FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Aircraft Technology	22,428	28,367	20,660	22,372	22,806	23,755	24,619	25,251	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program develops technology for naval aviation, with emphasis on the demands imposed by aircraft carrier flight operations and Marine Corps amphibious and field operations relating to the Joint Mission Areas of Strike and Littoral Warfare. This program exploits the emerging technologies of: (a) composite and matrix materials for structures to reduce airframe and propulsion system weight and the effects of saltwater corrosion; (b) reduced observables, (c) aerodynamic designs of Navy-unique aircraft components; (d) advanced gas turbine engine component designs and power systems for extended range/endurance; and (e) predicting safer, more reliable at-sea operating envelopes. The program provides mission area analysis and concept definition required for the Applied Research phase of air vehicle programs.

(U) Aircraft Technology develops manned and unmanned airborne platform technologies for future joint warfighting capabilities to promptly engage regional forces in decisive combat on a global basis and to employ a range of capabilities more suitable to actions at the lower end of the full range of military operations, which allow achievement of military objectives with minimum casualties and collateral damage. This element adheres to Defense Science and Technology (S&T) Reliance Agreements and supports the Department of Defense Science and Technology Strategy, which coordinates and minimizes duplication of aircraft technology efforts. The individual Navy aircraft technology exploratory efforts are selected to fill Naval Aviation needs that are not being met by the United States Air Force, Army, National Aeronautics and Space Administration (NASA), Defense Advanced Research Projects Agency (DARPA) and industry programs.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

(U) Aircraft Technology addresses the Air Platforms Defense Technology Area Plan (DTAP), which develops goals and payoffs from both the operational user's and system & technology developer's perspective. At the Project Reliance Fixed Wing Vehicle taxonomy level, goals include Aerodynamics, Flight Control, Subsystems, Structures and Integration technologies. The following reflects the Joint Subarea Level goals for fighter/attack aircraft for the year 2003 (baseline F-22 & F-18E/F),: 0% increase in production cost/Air Vehicle Weight; 0% increase in development costs/Air Vehicle Weight; 20% reduction in support costs per flight hour/Air Vehicle Weight; 10% increase in lift-to-drag; 8% reduction in Air Vehicle weight fraction; 20% increase in controllable angle-of-attack envelope. Holding constant the three cost goals (0%) represents a break in the paradigm currently faced with high-performance tactical aircraft of ever increasing cost per pound of airframe. There is also an increasing emphasis on developing technology which addresses the cost-of-ownership of legacy airframes.

(U) Based on the Secretary of Defense's Blue Ribbon panel's recommendation, after studying F/A-18E/F transonic wing drop, a joint program to develop an understanding of the fundamental flow phenomenon and develop technology to reduce /control abrupt asymmetric wing stall of fighter aircraft will be funded under this and other program elements. This effort will fund the development of a basic understanding of the transonic abrupt wing stall problem, figures of merit and guidelines to prevent abrupt transonic wing stall and improve maneuverability. This effort is planned as a joint effort with Navy, NASA, Air Force (AF) and industry.

(U) Aircraft Technology has a limited investment in Navy unique or critical technology for Rotary Wing Vehicles and seabased vertical flight operations. These efforts are coordinated with the Army's Rotary Wing Vehicle (RWV) science and technology subarea under the DTAP.

(U) Other Joint Subarea Level quantified goals are addressed under the Air Platforms DTAP: Aeropropulsion (by year 2003; baseline engine YF-119 for fighter/attack aircraft, T700/T406 for patrol/transport/rotary wing aircraft, and F107 for missiles/Unmanned Air Vehicles (UAVs)): 100% increase in thrust-to-weight, 35% reduction in acquisition & maintenance cost, 40% reduction in fuel consumption, and 120% increase in specific thrust; and by year 2010, 150% increase in thrust-to-weight and 50% reduction in development costs. Aircraft Power (by year 2000; baseline F-18E/F & F-22): Eliminate hydraulic system; 10 times increase in reliability.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

(U) Other DTAPs addressed by Aircraft Technology: Sensors, Electronics & Battlespace Environment; Integrated Platform Electronics (by year 2005): Reduce size, weight and cooling requirements by 50% for Fixed Wing Vehicle (FWV) and 40% for RWV; and 50% reduction in cost for multifunction Radio Frequency (RF) avionics.

