design and fabrication iterations to mature engine design and demonstrate significant reduction in specific fuel consumption (SFC), significant improvement in horsepower-to-weight ratio, and significant reduction in production and maintenance cost compared to year 2000 state-of-the-art engine technology. The sequential design and fabrication process is as follows, respectively: compressor subsystem, combustor subsystem, turbine subsystem, and mechanical systems. Work in this project is coordinated with efforts in Program Element (PE) 0602211A, Project 47A. ***FY 2016 Accomplishments:*** Completed fabrication of redesigned engine components and complete assembly, instrumentation, and testing of the final performance demonstration engine. This full engine system level test validated the horsepower to weight ratio and specific fuel consumption goals of the advanced FATE architecture.			
Title: Alternative Concept Engine (ACE)	-	4.947	6.097
Description: This effort demonstrates alternative, adaptive, and intelligent engine technologies to provide improved / mission-optimized performance, readiness, and affordability across an expanding engine envelope for increased operational capability for Army Aviation platforms. The alternative concept engine technology demonstrations planned for this effort are applicable to			

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army		Date: May 2017
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603003A / *Aviation Advanced Technology*	**Project (Number/Name)** 447 / *ACFT Demo Engines*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
current and future platforms including Unmanned Aerial Systems (UAS). Work in this project is coordinated with efforts in PE 0602211A, Project 47A. ***FY 2017 Plans:*** Will provide preliminary design and perform detailed design efforts supporting planned engine level demonstration of alternative concept engine technologies. Effort will build on knowledge gained under previous project A47A design activities and other Government agency research. Research included investigation of innovative/adaptive engine component technologies such as variable speed power turbine. ***FY 2018 Plans:*** Will complete detailed design and initiate fabrication of innovative/adaptive engine component technologies such as variable speed power turbine. Will perform component design integration efforts in preparation for full system demonstration.			
Accomplishments/Planned Programs Subtotals	7.891	4.947	6.097

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Army			Date: May 2017
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603003A / *Aviation Advanced Technology*	Project (Number/Name) BA7 / *AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
BA7: *AVIATION ADVANCED TECHNOLOGY INITIATIVES (CA)*	-	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	-	-

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Aviation advanced technology development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017
Congressional Add: Helicopter Seat Improvements	3.400	-
FY 2016 Accomplishments: This Congressional Add supported research for helicopter seat improvements.		
Congressional Add: Future Vertical Lift Research	10.000	-
FY 2016 Accomplishments: This Congressional Add supported research for Future Vertical Lift technologies and concepts in support of the Joint Multi-Role Tech Demo Program.		
Congressional Adds Subtotals	13.400	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A