# DEPARTMENT OF THE AIR FORCE

# SUPPORTING DATA FOR FISCAL YEAR 1996

# RESEARCH, DEVELOPMENT, TEST AND EVALUATION

# DESCRIPTIVE SUMMARIES

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**FEBRUARY 1995**

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# DESCRIPTIVE SUMMARIES FOR PROGRAM ELEMENTS OF THE DEPARTMENT OF THE AIR FORCE RESEARCH AND DEVELOPMENT PROGRAM FY 1996 BUDGET ESTIMATES FEBRUARY 1995

## INTRODUCTION AND EXPLANATION OF CONTENTS

1. (U) GENERAL. This document has been prepared to provide information on the United States Air Force (USAF) Research, Development, Test and Evaluation (RDT&E) program to Congress committees during the Fiscal Year 1996 hearings. This information is in addition to the testimony given by DOD witnesses.

a. (U) Exhibits R-2 and R-3 (formerly called Descriptive Summaries) provide narrative information for all RDT&E program elements and projects, except those listed in paragraph 4b, within the USAF FY95 RDT&E program. The formats and contents of this documents are in accordance with the guidelines and requirements of the Congressional committees insofar as possible.

b. (U) The "Other Program Funding Summary" portion of the R-2 includes, in addition to RDT&E funds, Procurement funds and quantities, Military Construction appropriation funds on specific development programs, Operations and Maintenance appropriation funds where they are essential to the development effort described, and where appropriate, Department of Energy (DOE) costs.

c. (U) There are no FY96 "Facilities Exhibits" that contain information on major improvement to and construction of government owned facilities funded by RDT&E.

d. (U) The FY95 reduction for the Small Business Innovative Research program is reflected in the R-2's FY95 column. The FY95 R-2 column differs from the R-1 column by the SBIR reduction amount with the exception of the Science and Technology Programs (6.1, Basic Research; 6.2, Exploratory Development; 6.3A, Advanced Development; and PE 0605306F, Ranch Hand).

2. (U) COMPARISON OF FISCAL YEARS 1995 AND 1996 DATA. A direct comparison of Fiscal Years 1995 and 1996 data shown in this document with corresponding data in the Descriptive Summaries dated February 1994 will reveal differences. Many of the differences are attributable to the following:

a. (U) FY95 funding changes as a result of congressional action on the appropriation and/or proposed RDT&E reprogramming actions.

b. (U) FY94 funding changes between October 1, 1993 and September 30, 1994 due to RDT&E reprogramming actions, supplemental appropriations and rescissions.

c. (U) Reclassification of FY94 and FY95 data to achieve comparability with the program structure for FY96.

3. (U) Relationship of FY96 budget structure to the FY95 Budget approved by the Congress:

| PE | TITLE | REMARKS |
|---|---|---|
| 0101213F | Minuteman Squadrons | Terminated; transferred resources to PE 0604851 ICBM, EMD, and PE 0603851F ICBM Dem/Val |
| 0207136F | Manned Destruction Suppression | Transferred-in project 2671- FY95 and prior funded under another (classified) PE<br>Terminated project 3777 was incorrectly put in ABIDES the correct project number is 4375 which is terminated in FY96 |
| 0207160F | Tri-Service Standoff attack Missile | Terminated FY95 |
| 0207422F | Deployable C3 Systems | Transferred-in FY96 to 0207423F, project 1013 |
| 0207423F | Advanced Communications Sytems | Transferred-in project 1013- FY95 program funded in PE0207422F |
| 0207590F | Seek Eagle | Transferred-in project 2784- FY95 and prior funded in PE 0604602F |
| 0303110F | Defense Satellite Communications System (DSCS) | New Start project 2638 begins subproject Service Life Extension Program |
| 0303144F | Electromag Compatability Analysis Center (ECAC) | Transfer to Joint Spectrum Center (DISA) PE 033144K |
| 0303605F | MILSATCOM | Zero transfer to 3400 by Congressional direction |
| 0305119F | Medium Launch Vehicles | Transferred a portion of funds to PE 0603853F EELV |
| 0305128F | Security Investigative Activities | New Start FY96 |

| | | |
|---|---|---|
| 0305145F | Arms Control Implementation | New Start project 4190 |
| 0305158F | Constant Source | Eliminated project 4071 and transferred funds to start two new projects, 4394 and 4395 for better visibility |
| 0305906F | NCMC TW/AA System | New Start; Congressional transfer in FY95 |
| 0305910F | Spacetrack | Eliminated project 2296-was not started in FY95 |
| 0401119F | C-5 Airlift Squadrons | New Start FY97 only |
| 0401218F | KC-135s | Terminated project 2214 FY96<br>Transfer funds from 4285 to 4286<br>New Start project 4403 FY96 |
| 0404102F | Aerospace Rescue and Recovery | New Start FY96 |
| 0602201F | Aerospace Flight Dynamics | Transferred-in resources to project 4397 from PE 0602206F, project 2673 |
| 0602202F | Human Systems Technology | Combined PE 0602205F and 0602206F into this PE<br>Transferred project 1121 to project 1123<br>Transferred project 2673 to PE 0602201 project 4397<br>Transferred project 6302 to project 7757<br>Transferred project 6893 to project 7184<br>Transferred project 7231 to projects 7184 & 7757<br>Transferred project 7719 to project 1123<br>Transferred project 7930 to project 7184 |
| 0602205F | Personnel, Training & Simulation | PE 0602205F & 0602206F were combined into 0602202F |
| 0602206F | Civil Engineering & Environmental Quality | |
| 0602602F | Conventional Munitions | Transferred resources from project 2567 to project 2068 |

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|---|---|---|
| 0603205F | Flight Vehicle Technologies | Transferred resources from project 2506 to project 2978<br>Transferred resources from PE 0603723F project 2104 to project 4398 |
| 0603250F | Lincoln Laboratory | Terminated PE in FY96 |
| 0603253F | Advanced Avionics Integration | Transferred project 3833 to PE 0603800F (JAST) in FY95 & out as it was denied by Congress in FY94<br>Restructured PE to address aging aircraft & obsolescence of avionics inventory |
| 0603302F | Space & Missile Rocket Propulsion | Transferred a portion of project 6340 & 6341 to project 4373<br>Transferred a portion of project 6341 to project 6339<br>Transferred-in project 0003 from PE 0603401F |
| 0603308F | Strategic Missile Modernization | Terminated; resources transferred to PE 0603851F ICBM Dem/Val |
| 0603311F | Ballistic Missiles Technology | Terminated project 4092 FY96 |
| 0603401F | Advanced Spacecraft Technology | Transferred-in resources to project 4400 from PE 0603438F<br>Transferred project 0003 to PE 0603302F |
| 0603438F | Satellite Systems Survivability | Transferred resources to PE 0603401F project 4400 |
| 0603723F | Civil & Environmental Engineering Technology | Transferred project 2104 to PE 0603205F project 4398 |
| 0603851F | Intercontinental Ballistic Missile Dem/Val | New Start PE and project initiated by Congress |
| 0603853F | Evolved Expendable Launch Vehicle | New Start project 0006 funds EELV which was initated by Congress in FY95 |
| 0604201F | Aircraft Avionics Equipmrnt Development | New Start project 2050 JHMCS is currently in phase 0 (concept exploration) |
| 0604227F | Training Systems Development | Transferred project 3135 to PE 0604243F, project 4369, for FYs 96-98.<br>FY99 and outyears remain in PE0604227F project 2325 |
| 0604233F | Specialized Undergraduate Pilot | New Start project 4376 |