(U) Human Systems (by year 2001; baseline F-18E/F & F-22): Achieve crew safe escape to 700 KEAS; 50% reduction in aircrew workload attributable to effective crew station integration, enabling single-seat, air-to-ground precision weapons delivery at night and in adverse weather; Improve mission effectiveness (50% reduction in target acquisition time); Improve lethality (3:1 increase in targets killed per pass); Increase survivability (2:1 improvement in kill ratio); Enhanced situational awareness (75% reduction of head-in cockpit time).

(U) Due to the sheer volume of efforts included in this Program Element (PE), the programs described in the Accomplishment/Plans sections are representative selections of the work included in this PE.

(U) The Navy S&T program includes projects that focus on or have attributes that enhance the affordability of warfighting systems. This program develops the Condition Based Maintenance (CBM) enabling technologies for aviation, with the emphasis on increased affordability, safety and operational flexibility. Specific goals of the program include an 80% reduction in aircraft mechanical mishaps, 35% reduction in the required inventory of spare parts and a 30% reduction in overall aircraft maintenance costs. This effort is part of a vertically integrated, multi-disciplinary program in condition based maintenance that leverages from Program Elements 0602233N, 0602234N and 0601153N.

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within the APPLIED RESEARCH Budget Activity because it investigates technological advances with possible applications toward solution of specific Naval problems, short of a major development effort.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

- (U) ($6,861) PROPULSION & POWER:
  (U) Completed:
  - (U) Aerodynamic and mechanical design of an advanced compression system that increases stage loading by 50% and reduces cost by 30% in a Vertical/Short TakeOff & Landing (V/STOL) relevant configuration.
  - (U) Demonstration of an advanced combustor, compressor and turbine components in a subsonic core that reduces fuel consumption by 30% and increases power-to-weight by 40%.

- (U) ($5,541) INTEGRATED AVIONICS (includes DISPLAYS AND ADVANCED COCKPIT TECHNOLOGIES):
  (U) Initiated:
  - (U) An effort that focuses on enhanced affordability and safety by advancing state-of-the-art maintenance technologies, and develops the capability for critical machinery self-diagnosis, in order to transition from a time-based to a condition-based maintenance philosophy. This program includes the development of enabling technologies such as advanced sensing and signal processing techniques, high speed image processing and particulate classification (Oil Analysis), galvanic, electrical potential and guided wave ultrasonic sensing (Corrosion Detection) and embedded training with intelligent tutoring systems and aircrew coordination protocols.

  (U) Continued:
  - (U) Development of preliminary smart escape system algorithms to improve aircrew survivability within the aircraft flight envelope.
  - (U) Development of preliminary smart aircrew interface algorithms to provide effective information management between the aircrew and the aircraft subsystems.
  - (U) Development of an intelligent crewstation concept to unobtrusively monitor aircrew mission performance.
  - (U) Development of fault tolerant processing and network elements based on the selected vehicle management system architecture and information flow control structure.
  - (U) Work towards multiple platform applicability demonstrations of emerging Advanced Helmet Vision systems for enhanced aircrew mission effectiveness and improved targeting accuracy.

- (U) Demonstration of component building block technology for a (non-moving parts) 3-Dimensional volumetric display.
- (U) Development of advanced common electronic modules (ACEMs) that will be smaller, and have less power consumption and higher performance than their analog counterparts, while accomplishing all the requisite acquisition, transmission and digital processing of RF signals over a very wide frequency range (50 MHz to 45 GHz). The family of ACEMs consists of advanced analog-to-digital technology and will be integrated to create systems capable of performing multiple functions. This enhances affordability through a 10-fold projected decrease in systems weight and power consumption, a 15-fold increase in systems performance, and substantial Life Cycle Cost savings.

(U) Completed:
- (U) Design and validation of effective information fusion concepts for helmet-mounted displays which contribute toward providing 3:1 improvement in target kills per first pass, 75% reduction in head-in cockpit time and enhanced situational awareness. Concepts and validation data available on multi-media CD-ROM.

- (U) ($2,640) PIXEL FLAT PANEL DISPLAY CONGRESSIONAL PLUS-UP:
  (U) Initiated:
  - (U) Development of the laboratory integration of the solid state high-brightness pixel miniature flat panel display technology with the enhanced Crusader Helmet Mounted Display precision optics and helmet/vehicle interface assembly.

- (U) ($4,106) NAVAL AIR VEHICLE TECHNOLOGY (formerly FUTURE AND LEGACY AIRCRAFT TECHNOLOGY):
  (U) Initiated:
  - (U) Detailed design and fabrication of an unmanned air vehicle (UAV) platform to demonstrate conversion from rotary-wing to fixed-wing flight using a canard/rotor wing concept. This effort will include risk reduction activities (e.g., stability & control testing, full scale engine testing, control law development, hardware-in-the-loop simulation, and operational analysis/concept of operations development).

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

- (U) Development of novel concepts to control or limit the suckdown, thermal and acoustical environment penalty associated with the VSTOL from a surface combatant. Develop more accurate and efficient modeling and prediction capability to evaluate VSTOL aerodynamic characteristics of manned aircraft and uninhabited combat air vehicles (UCAVs). Update current VSTOL design handbook for modern configurations.
- (U) Development of a corrosion-fatigue interaction analysis to support the aging aircraft service life extension requirements. It provides prediction capabilities to optimize maintenance inspection and repair thereby reducing the corresponding operations and maintenance (O&M) cost by at least 10%.
- (U) Development of a durability-based design criteria for bonded composite patching of metal structures. The product will allow a service life extension of aircraft heretofore required to be replaced by new platforms.
- (U) System architecture for the Real-Time Battle and Mid-Air Collision Damage Identification System for flight controls reconfiguration.

(U) Continued:
- (U) Improvement of high-lift system aircraft configurations and a validated 3D optimization/design method for high-lift systems.
- (U) Development of methods and concepts to alleviate empennage buffet during high alpha maneuvering of fighter/attack aircraft.
- (U) Refinement, optimization and testing of control augmentation system most appropriate for compensating for aircraft operational deficiencies in degraded operational conditions.
- (U) Development of structural life enhancement techniques applicable to both new and aging aircraft to support FY 2005 objective of increasing fatigue life by 25%.
- (U) Development and refinement of Molecular Air Data System based on laboratory testing. Validated system performance prediction versus testing in controlled environment and during atmospheric tests.
- (U) Develop concept for uninhabited naval strike aircraft (UNSA) to reduce future air vehicle operation and support costs.

(U) Completed:

- (U) Demonstration of wing fabrication cost savings of 15% with the use of structural joints based on low cost composite substructure.

- (U) ($3,280) OXIDE PURPLE:
  - (U) Classified.

2. (U) FY 1999 PLAN:

- (U) ($7,876) PROPULSION & POWER:
  (U) Initiate:
  - (U) Development of power electronic building blocks (PEBBs) for Naval aircraft applications.
  - (U) Testing of Carbon/Carbon lightweight heat exchanger technology for Naval Aircraft application.
  - (U) Development of dynamic system simulation tool for electric power systems.

  (U) Continue:
  - (U) Development of technology to reduce the weight and volume of the Inverter Converter Controller (ICC) by 45% in support of the More Electric Aircraft (MEA) Initiative.
  - (U) Development of Joint Technology Demonstrator Engine (JTDE) Fighter/Attack Phase III Fan for 5% increased efficiency, 50% increase in stage loading and improved distortion tolerance.
  - (U) Development of improvements in turbine system components to increase durability by 50%.
  - (U) Rig testing of advanced high temperature turbine sealing concepts. The reduced leakage will result in a fuel consumption reduction of 2 percent and increased range for both subsonic support and fighter/attack applications.
  - (U) Design and fabrication of a ceramic matrix composite (CMC) turbine vane to increase temperature capability by 400 degrees over metallic designs.
  - (U) Design and sector rig testing of an Advanced Gas Generator/JTDE Phase III affordable combustor. It will provide reduced weight and cost for Fighter/Attack and VSTOL applications.

(U) Complete:
- (U) Rig demonstration of a fuel flow metering system that will provide more precise main fuel system delivery to the engine while reducing weight, production and maintenance costs.
- (U) Demonstration of Phase II Fighter/Attack category engine fan, turbine and afterburner components in a full engine configuration to increase thrust-to-weight by 60% and reduce cost by 20%.
- (U) Rig demonstration of a radial turbine blade damping concept which reduces stresses and increases turbine life by 50% and reduces weight by 20%.
- (U) Demonstration of a turbine blade leading edge cooling concept that will be incorporated into an engine design to improve durability.