| | | |
|---|---|---|
| | Training | |
| 0604256F | Threat Simulator Development | Terminated project 1006<br>Transferred from PE 0605708F to project 2900<br>Transferred from PE 0305887F to project 2907 |
| 0604270F | Electronic Warfare Development | Terminated project 2066 (EF-111A SIP) in FY96 with retirement of EF-111A in FY97<br>Combined project 3896 and project 4077 to project 3891 beginning in FY96 |
| 0604441F & 0603441F | SBIRS EMD & DEM/VAL | New Start; project 0002 continues funding of MSTI from PE 0603402F. Funding initated by Congress in FY95 |
| 0604480F | GPS IIF | New Start PE and project 0005; resources from PE 0305165F Satellite Replenishment effort |
| 0604600F | Munitions Dispenser Development | New PE. Prior to FY95, project 1015 was funded in PE 0604604F |
| 0604601F | C/B Defense Equipment | FY96 and out resources transferred to RDT&E Defensewide PE |
| 0604602F | Armament/Ordnance Development | Transferred project 2784 to PE 0207590F (Seek Eagle) |
| 0604609F | R&M Maturation/Technology Insertion | PE eliminated; effort and resources transferred to PE 0708026F |
| 0604617F | Air Base Operability | Combined projects 2621, 3141, 4057, and 4058 were consolidated under project 2895 beginning FY96 |
| 0604704F | Common Support Equipment Development | Transferred project 3759 to PE 0708611F |
| 0604711F | Systems Survivability Nuclear Affects | Terminated FY96. Funding on R-1 is an administrative error |
| 0604851F | EMD | New start PE and project initiated by Congress in FY95 |
| 0605708F | NAVSLED Radar Track | PE eliminated. Effort and resources transferred to 0605807F (project 06TG) and 0604256F Threat Simulator Development |

| | | |
|---|---|---|
| 0605807F | Test & Evaluation Support | Transferred a portion of funds to 0605896F Base Operations RDT&E projects 06BS, 06CE, & 06UT from project 06TS. Transferred in resources from PEs 0605708F, 0605863F, 0605876F, and 0605878F |
| 0604853F | Environmental Conservation | New PE. Effort and resources transferred from PE 0605856F |
| 0605854F | Pollution Prevention | Transferred-in resources from PE 0708054F |
| 0605856F | Environmental Compliance | Transferred a portion of funds to start PE 0605853F |
| 0605863F | Aircraft Support | PE eliminated. Effort and resources transferred to 06050807F project 06AS |
| 0605876F | Minor Construction | PE eliminated. Effort and resources transferred to 06050807F project 06MC |
| 0605878F | Maintenance & Repair | PE eliminated. Effort and resources transferred to 0605807F project 06MR |
| 0708012F | Logistic Support Activities | Transferred resources to PE 0708611F Support Systems Development and 0604740F Product Data Systems Modernization |
| 0708026F | Productivity, Reliability, Availability, Maintainability (PRAM) | Transferred-in resources from PE 0604609F |
| 0708054F | Pollution Prevention | Transferred resources to 0605854F |
| 0708611F | Support Systems Development | New Start consolidated resources transferred from portions of 0708012F, 0604704F and 0604740F |

Budget Activities 6.1, 6.2, 6.3, and Ranch Hand II Epidemiology Study (PE 0605306F); reference the FY95 projects that begin with "06." For FY96 and beyond, resources were transferred to the appropriate technical project within the PE.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603302F Space and Missile Rocket Propulsion

| | COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Program Element (PE) Cost | 11,564 | 16,492 | 15,203 | 14,441 | 14,642 | 15,833 | 18,157 | 19,495 | Continuing | Continuing |
| 0003 | Launch Vehicle Technology | 0 | 0 | 600 | 600 | 600 | 600 | 600 | 600 | Continuing | Continuing |
| 4373 | Launch Propulsion Technology | 0 | 0 | 12,603 | 11,641 | 11,432 | 12,323 | 13,437 | 13,405 | Continuing | Continuing |
| 6339 | Tactical Propulsion Technology | 0 | 0 | 300 | 500 | 1,110 | 1,110 | 2,020 | 2,990 | Continuing | Continuing |
| 6340 | Satellite Control and On-Orbit Transfer Propulsion Technology | 7,267 | 8,836 | 1,700 | 1,700 | 1,500 | 1,800 | 2,100 | 2,500 | Continuing | Continuing |
| 6341 | Missile Systems Propulsion Technology | 4,297 | 7,656 | 0 | 0 | 0 | 0 | 0 | 0 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This Advanced Development program develops and demonstrates advanced rocket propulsion and space launch technology. This program is the key technology step to transition the most promising rocket propulsion and space launch technologies developed and demonstrates them in applications using full-scale, proof-of-principle demonstrations. The projects within this program are structured to support Air Force Space Command's and Air Combat Command's mission area requirements for space and missile launch technologies which include the goals established in the Integrated High Payoff Rocket Propulsion Technology Initiative (IHPRPT), a joint DOD, NASA, and Industry effort to focus rocket propulsion technology to the needs of the nation. Solid propellant technology with higher performance than current propellants and environmentally acceptable exhaust products, manufactured using environmentally sensitive processes, are under development. New and improved component technologies will be integrated with propellant advances to develop new propulsion systems for the next generation of launch vehicles and satellites. Anticipated technology advances in this program are to improve performance and reduce propulsion system costs by the year 2000 (IHPRPT Phase I completion). These advances equate to expendable system payoffs of 7-10% increased payload capability at 14% reduced launch cost. Potential reusable system payoffs include 71% increased payload capability with increased system life and 14% reduced launch cost. Technologies demonstrated under this program will also support NASA propulsion needs. The space launch and missile propulsion industry also leverages the technologies from this program to enhance the country's industry competitiveness. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603302F Space and Missile Rocket Propulsion |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 11,727 | 11,800 | 13,675 | 12,909 | Cont |
| (U) Appropriated Value | 12,030 | 16,800 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -303 | -308 | | | |
| b. SBIR | -163 | | | | |
| (U) Current President's Budget | 11,564 | 16,492 | 15,203 | 14,441 | Cont |

(U) Change Summary Explanation:

Funding: Funding change was a result of increased priority for space launch propulsion.

Schedule: Not Applicable.

Technical: In FY 1996, Project 0003, Launch Vehicle Technology, is transferred from PE 0603401F to this PE to combine all space launch technology into a single PE.

(U) **C. Other Program Funding Summary:** Not Applicable.

(U) **D. Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603302F Space and Missile Rocket Propulsion

PROJECT: 0003

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0003 Launch Vehicle Technology | 0 | 0 | 600 | 600 | 600 | 600 | 600 | 600 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project demonstrates all advanced and innovative launch vehicle technologies in the areas of structures (i.e., fairings, interstages, struts, thermal protection systems, etc.), tanks, and operations to reduce launch costs and launch reaction time of existing and future launch vehicles. This project is transferred to this PE in FY 1996 from PE 0603401F where it was placed in FY 1995 as a result of a Congressional add for Reusable Launch Technology.

(U) FY 1994: Not Applicable.

(U) FY 1995: Not Applicable.

(U) FY 1996:
- (U) Continue space launch vehicle technology development. ($600K)
  - (U) Fabricate sub-scale subcomponents for advanced composite interstages for future launch vehicles, validating design and manufacturing techniques that promise up to 50% weight reductions and 30-60% cost reductions.

(U) FY 1997:
- (U) Continue space launch vehicle technology development. ($600K)
  - (U) Fabricate full size advanced composite interstages for future launch vehicles, validating design and manufacturing techniques that promise up to 50% weight reductions and 30-60% cost reductions.