- (U) ($4,972) INTEGRATED AVIONICS (includes DISPLAYS AND ADVANCED COCKPIT TECHNOLOGIES):
(U) Continue:
- (U) Effort that focuses on enhanced affordability and safety by advancing state-of-the-art maintenance technologies, and develops the capability for critical machinery self-diagnosis, in order to transition from a time-based to a condition-based maintenance philosophy.
- (U) Demonstration of an intelligent crewstation concept to include an onboard computer to continuously assess the conditions of the pilot and the aircraft relative to the escape envelope, and a measurement and control system to unobtrusively monitor aircrew physiological functions.
- (U) Development of the preliminary aircrew interface required to support the Aircrew Decision Aiding Interface effort.
- (U) Investigation of an Advanced Multi-Mode Helmet Vision System to effectively merge real-time sensor information as well as synthetically generated environment imagery.
- (U) Development of advanced analog-to-digital ACEMs technology to enhance air vehicle capability by performing multiple avionics functions. This work is expected to transition to the 0603217N P.E. by FY00.

(U) Complete:

- (U) Demonstration of a smart cockpit controller to effectively manage the functions of the life support, escape and control/display subsystems to achieve a 50% reduction in aircrew workload and 50% improvement in mission performance (i.e. target acquisition time/survivability/situational awareness).
- (U) Demonstration of component building block technology for a (non-moving parts) 3-Dimensional volumetric display.

- (U) ($1,000) ADVANCED 1000-PLUS LINE RESOLUTION CHARGED COUPLED DEVICE (CCD) II NIGHT VISION CAMERA CONGRESSIONAL PLUS-UP
  (U) Initiate:
  - (U) Design, fabrication and bench testing of a CCD camera breadboard mock-up. This will assess its suitability to meet safety criteria for a head-supported weight, ejection safe, high resolution camera for eventual integration into the Crusader day/night helmet vision system.

- (U) ($5,443) NAVAL AIR VEHICLE TECHNOLOGY (formerly FUTURE AND LEGACY AIRCRAFT TECHNOLOGY):
  (U) Initiate:
  - (U) Development of technology to reduce/control abrupt asymmetric wing stall (wing drop) of fighter aircraft. Develop the basic understanding, figures of merit and guidelines to prevent abrupt transonic wing stall and improve maneuverability under a joint effort with Navy, National Aeronautics and Space Administration (NASA), Air Force and industry.

  (U) Continue:
  - (U) Design, fabrication and testing of a UAV to demonstrate conversion from rotary-wing to fixed-wing flight using a canard/rotor wing concept.
  - (U) Development of novel concepts to control or limit the suckdown, thermal and acoustical environment penalty associated with the VSTOL from a surface combatant. Develop more accurate and efficient modeling and prediction capability to evaluate VSTOL aerodynamic characteristics of manned aircraft and UCAVs. Update current VSTOL design handbook for modern configurations.

- (U) Development of a corrosion-fatigue interaction analysis to support the aging aircraft service life extension requirements. It will provide prediction capabilities to optimize maintenance inspection and repair thereby reducing the corresponding O&M cost by at least 10%.
- (U) Development of a durability-based design criteria for bonded composite patching of metal structures. The product will allow a service life extension of aircraft heretofore required to be replaced by new platforms.
- (U) Development of structural life enhancement techniques applicable to both new and aging aircraft to support FY 2005 objective of increasing fatigue life by 25%.
- (U) Development of improved tactical aircraft high-lift system configurations and a validated 3-dimensional optimization/design method for high-lift systems.

(U) Complete:
- (U) Development of guidelines to alleviate empennage buffet during high alpha maneuvering of fighter/attack aircraft. Development of coupled unsteady aerodynamics and structures interaction methods. Contributes to FY-2000 objective of reducing twin-tail buffet by 20%.
- (U) Joint Service Flight demonstration of an Advanced Molecular Optical Air Data acquisition sensor.
- (U) Demonstration of Nonlinear Adaptive Control Algorithms on both damaged and undamaged aircraft simulations.
- (U) Demonstration of damage identification and estimation algorithms on a high fidelity nonlinear six degree of freedom high performance aircraft simulation.