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| (U) Current President's Budget | 0 | 0 | 600 | 600 | Cont |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603302F Space and Missile Rocket Propulsion |
| | PROJECT<br>0003 |

(U) Change Summary Explanation:

Funding: This project was a Congressionally-directed new start in FY 1995 in PE 0603401F and is combined in this PE to maintain synergy with all launch vehicle and propulsion technology development.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603401F, Advanced Spacecraft Technology.
- (U) PE 0603853F, Evolved Expendable Launch Vehicle Program.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603302F Space and Missile Rocket Propulsion

PROJECT: 4373

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4373 Launch Propulsion Technology | 0 | 0 | 12,603 | 11,641 | 11,432 | 12,323 | 13,437 | 13,405 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project demonstrates advanced and innovative low-cost turbomachinery, low-cost space and missile launch propulsion system manufacturing technologies, environmentally acceptable propellants, and propulsion system components compatible with these environmentally safe propellants for current and future launch systems. The project emphasizes environmentally acceptability, as well as propulsion system affordability, reliability, reusability, reduced weight, reduced operation and launch costs, and increased life and performance. Anticipated system payoffs include a 50% decrease in launch costs and a 50% increase in payload to geosynchronous earth orbit by 2010 for existing launch systems. The technologies will enable a new expendable launch system to achieve a 34% reduction in gross lift-off weight and an 80% reduction in launch costs. A reusable spacelift system will realize a 42% reduction in vehicle gross lift-off weight or a 400% increase in payload to low earth orbit with these technologies. This technology was previously contained in Projects 6340 and 6341.

(U) FY 1994: Not Applicable.

(U) FY 1995: Not Applicable.

(U) FY 1996:

- (U) Continue technology development of advanced, environmentally acceptable propellants for current and future launch systems. ($5,448K)
  - (U) Complete large-scale testing of chlorine free space launch propellant and verify the performance capabilities and cost benefits for replacement of current toxic space boost propellants.
  - (U) Quantify the cost benefits and performance characteristics of solid motors developed using environmentally acceptable processing techniques.
  - (U) Conduct impact analysis of environmental propellant effects on solid rocket motor components (such as hotter burning temperatures and highly erosive environments) and determine increased performance needs of replacement components.
  - (U) Test low-cost, carbon/carbon nozzles to quantify the manufacturing cost savings of a new rapid densification process.
- (U) Continue development of liquid propulsion technologies for existing and future launch vehicles. ($7,155K)
  - (U) Complete design and begin fabrication of the oxygen and hydrogen turbopumps to fabricate, integrate, and assemble low-cost, highly reliable turbopump, preburner, and thrust chamber components with fluid film bearing technologies to increase liquid booster propulsion capabilities.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603302F Space and Missile Rocket Propulsion |
| | PROJECT<br>4373 |

(U) FY 1997:
- (U) Continue technology development of advanced, environmentally acceptable propellants for current and future launch systems. ($1,750K)
  - (U) Publish final report for chlorine free space launch propellant.
  - (U) Publish final report on environmentally acceptable processing techniques of solid rocket motor propellants, liners, and insulations.
- (U) Continue technology development of components for solid boosters. ($2,000K)
  - (U) Analyze data and determine alternative materials and manufacturing processes to produce replacement components capable of withstanding the new environmentally safe propellant storing and firing conditions.
  - (U) Begin data analysis and integration of a low-cost, highly operable solid motor project to quantify the performance increases over current solid rocket motor propellants while achieving 100% environmental acceptance. The decreased cost and increased manufacturability and operability of the solution propellants will also be demonstrated and quantified.
  - (U) Demonstrate improved strength and temperature capabilities of low-cost, carbon/carbon nozzles manufactured with a new rapid densification process.
- (U) Develop hybrid rocket propulsion for current and future launch systems. ($1,012K)
  - (U) Analyze and compile data to pull together the current state of the art design techniques, components, and propellants to demonstrate the safety, operability, and cost gains that can be realized by utilizing a hybrid rocket motor on space launch vehicles.
- (U) Continue development of liquid propulsion technologies for existing and future launch vehicles. ($6,879K)
  - (U) Integrate and assemble the oxygen and hydrogen turbopumps with fluid film bearing technologies to increase liquid booster propulsion capabilities.

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| (U) Current President's Budget | 0 | 0 | 12,603 | 11,641 | Cont |

(U) Change Summary Explanation:

Funding: All launch technology was combined into a single project from Projects 6340 and 6341.

Schedule: Not Applicable.

Technical: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603302F Space and Missile Rocket Propulsion |
| | PROJECT<br>4373 |

(U) C. **Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603853F, Evolved Expendable Launch Vehicle Program.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603302F Space and Missile Rocket Propulsion | PROJECT<br>6339 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 6339 Tactical Propulsion Technology | 0 | 0 | 300 | 500 | 1,110 | 1,110 | 2,020 | 2,990 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project demonstrates advanced and innovative highly energetic/safe propellants, environmentally compliant propulsion systems, improved case/insulation/propellant interfaces, nozzle development and integration, thrust vector control, thrust modulation, signature characterization, and signature reduction technologies for current and future tactical missile systems. The emphasis is on propulsion system affordability, reliability, reduced weight, reduced operation costs, and increased life and performance. Anticipated payoffs identified through the Integrated High Payoff Rocket Propulsion Technology Initiative (IHPRPT) from these technologies include a 49% range increase, 50% size reduction, 100% increase in loiter time, 100% payload increase, and 21% reduction in time-to-target. This technology effort was part of Project 6341 technology development of components for solid boosters prior to FY 1996.

(U) FY 1994: Not Applicable.

(U) FY 1995: Not Applicable.

(U) FY 1996:
- (U) Develop and characterize in lab size quantities, propellants and components that can be incorporated into the design and manufacturing of missile systems that will result in high performance, low environmental impacts, and reduced signature characteristics. ($150K)
  - (U) Complete analysis to develop environmentally acceptable, minimum smoke/low erosion propellants, insulators and nozzle coatings, and solventless manufacturing processes to improve delivered energy and reduce signature.
- (U) Conduct system payoff analyses to validate program objectives and approaches to successfully achieve the IHPRPT tactical goals. ($150K)
  - (U) Conduct payoff analyses to identify all candidate component technologies and determine their benefit to aircraft survivability and kill ratio.

(U) FY 1997:
- (U) Develop and characterize in lab size quantities, propellants and components that can be incorporated into the design and manufacturing of missile systems that will result in high performance, low environmental impacts, and reduced signature characteristics. ($350K)
  - (U) Demonstrate environmentally acceptable, minimum smoke/low erosion insulators and nozzle coatings, and solventless manufacturing processes, and begin hardware design of new combustion chambers to improve delivered energy and reduce signature.
- (U) Finalize system payoff analyses to achieve program objectives and approaches and successfully achieve the IHPRPT tactical goals. ($150K)
  - (U) Finish system payoff analyses and downselect the best candidate technologies and to prove their benefit to aircraft survivability and kill ratio.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603302F Space and Missile Rocket Propulsion — PROJECT: 6339 |

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| (U) Current President's Budget | 0 | 0 | 300 | 500 | Cont |

(U) Change Summary Explanation:

Funding: Effort previously part of Project 6341.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0602303A, Missile Technology.
- (U) PE 0603313A, Missile and Rocket Advanced Technology.
- (U) PE 0603792N, Advanced Technology Transition.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603302F Space and Missile Rocket Propulsion<br>PROJECT 6340 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 6340 Satellite Control and On-Orbit Transfer Propulsion Technology | 7,267 | 8,836 | 1,700 | 1,700 | 1,500 | 1,800 | 2,100 | 2,500 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project demonstrates rocket propulsion system technologies for chemical, electric, and solar propulsion systems for station keeping, on-orbit maneuvering applications, and on-orbit transfer. Technology areas that are being investigated include ground demonstrations of compact, lightweight advanced propulsion systems, higher efficiency conversion systems coupled with an improved understanding of combustion fundamentals, and high energy chemical propellant development which will lead to propulsion system delivered impulse. Integrated High Payoff Rocket Propulsion Technology Initiative (IHPRPT) anticipated payoffs include a seven year increase in satellite on-orbit time, 50% increase in satellite maneuvering capability, a 25% reduction in orbit transfer operations costs, and a 15% increase in satellite payload. In FY 1996, liquid propulsion technology is removed from this project and consolidated with all launch propulsion in Project 4373.

(U) FY 1994:
- (U) Continued orbit transfer and maneuvering technology demonstration. ($7,017K)
  - (U) Flight-qualified the 30-kilowatt (kW) ammonia arcjet, conducted integrated mission simulation, and delivered arcjet for integration into the space test and transportation satellite for demonstration of advanced orbit transfer capability.
  - (U) Completed initial evaluation of the 10-kW ammonia arcjet for satellite station keeping.
- (U) Continued development of space launch propulsion technologies for existing and future launch vehicles. ($250K)

(U) FY 1995:
- (U) Continue orbit transfer and maneuvering technology demonstration. ($1,820K)
  - (U) Complete the 30-kW ammonia arcjet flight qualification, deliver, and integrate with the space test and transportation satellite for demonstration of advanced orbit transfer capability.
- (U) Continue development of space launch propulsion technologies for existing and future launch vehicles. ($7,016K)
  - (U) Complete risk mitigation testing of liquid engine components to fabricate, integrate, and assemble low-cost, highly reliable turbopump, preburner, and thrust chamber components with fluid film bearing technologies to increase liquid system booster propulsion capabilities.

(U) FY 1996:
- (U) Continue orbit transfer and maneuvering technology demonstration. ($1,700K)
  - (U) Launch the 30-kW ammonia arcjet on the space test and transportation satellite to measure performance, integration, and satellite interaction issues with an electric propulsion system (issues like electro-magnetic impulse, contamination, solar array degradation, etc.), and write final report.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603302F Space and Missile Rocket Propulsion |
| | PROJECT<br>6340 |

- (U) Design a satellite thruster with an anode layer (Hall Thruster) and test the breadboard power processing unit with a specific impulse of 1500 sec, which will enable the repositioning capabilities of current satellites to be tripled.

(U) FY 1997:
- (U) Continue orbit transfer and maneuvering technology demonstration. ($1,700K)
  - (U) Demonstrate the Hall Thruster breadboard power processing unit for flight qualification.

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 7,430 | 6,490 | 8,261 | 7,634 | Cont |
| (U) Current President's Budget | 7,267 | 8,836 | 1,700 | 1,700 | Cont |

(U) Change Summary Explanation:

Funding: Project previously included liquid propulsion technology which is now combined with all space launch propulsion technology in Project 4373. FY 1995 increase reflects Congressional add.

Schedule: Not Applicable.

Technical: Not Applicable.

**(U) C. Other Program Funding Summary:**

(U) Related Activities:
- (U) PE 0602601F, Phillips Laboratory.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

**(U) D. Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603302F Space and Missile Rocket Propulsion — PROJECT: 6341 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 6341 Missile Systems Propulsion Technology | 4,297 | 7,656 | 0 | 0 | 0 | 0 | 0 | 0 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project develops innovative and advanced solid propulsion systems for tactical and ballistic missile applications. The emphasis of this project is environmental acceptability, as well as reducing the development and fabrication costs of future missile propulsion systems and increasing the reliability and life of these systems. Technologies developed under this project may also be applied to solid propulsion space launch vehicles including boosters and orbit transfer vehicles. In FY 1996, booster propulsion technology is combined in Project 4373.

(U) FY 1994:
- (U) Demonstrated use of reclaimed ammonium perchlorate in full-scale Minuteman Stage II class motor, reducing the amount of hazardous waste generated during solid rocket motor development, repouring, and demilitarization. ($4,197K)
  - (U) Validated (through demonstrations), quantified, and wrote report on the reduced chemicals generated through the use of reclaimed ammonium perchlorate.
  - (U) Completed analysis of environmentally acceptable processing techniques to produce environmentally safe propellants, liners, and insulations.
- (U) Continued technology development of components for solid boosters. ($100K)
  - (U) Completed testing of new "integrated stage" nozzle/exit cone designs and demonstrated capability to reduce system weight and improve propellant loading capabilities.

(U) FY 1995:
- (U) Continue technology development of advanced, environmentally acceptable solid propellants for current and future missile systems. ($4,913K)
  - (U) Complete hazard testing of chlorine free space launch propellant and demonstrate performance capabilities and ballistic properties to establish a baseline for future environmental propellant development.
  - (U) Complete hazard verification of a low chlorine or chlorine free replacement propellant for strategic (storable) applications.
  - (U) Demonstrate scaled-up environmentally acceptable processing techniques to produce environmentally safe propellants, liners, and insulations.
- (U) Continue technology development of components for solid boosters necessary to incorporate environmentally acceptable propellant. ($2,743K)
  - (U) Analyze operating conditions created when firing environmentally safe propellants, and identify all components affected by the storing and firing of these new, environmentally acceptable propellants.

(U) FY 1996: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603302F Space and Missile Rocket Propulsion |
| | PROJECT<br>6341 |

(U) FY 1997: Not Applicable.

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 4,297 | 5,310 | 5,414 | 5,275 | Cont |
| (U) Current President's Budget | 4,297 | 7,656 | 0 | 0 | Cont |

(U) Change Summary Explanation:

Funding: Booster propulsion technology combined in Project 4373. FY 1995 increase reflects Congressional add.

Schedule: Not Applicable.

Technical: Not Applicable.

**(U) C. Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602601F, Phillips Laboratory.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

**(U) D. Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603311F Ballistic Missiles Technology

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 20,495 | 4,939 | 3,085 | 3,184 | 3,284 | 3,383 | 3,482 | 3,581 | Continuing | Continuing |
| 4091 Missile Electronics | 19,889 | 4,900 | 3,085 | 3,184 | 3,284 | 3,383 | 3,482 | 3,581 | Continuing | Continuing |
| 4092 Reentry Vehicle Technology | 606 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD |

(U) A. **Mission Description and Budget Item Justification:** This Advanced Development program develops and demonstrates ballistic missile technologies in the areas of guidance and control and reentry vehicles, and range instrumentation and safety for existing and future intercontinental ballistic missile (ICBM) systems and subsystems. The decline of the Soviet threat dramatically reoriented this program element. Near-term emphasis is on technologies which provide low-cost, low-maintenance, increased reliability, and increased safety of the currently deployed ICBM force. Through the Ballistic Missile Technology (BMT) program, the Air Force performs technology trade offs, develops brassboard hardware, and conducts ground and flight testing. The BMT program maintains technological superiority, thereby, maintaining U.S. security options within a changing global environment. This program integrates individual components into subsystems to demonstrate technology. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 20,784 | 10,000 | 10,259 | 15,538 | Cont |
| (U) Appropriated Value | 20,900 | 5,000 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -116 | -61 | | | |
| b. SBIR | -289 | | | | |
| (U) Current Budget Submit/President's Budget | 20,495 | 4,939 | 3,085 | 3,184 | Cont |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603311F Ballistic Missiles Technology |

(U) Change Summary Explanation:

Funding: Change reflects the reduced Air Force emphasis on intercontinental ballistic missile weapons development.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:** Not Applicable.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603311F Ballistic Missiles Technology<br>PROJECT 4091 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4091 Missile Electronics | 19,889 | 4,900 | 3,085 | 3,184 | 3,284 | 3,383 | 3,482 | 3,581 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** The current focus of the Missile Electronics project is to develop and demonstrate technologies which dramatically reduce acquisition and support costs of advanced guidance for existing and future intercontinental ballistic missiles (ICBM) while maintaining present day accuracies. This project investigates and pursues technologies to improve the guidance, electronics, and power subsystems of existing and future missiles, and leverages ongoing advanced tactical precision navigation projects to extend their capabilities to support global reach/global power.