- (U) ($5,000) VECTORED THRUST DUCTED PROPELLER (VTDP) HELICOPTER CONGRESSIONAL PLUS-UP

(U) Initiate:
- (U) Evaluation of the capability of the VTDP Compound Helicopter technology to: (i) perform/enhance Airborne Mine Counter-Measures (AMCM), (ii) improve multi-mission rotorcraft speed, range, survivability and reduce life cycle cost, (iii) evaluate and mitigate the impact of increased weight empty and hover power required, and (iv) utilize the H-60 as the technology demonstration platform.
- (U) Preliminary design of the YSH-60/VTDP compound demonstrator; conceptual design & operational performance/life cycle cost assessment of a CH-60/VTDP production upgrade configuration.
- (U) Component detail design & risk reduction.

- (U) Modeling & piloted simulation.
- (U) Refinement of the Flight Demonstration Program Plan.

(U) Complete (additional work funded from FY96 Congressional Plus-up):
- (U) Full-scale VTDP fabrication and ground testing.

- (U) ($3,701) OXIDE PURPLE:
  - (U) Classified.

- (U) ($375) Small Business Innovation Research (SBIR). Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2000 PLAN:

- (U) ($8,417) PROPULSION & POWER
  (U) Initiate:
  - (U) Design of low cost efficient fuel control system to reduce weight and operate at higher fuel temperatures for Fighter/Attack and UCAV systems.
  - (U) Sector rig test of a CMC combustor for subsonic, UCAV and rotary wing aircraft applications. It will increase combustor temperature 900 degrees F for reduced fuel consumption and increased power density.

  (U) Continue:
  - (U) Development of technology to reduce the weight and volume of the Inverter Converter Controller (ICC) by 45%.
  - (U) Development of PEBBs for Naval aircraft applications in support of the MEA initiative.
  - (U) Development of dynamic system simulation tool for electric power systems.
  - (U) Design and fabrication of JTDE Phase III Fighter/Attack Fan for increased efficiency stage loading and distortion tolerance.
  - (U) Development of improvements in turbine system components to increase durability by 50%.

- (U) Rig testing of a CMC turbine vane to increase temperature capability by 400 degrees over metallic designs.

(U) Complete:
- (U) Testing of a Carbon/Carbon lightweight heat exchanger technology for application in Naval aircraft.
- (U) Rig testing of advanced high temperature turbine sealing concepts. The reduced leakage will result in a fuel consumption reduction of 2% and reduced costs of 50% for increased range for both subsonic support and fighter/attack applications.
- (U) Sector rig test of an Advanced Gas Generator/JTDE Phase III affordable combustor. It will provide reduced weight and cost for Fighter/Attack and VSTOL applications.
- (U) Demonstration of Fighter/Attack category engine fan, turbine, fuel metering system and afterburner components in a full engine configuration to increase thrust-to-weight by 60% and reduce cost by 20%.

- (U) ($4,169) INTEGRATED AVIONICS (includes DISPLAYS AND ADVANCED COCKPIT TECHNOLOGIES):
(U) Continue:
- (U) Refinement and validation of smart escape algorithms.
- (U) Validation of adaptive automation algorithms for managing the smart aircrew interface.
- (U) Integration of smart escape, smart aircrew interface, and smart life support systems into future tactical cockpit simulator.
- (U) Integration of high definition display prototype into flight worthy multi-mode helmet vision system configuration.

(U) Complete:
- (U) Effort that focuses on enhanced affordability and safety by advancing state-of-the-art maintenance technologies, and develops the capability for critical machinery self-diagnosis, in order to transition from a time-based to a condition-based maintenance philosophy.
- (U) Building block helmet mounted display technology for transition to Fleet via the Joint Helmet Mounted Cueing System (JHMCS); basic magnetic head tracker, common helmet vehicle interface, visor optics, and miniature cathode ray tube technology.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

(U) ($4,474) NAVAL AIR VEHICLE TECHNOLOGY:

(U) Initiate:

- (U) Development of technology for integrated multi-disciplinary optimization of manned aircraft and UAVs.
- (U) Development of a statistically based flight certification design criteria. Such an approach will reduce experimental requirements thereby reducing development cost by 10%, allowing for optimal use of complex composite architectures providing weight reduction by 20% and acquisition cost by 10%.
- (U) Development of flight control technology for an automated maneuvering system that assists the pilot in air-to-air and air-to-ground combat phase and in maritime operations.