(U) FY 1994:
- (U) Continued development of advanced boost guidance technology to reduce current operations costs and improve reliability and maintainability of existing systems. ($19,889K)
  - (U) Complete the Advanced Inertial Measurement System design to improve reliability and supportability of existing and future ICBMs.

(U) FY 1995:
- (U) Continue development of advanced boost guidance technology to reduce current operations costs and improve reliability and maintainability of existing systems. ($1,000K)
  - (U) Develop, integrate, and test advanced solid state navigation technology for ICBM applications.
- (U) Continue development of advanced navigation technology to support range instrumentation and safety requirements. ($3,900K)
  - (U) Develop, integrate, and test Global Positioning System (GPS)-based systems which will enhance metrics and range safety.

(U) FY 1996:
- (U) Continue development of advanced boost guidance technology to reduce current operations costs and improve reliability and maintainability of existing systems. ($1,000K)
  - (U) Develop, integrate, and test advanced solid state navigation technology for ICBM applications.
- (U) Continue development of advanced navigation technology to support range instrumentation and safety requirements. ($2,085K)
  - (U) Develop, integrate, and test GPS-based navigation systems that enhance range metrics and safety for ICBM flight testing.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603311F Ballistic Missiles Technology / PROJECT: 4091 |

(U) FY 1997:
- (U) Continue development of advanced boost guidance technology to reduce current operations costs and improve reliability and maintainability of existing systems. ($1,000K)
  - (U) Develop, integrate, and test advanced solid state navigation technology for intercontinental ballistic missiles (ICBM) applications.
- (U) Continue development of advanced navigation technology to support range instrumentation and safety requirements. ($2,184K)
  - (U) Develop, integrate, and test Global Positioning System-based navigation systems that enhance range metrics and safety for ICBM flight testing.

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 19,889 | 4,900 | 5,259 | 10,538 | Cont |
| (U) Current President's Budget | 19,889 | 4,900 | 3,085 | 3,184 | Cont |

(U) Change Summary Explanation:

Funding: Change reflects the reduced Air Force emphasis on ICBM weapons development.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:**

(U) Related Activities:
- (U) PE 0602204F, Aerospace Avionics.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603311F Ballistic Missiles Technology / PROJECT: 4092 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4092 Reentry Vehicle Technology | 606 | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD |

(U) **A. Mission Description and Budget Item Justification:** This project develops reentry phenomenology which involves understanding the ionized plasma sheath around a reentry vehicle, ablative material needs, and aerodynamic performance characteristics.

(U) FY 1994:
- (U) Continued analyzing penetration tactics and options for defeating current and projected anti-ballistic missile threats. ($200K)
- (U) Continued development of reentry vehicle phenomenology to support global reach/global power. ($406K)
  - (U) Tested ablative materials for advanced reentry vehicle concepts.
  - (U) Developed and validated plasma models for reentry vehicle design

(U) FY 1995:
- (U) Continue analyzing penetration tactics and options for defeating current and projected antiballistic missile threats. ($39K)
  - (U) Complete testing of ablative material for advanced reentry vehicle concepts.

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 895 | 5,100 | 5,000 | 5,000 | Cont |
| (U) Current President's Budget | 606 | 39 | 0 | 0 | TBD |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603311F Ballistic Missiles Technology |
| | PROJECT<br>4092 |

(U) Change Summary Explanation:

Funding: Project is terminated after FY 1995 due to the reduced Air Force emphasis on intercontinental ballistic missile reentry vehicle development.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602201F, Flight Dynamics.
- (U) PE 0602203F, Aerospace Propulsion and Power.
- (U) PE 0602204F, Aerospace Avionics.
- (U) PE 0602601F, Phillips Laboratory.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 4 - DEMONSTRATION AND VALIDATION

PE NUMBER AND TITLE: 0603319F Airborne Laser Demonstrator

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 1881 | 19303 | 19954 | 19954 | 0 | 0 | 0 | 0 | 0 | 61853 |
| 0 4269 | 1881 | 19303 | 19954 | 19954 | 0 | 0 | 0 | 0 | 0 | 61853 |

(U) A. Mission Description and Budget Item Justification

(U) The Airborne Laser (ABL) program will demonstrate all necessary technologies required for acquiring, tracking, and killing Theater Ballistic Missiles in the boost phase. The Air Force approved program is a two-phased effort. Phase I involves award of two competing concept design contracts (FY 1994-1997) which were awarded in May 1994. The program will down-select to a single contractor in FY 1997 who will build and test the winning ABL Demonstrator design (Phase II). Phase II will be performed in two parts: Phase IIA is a one-year effort beginning in January 1997 and continuing through the Preliminary Design Review (PDR) in January 1998; Phase IIB begins after the completion of Phase IIA in January 1998 and culminates in FY 2001 with lethality demonstrations against boosting Theater Ballistic Missiles. The Phase II effort must demonstrate all key technologies for a fully operational system, allowing the Air Force to advance to EMD/Production in the FY 2001 time frame should the Air Force decide to proceed with an operational fleet of ABLs. Phase II will begin only if results of Phase I allow the program to pass exit criteria dealing with physics and engineering-related issues. During Phase I, the ABL leverages off laser and imaging technologies in PE 0603605F as well as the High Altitude Balloon Experiment (currently BMDO funded), which is to validate key fire control and tracking technologies. Deliveries from Phase I are: full operational capability ABL designs; scalable/traceable ABL Demonstrator designs; contractor risk mitigation demonstrations to decrease Phase II engineering/aircraft integration risk; simulations in the Air Combat Command's (ACC) Theater Air Command and Control Simulation Facility (TACCSF); and ABL adjunct mission studies for (a) cruise missile defense, (b) protection of high value assets, (c) defensive counter-air, (d) $BMC^4I$, (e) suppression of enemy air defenses, and (f) surveillance.

(U) Acquisition Strategy

(U) Phase I competing contracts include: (1) Boeing, Seattle WA (prime); Lockheed, Sunnyvale CA; TRW, Redondo Beach CA; and ITEK, Lexington MA (subcontractors), and (2) Rockwell, Canoga Park CA (prime); Hughes, Los Angeles CA; United Technologies Optical Systems, West Palm Beach FL; North American Aircraft, El Segundo CA; Strategic Defense Centers, Seal Beach CA; E-Systems, Greenville TX; IBM, Boulder CO and Gaithersburg MD; Unisys, Salt Lake City UT and Eagan MN; and Parsons, Pasadena CA (subcontractors). Government Integrated Product Teams include Phillips Laboratory ABL SPO, Lasers and Imaging Directorate, and Advanced Weapons and Survivability Directorate; Air Force Electronics Systems Center; Wright Laboratories; Air Combat Command; and US Army White Sands Missile Range.

(U) Project Justification Narrative

(U) FY 1994: Awarded dual 33 month competing ABL Concept Design contracts in May 1994.

- (U) Initiated design of airframe modifications, as well as the related hardware and software necessary to install and support the high energy laser and related subsystems into an existing 747 aircraft platform. ($87)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - DEMONSTRATION AND VALIDATION | PE NUMBER AND TITLE PROJECT<br>0603319F Airborne Laser Demonstrator |

- (U) Initiated design of a high power laser including fuel handling or power generation subsystem and resonator optical benches/components. ($248)
- (U) Initiated design of a laser beam control subsystem to irradiate target with lethal energy density. ($197)
- (U) Initiated design of avionics, battle management, and fire control components. ($40K)
- (U) Initiated development of analytical models/computer codes to predict the performance of the ABL to include the aircraft, weapons, and command and control elements. ($205)
- (U) Provided government participation in government/contractor Integrated Product Teams to accomplish Integrated Product Development of tasks described above. ($599)
- (U) Provided ACC/Air Staff technical support for continued ABL requirements, operational concept, and COEA development. ($425)
- (U) Continued maturing of theater integration and ABL adjunct mission capabilities through active defense and BMC$^4$I Integrated Product Teams and government modeling/simulation efforts such as the Theater Air Command and Control Simulation Facility (TACCSF). ($60)
- (U) Began government Phase II environmental impact studies. ($20)

(U) FY 1995: Continue all efforts under Concept Design contracts begun in FY 1994 plus initiate additional tasks described below:

- (U) Initiate contractor hardware/software demonstration to reduce engineering/aircraft integration risk for Phase II of the program. Results factor into Phase II downselect decision in FY 1997. ($4400)
- (U) Begin contractor modeling of their ABL design in TACCSF. Results factor into Phase II downselect decision in FY 1997. ($200)
- (U) Begin ABL adjunct mission studies described above. ($180)
- (U) Conduct Operational Concept and Preliminary Requirement Reviews with government. ($6800)
- (U) Continue design and conduct first incremental Demonstrator Concept Design Reviews with government. ($3403)
- (U) Begin government Phase II environmental impact studies. ($475)
- (U) Begin government Phase II test planning. ($675)
- (U) Support ACC/SMC/Air Staff in boost phase intercept COEA study development and requirements definition. ($470)
- (U) Provide government participation in contractors' Integrated Product Teams for Integrated Product Development of all contract tasks. ($2400)
- (U) Provide government system security engineering and facility utilization planning support to contractors. ($380)

(U) FY 1996: Continue all efforts begun under Concept Design contracts in FY 1994/1995 and deliver preliminary ABL Demonstrator specifications. Complete those Concept Design deliverables summarized below.

- (U) Continue hardware/software risk mitigation demonstrations for Phase II downselection decision. ($6500)
- (U) Continue initial contractor simulation modeling efforts in TACCSF for downselection decision. ($200)
- (U) Deliver final Demonstrator specifications for downselection evaluation. ($3200)
- (U) Prepare for final concept design review in FY 1997. ($4500)
- (U) Complete majority of ABL adjunct mission studies supporting COEA/study decision. ($200)
- (U) Government continues with detailed test planning for Phase II. ($700)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - DEMONSTRATION AND VALIDATION | PE NUMBER AND TITLE<br>0603319F Airborne Laser Demonstrator<br>PROJECT |

- (U) Government continues environmental impact study for Phase II. ($1000)
- (U) Government completes facility utilization planning for Phase II. ($200)
- (U) Government participates in IPTs with contractors to accomplish all tasks described above. ($3454)

(U) FY 1997: Phase I of program completes in FY 1997 when all contract tasks begun in FY 1994/1995/1996 are completed.

- (U) Completion and delivery of final designs. ($6600)
- (U) Conduct of final Concept Design Reviews. ($2000)
- (U) Completion of all remaining contractor risk-mitigation demonstrations. ($3300)
- (U) Completion of ABL adjunct mission studies. ($100)
- (U) Government completes environmental impact study for Phase II. ($50)
- (U) Completion of evaluation of all simulation and modeling efforts in TACCSF with government. ($350)
- (U) Government completes detailed test planning for Phase II. ($250)
- (U) Government participates in IPTs with contractors to accomplish all tasks. ($4000)
- (U) Government completes evaluation of competing Phase II proposals and completes active tracking experiments for concept design effort. ($2854)

(U) B. Program Change Summary

| $ IN THOUSANDS | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1945 | 20000 | 20000 | 20000 | 61954 |
| (U) Appropriated Value | 1945 | 20000 | 20000 | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. (U) Small Business Innovative Research | -27 | -374 | | | |
| b. (U) Below Threshold Reprogramming | -26 | | | | |
| c. (U) Congressional Reduction | -11 | | | | |
| d. (U) General Reduction | | -323 | | | |
| (U) Adjustment To Budget Years Since FY95 PB | | | -46 | -46 | |
| (U) Current Budget Submit/President's Budget | 1881 | 19303 | 19954 | 19954 | 61092 |

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

DATE: February 1995

BUDGET ACTIVITY: 4 - DEMONSTRATION AND VALIDATION

PE NUMBER AND TITLE: 0603319F Airborne Laser Demonstrator

PROJECT: 0

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 4269 | 1881 | 19303 | 19954 | 19954 | 0 | 0 | 0 | 0 | 0 | 61853 |

(U) C. Other Program Funding Summary

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) PE 0603605F Advanced Weapons Technology | 15950 | 12388 | 8300 | 11750 | | | | | | 48400 |
| (U) PE 0603217C BMD Advanced Development | 8100 | 7800 | 7300 | | | | | | | 23200 |

(U) D. Schedule Profile

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Airborne Laser Concept Design Contract Awards | | | * | | | | | | | | | | | | | |
| (U) Preliminary Requirements Review (PRR) | | | | | * | | | | | | | | | | | |
| (U) Conceptual Design Review 1 | | | | | | | | X | | | | | | | | |
| (U) Demonstrator Request for Purchase (RFP) Release | | | | | | | | | | | X | | | | | |
| (U) Conceptual Design Review 2 | | | | | | | | | | | | | X | | | |
| (U) Downselect winning Concept Design contractor for Demonstrator (Phase II) | | | | | | | | | | | | | | X | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - DEMONSTRATION AND VALIDATION | PE NUMBER AND TITLE<br>0603319F Airborne Laser Demonstrator<br>PROJECT 0 |

(U) A. Project Cost Breakdown ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Major Contracts | 800 | 14983 | 14600 | 12000 |
| (U) Support Contracts | 360 | 1620 | 2525 | 2160 |
| (U) In-House/Miscellaneous Support | 785 | 2780 | 2829 | 5794 |
| Total | 1945 | 19303 | 19954 | 19954 |

(U) B. Budget Acquisition History and Planning Information

**Performing Organizations**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Rockwell Int<br>Conoga Park, CA | CPFF | 9 May 94 | 61945 | 61945 | | 400 | 7700 | 7300 | 6000 | 0 | 21400 |
| Boeing Defense & Space Group<br>Seattle, WA | CPFF | 9 May 94 | 61945 | 61945 | | 400 | 7700 | 7300 | 6000 | | 21400 |
| Support and Management Organizations | | | | | | | | | | | |
| Support Contracts | | | | | | 360 | 1700 | 2525 | 2160 | | 6745 |
| In House/Misc Sup | | | | | | 785 | 2900 | 2829 | 5794 | | 9437 |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - DEMONSTRATION AND VALIDATION | PE NUMBER AND TITLE<br>0603319F Airborne Laser Demonstrator<br>PROJECT<br>0 |

**Government Furnished Property** **NOT APPLICABLE**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to FY 1994 | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | | | | | | | |
| Support and Management Property | | | | | | | | | | |
| Test and Evaluation Property | | | | | | | | | | |

| | Total Prior to FY 1994 | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | | | | | | | |
| Subtotal Support and Management | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | |
| Total Project | | | | | | | |