(U) Continue:

- (U) Design, fabrication and flight testing of a UAV to demonstrate conversion from rotary-wing to fixed-wing flight using a canard/rotor wing concept.
- (U) Development of figures of merit and design guidelines to prevent abrupt transonic asymmetric wing stall. Joint effort with Navy, NASA, Air Force and industry.
- (U) Development of concepts which will provide on-demand enhancement or degradation of the jet exhaust mixing process for enhanced Advanced Short Takeoff Vertical Landing (ASTOVL) performance for manned aircraft and UCAVs.
- (U) Development of a corrosion-fatigue interaction analysis with emphasis on random scatter of material properties.
- (U) Development of a reliability analysis capability for bonded composite patching of cracked metallic structure.

(U) Complete:

- (U) Improved tactical aircraft high-lift system configurations and a validated 3-dimensional optimization/design method for high-lift systems.

- (U) ($3,600) OXIDE PURPLE:

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

B. (U) PROGRAM CHANGE SUMMARY:

	FY 1998	FY 1999	FY 2000
(U) FY 1999 President's Budget:	24,553	23,229	22,735
(U) Appropriated Value		29,229	0
(U) Adjustments from FY 2000 PRESBUDG:	-2,125	+5,138	-2,075
(U) FY 2000 PRESBUDG Submission	22,428	28,367	20,660

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 adjustments reflect Small Business Innovation Research (SBIR) reduction (-$427); Actual Update adjustments (-$1,698). FY 1999 adjustments reflect Congressional Undistributed Reductions (-$362); Comparability adjustments (-$500); Congressional Plus-Up Vectored Thrust Ducted Propeller and (-$1,000) Night Vision Camera. (+$5,000). FY 2000 adjustments reflect Program Rebalancing (-$1,760); Civilian Pay Rates adjustment (+$45); Non Pay Inflation adjustment (-$300); Navy Working Capital Fund (NAWC) adjustment (-$60).

(U) Schedule:. Unavailability of NASA wind tunnel will delay completion of a FY99 effort to develop a 3-D optimization/design method for high lift systems.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable.

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

(U) RELATED RDT&E: This program adheres to Defense S&T Reliance Agreements on Air Vehicles (Fixed Wing, Rotary Wing, Integrated High Performance Turbine Engine Technology (IHPTET), and Aircraft Power), Sensors, Electronics & Battlespace Environment (Integrated Platform Electronics), and Human Systems.

(U) Work in this Program Element (PE) is related to and fully coordinated with efforts in the following PEs:
PE 0601101F (Geophysics)
PE 0601102F (Materials)
PE 0601153N (Defense Research Sciences)
PE 0602201F (Aerospace Flight Dynamics)
PE 0602202F (Human Systems Technology)
PE 0602203F (Aerospace Propulsion)
PE 0602204F (Aerospace Avionics)
PE 0602233N (Human Systems Technology)
PE 0602234N (Materials, Electronic and Computer Technology)
PE 0602708E (Cockpit Autonomous Landing)
PE 0603003A (Rotary Wing Aircraft Technology)
PE 0603106F (Logistics Systems Technology)
PE 0603112F (Advanced Materials)
PE 0603202F (Aerospace Propulsion Subsystems Integration)
PE 0603205F (Flight Vehicle Technology)
PE 0603211F (Aerospace Structures)
PE 0603216F (Aerospace Propulsion and Power Technology)
PE 0603217N (Air Systems and Weapons Advanced Technology)
PE 0603231F (Crew Systems and Personnel)
PE 0603238N (Precision Strike & Air Defense Technology)
PE 0603245F (Advanced Flight Technology Integration)
PE 0603706N (Medical Development(Advanced))
PE 0603707N (Manpower, Personnel, and Training Advanced Technology Development)
PE 0603792N (Advanced Technology Transition)

FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 1999

BUDGET ACTIVITY: 2

PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: Aircraft Technology

(U) Advanced Technology Transition in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments.

D. (U) SCHEDULE PROFILE: Not applicable.