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology

| | COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Program Element (PE) Cost | 19,900 | 48,291 | 32,627 | 36,443 | 40,941 | 45,780 | 49,640 | 51,753 | Continuing | Continuing |
| 0003 | Reusable Launch Vehicle Technology | 0 | 29,223 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29,223 |
| 1026 | Space Structures and Controls Technology | 0 | 600 | 1,200 | 1,200 | 2,000 | 2,800 | 3,600 | 4,354 | Continuing | Continuing |
| 2181 | Space Electronics and Software Technology | 10,984 | 10,068 | 11,527 | 11,527 | 12,300 | 12,422 | 12,760 | 12,902 | Continuing | Continuing |
| 3784 | Space Sensors and Satellite Communications Technology | 0 | 700 | 2,700 | 2,700 | 3,000 | 3,500 | 4,000 | 4,700 | Continuing | Continuing |
| 3834 | Space Technology Integration and Demonstration | 4,672 | 3,300 | 8,500 | 12,967 | 15,442 | 17,913 | 19,355 | 19,500 | Continuing | Continuing |
| 4400 | Space Control and Satellite Survivability Technology | 0 | 0 | 3,200 | 2,549 | 2,199 | 2,345 | 2,425 | 2,497 | Continuing | Continuing |
| 682J | Space Power and Thermal Management Technology | 4,244 | 4,400 | 5,500 | 5,500 | 6,000 | 6,800 | 7,500 | 7,800 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This Advanced Development program develops and demonstrates advanced spacecraft technologies including integrated space, ground, and flight demonstrations. The broad goal is to decrease innovative space technology transition time and reduce the associated development costs and risks of future space-based systems. Efforts are focused on five high payoff space technology areas: advanced space structures and structural controls; hardened space electronics and satellite control software; advanced passive/active space-based sensors and satellite communications; compact, low-cost, space power and thermal management; and satellite survivability. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the listed technical activities.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603401F Advanced Spacecraft Technology |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 20,459 | 24,200 | 26,730 | 32,863 | Cont |
| (U) Appropriated Value | 21,091 | 49,400 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -632 | -1,109 | | | |
| b. SBIR | -278 | | | | |
| c. Below Threshold Reprogramming | -281 | | | | |
| (U) Current President's Budget | 19,900 | 48,291 | 32,627 | 36,443 | Cont |

(U) Change Summary Explanation:

Funding: Changes reflect increased Air Force priority on space-related Science and Technology. The FY 1995 appropriation was increased $30 million by Congress for Reusable Launch Vehicle (RLV) technology in support of NASA.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary:** Not Applicable.

(U) **D. Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603401F Advanced Spacecraft Technology<br>PROJECT 0003 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0003 Reusable Launch Vehicle Technology | 0 | 29,223 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29,223 |

(U) A. **Mission Description and Budget Item Justification:** This project accounts for the FY 1995 Congressional add for Reusable (space) Launch Vehicle (RLV) technology development. Accompanying Congressional direction stipulated funds were to support the ongoing National Aeronautics and Space Administration (NASA) single-stage-to-orbit (SSTO) vehicle program. This Air Force RLV technology project directly complements and fully supports the NASA-led RLV program and has been coordinated and approved through NASA Headquarters. The tasks identified in this project summary represent the DoD equity in RLV technology development as recommended by the Space Launch Modernization Plan (SLMP) study and do not incur any outyear funding commitment except as budgeted in PE 0603302F, Project 0003. This project will be moved in FY 1996 to PE 0603302F, Space and Missile Rocket Propulsion Technology, and the title revised to Launch Vehicle Technologies.

(U) FY 1994: Not Applicable.

(U) FY 1995:

- (U) Apply advanced rocket propulsion technology to reusable launch vehicles. ($11,643K)
  - (U) Modify the design of the Integrated Power-Head (IPHD) pre-burner components.
  - (U) Demonstrate application of the advanced long life turbopump fluid film bearing technologies to reusable launch vehicles.
  - (U) Investigate high performance thrust cell unconventional nozzles and fundamental technologies.
- (U) Perform advanced reusable launch vehicle structures/tankage technology development. ($10,670K)
  - (U) Design and demonstrate lightweight, reusable launch vehicle structures.
  - (U) Design and demonstrate reusable launch vehicle (RLV) composite, cryogenic propellant tanks.
- (U) Perform advanced reusable launch vehicle thermal protection system technology development. ($2,910K)
  - (U) Design and demonstrate lightweight, reusable, maintainable and affordable thermal protection system critical technologies.
- (U) Perform advanced reusable launch vehicle operations technology development. ($1,000K)
  - (U) Develop and demonstrate reliable, cost effective reusable launch vehicle (RLV) ground and flight operations.
- (U) Perform advanced reusable launch vehicle high density propellant technology demonstration. ($3,000K)
  - (U) Investigate application of high density, high mass fraction propellant technologies to reusable launch vehicles.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology / PROJECT: 0003 |

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| (U) Current President's Budget | 0 | 29,223 | 0 | 0 | 29,223 |

(U) Change Summary Explanation:

Funding: Budget reflects Congressional add in FY 1995.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602269F, Hypersonic Technology Program.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603302F, Space and Missile Rocket Propulsion Technology.
- (U) PE 0603853F, Evolved Expendable Launch Vehicle Program.
- (U) UPN 242, NASA Reusable Launch Vehicle Program.
- (U) This project has been coordinated through the Project Reliance process and with NASA to harmonize efforts and eliminate duplication.

(U) **D. Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology

PROJECT: 1026

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1026 Space Structures and Controls Technology | 0 | 600 | 1,200 | 1,200 | 2,000 | 2,800 | 3,600 | 4,354 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project develops advanced composite structures and structural control technologies for future Air Force space and missile systems. Prior to FY 1995, the Air Force relied on Ballistic Missile Defense Organization (BMDO) funding to address its needs in this technology area. As BMDO budgets have declined, so has their funding in this area, necessitating Air Force investment to maintain critical spacecraft structures and controls technologies. Advanced space structure component efforts focus on the demonstration of new composite structure technologies whose goal is to significantly improve the payload mass fraction and shorten overall spacecraft fabrication time and cost. This project also develops advanced passive and active spacecraft structural control technologies. Structure vibration and shock suppression technologies are intended to significantly enhance space platform stability, improving the focusing/imaging ability of space-based optical components such as focal plane arrays developed in Project 3784 or solar cell arrays developed in Project 682J.

(U) FY 1994: Not Applicable.

(U) FY 1995:
- (U) Continue former BMDO advanced composite space vehicle structure technology development. ($300K)
  - (U) Complete design of all-composite satellite bus technology demonstrator to be flown on MightySat-1.
- (U) Continue former BMDO advanced spacecraft structural control technology development. ($300K)
  - (U) Complete non-pyrotechnic release device technology hardware fabrication.

(U) FY 1996:
- (U) Continue advanced composite spacecraft structures technology development. ($600K)
  - (U) Complete fabrication of the all-composite satellite bus technology demonstration to be flown on MightySat-1, showing 30-50% weight savings.
- (U) Continue advanced spacecraft structural controls technology development. ($600K)
  - (U) Assemble the non-pyrotechnic release device technology demonstration experiment to be flown on MightySat-1.

(U) FY 1997:
- (U) Continue advanced composite spacecraft structures technology development. ($600K)
  - (U) Demonstrate preliminary design of the next generation composite satellite bus for future space applications like the MilSatCom program.
- (U) Continue advanced spacecraft structural controls technology development. ($600K)
  - (U) Initiate launch vibration isolation technology demonstration program.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603401F Advanced Spacecraft Technology |
| | PROJECT<br>1026 |

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 600 | 1,200 | 1,963 | Cont |
| (U) Current President's Budget | 0 | 600 | 1,200 | 1,200 | Cont |

(U) Change Summary Explanation:

Funding: This project started in FY 1995 to continue former Ballistic Missile Defense Organization funded efforts critical to the Air Force.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603218C, Research and Support.
- (U) PE 0603302F, Space and Missile Rocket Propulsion Technology.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology

PROJECT: 2181

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2181 Space Electronics and Software Technology | 10,984 | 10,068 | 11,527 | 11,527 | 12,300 | 12,422 | 12,760 | 12,902 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project develops, demonstrates, and evaluates hardware, software, and modeling/simulation technologies, enabling interchangeable, interoperable, and standardized data and signal processing for existing and future Air Force space and missile systems. This project will demonstrate the capability to produce space-qualified, Very High Speed Integrated Circuit (VHSIC)-based components, wafer scale integration (WSI) packages, electronic processors, and reusable standardized satellite control software. In the near-term, this project concentrates on converting (e.g., hardening) commercial data and signal processor technologies for use in Air Force space and missile systems. Advanced electronic packaging technologies, reducing weight and volume, are being developed for broad military space applications. This project develops and demonstrates space data processor technologies like the Advanced Technology Insertion Module (ATIM) (32-bit) technology. The Advanced Spaceborne Computer Module (ASCM), ATIM's 16-bit predecessor, is currently baselined into 65 DoD, NASA, and commercial programs. This project develops and demonstrates space signal processor technologies like the Hardened Ada Signal Processor (HASP) program. It also develops low-cost, easily modifiable software and hardware architectures for ground control, satellite components, and autonomous satellite operations. The Multi-mission Advanced Ground Intelligent Control (MAGIC) program has developed a low-cost, flexible architecture for satellite control and mission operations. In the long-term, this project focuses on developing an integrated avionics-like architecture for satellites where high-speed data busses centralize many of the functions now scattered about the spacecraft. Additionally, this project develops very low-power electronics allowing dramatic size, weight, and power reductions for future Air Force space applications.

(U) FY 1994:

- (U) Continued development of space-qualifiable, advanced low-power, hardened data processors and memory technologies. ($8,684K)
  - (U) Completed advanced technology insertion module fault tolerance demonstration.
  - (U) Completed advanced technology insertion module preliminary design reviews for single board computer fabrication and test.
  - (U) Completed design and began fabricating Rad-6000 single chip hardened processor.
  - (U) Demonstrated fully fault tolerant 16-bit space computer system which recovered from 45 consecutively inserted faults.
- (U) Continued development of space-qualifiable, hardened signal processor electronics technologies and standard electronic devices. ($500K)
  - (U) Completed hardened Ada signal processor single chip design and 92% of layout.
  - (U) Investigated alternate silicon on insulator digital signal processor potential sources for space.
- (U) Continued space-qualifiable, advanced mixed-signal electronics packaging technology development, using commercial technology base. ($700K)
  - (U) Fabricated enough multi-chip memory modules to demonstrate a space-qualifiable solid state recorder technology for magnetic tape replacement.
  - (U) Completed analog signal processing module fabrication, demonstrating the technical feasibility of mixed multi-chip modules for space.
  - (U) Delivered advanced technology multi-chip module anti-jam filters.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology | PROJECT: 2181 |

- (U) Continued development of astrodynamics routines and reusable, space standardized software technologies. ($600K)
  - (U) Completed continuous thrust orbit transfer analysis and started continuous thrust orbit relocation technology study.
  - (U) Ported a research version of the Goddard trajectory determination system on a personal computer (PC), resulting in the successful transition of 150,000 lines of mainframe computer code to a PC.
  - (U) Defined and demonstrated a visual interface for satellite telemetry analysis; first step of the multi-mission advanced ground intelligent control program.
  - (U) Expanded reusable software architecture for on-board satellite processing domain analysis for use with Defense Meteorological Support Program and GE A2100 satellites including the communication and electrical power subsystems.
- (U) Continued development of space-qualifiable accelerated insertion of standard microelectronics components. ($500K)
  - (U) Modified commercial integrated circuits so they can be fabricated on space-qualified manufacturing lines.

(U) FY 1995:
- (U) Continue development of space-qualifiable, advanced low-power, hardened data processors and memory technologies. ($6,968K)
  - (U) Design and fabricate processor chipsets and other integrated circuits to provide complete core chipset for advanced technology space computer.
  - (U) Fabricate a breadboard and test functionality of full computer and operating system software.
- (U) Continue development of space-qualifiable, hardened signal processor electronics technologies and standard electronic devices. ($1,000K)
  - (U) Purchase license to fabricate a space-qualifiable version of a commercial digital signal processor design.
  - (U) Initiate transfer of a commercial digital signal processor to a space-qualified integrated circuit manufacturing line.
- (U) Continue space-qualifiable, advanced mixed-signal electronics packaging technology development, using commercial technology base. ($600K)
  - (U) Complete high-speed, single layer computer for three-dimensional integrated sensor processor.
  - (U) Develop robust analog processor multi-chip module and brassboard for space flight, demonstrating advanced packaging reliability.
- (U) Continue development of reusable, space standardized software technologies. ($600K)
  - (U) Complete multi-mission advanced ground intelligent control telemetry analysis development and test.
  - (U) Enhance multi-mission advanced ground intelligent control to provide assistance to satellite operators in anomaly resolution.
  - (U) Enhance multi-mission advanced ground intelligent control to include satellite commanding.
- (U) Continue development of space-qualifiable accelerated insertion of standard microelectronics components. ($900K)
  - (U) Transfer commercial field programmable gate array to a space-qualified integrated circuit manufacturing line.
  - (U) Fabricate and ground test space-qualifiable 8,000 gate, field programmable gate array.

(U) FY 1996:
- (U) Continue development of space-qualifiable, advanced low-power, hardened data processors and memory technologies. ($7,127K)
  - (U) Fabricate engineering model of standard satellite computer to demonstrate functionality and performance of data processors.
  - (U) Develop full capability operating system and applications software environment using desktop computer and hardware-in-the-loop.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology — PROJECT: 2181 |

- (U) Continue development of space-qualifiable, hardened signal processor electronics technologies and standard electronic devices. ($1,100K)
  - (U) Fabricate Digital Signal Processor in bulk Silicon.
  - (U) Demonstrate functionality and performance of space-qualifiable digital signal processor using commercial hardware/software tools.
- (U) Continue space-qualifiable, advanced mixed-signal electronics packaging technology development using commercial technology base. ($1,300K)
  - (U) Demonstrate two times increase in density and decrease in cost to space qualify high density interconnect technology.
  - (U) Integrate plastic/non-hermetic and three-dimensional (3-D) packaging technologies into a space demonstration.
- (U) Continue development of reusable, space standardized software technologies. ($1,000K)
  - (U) Enhance multi-mission advanced ground intelligent control software to include independent decision making capability.
  - (U) Develop a realistic training environment for ground spacecraft operators.
- (U) Continue development of space-qualifiable accelerated insertion of standard microelectronics components. ($1,000K)
  - (U) Fabricate and ground test space-qualifiable 2,000 field programmable gate arrays.
  - (U) Start demonstrating programmability of 8,000 field programmable gate array using commercial hardware/software tools.

(U) FY 1997:
- (U) Continue development of space-qualifiable, advanced low-power, hardened data processors and memory technologies. ($7,527K)
  - (U) Fabricate space-qualifiable configuration of 32-bit processor-based computers and demonstrate the full range of performance capabilities.
  - (U) Initiate design of advanced high throughput, low-power data processor-based on commercial technology base.
- (U) Continue development of space-qualifiable, hardened signal processor electronics technologies. ($800K)
  - (U) Fabricate silicon on insulator (SOI) version of space-qualifiable digital signal processor.
  - (U) Evaluate the ability of both bulk silicon and SOI version of the digital signal processor to perform in the space environment.
- (U) Continue space-qualifiable, advanced mixed signal electronics packaging technology development such as 3-D wafer scale integration. ($1,400K)
  - (U) Demonstrate integrated sensor processing 3-D electronics assembly in robust space-qualifiable configuration.
  - (U) Demonstrate improved multi-chip module technology by constructing a complex multi-processor system.
- (U) Continue development of reusable, space standardized software technologies. ($1,100K)
  - (U) Add the ability to assist in the identification and resolution of unknown anomalies in multi-mission advanced ground intelligent control software.
  - (U) Analyze capabilities that can be integrated into autonomous satellite operations.
- (U) Continue development of space-qualifiable accelerated insertion of standard electronics. ($700K)
  - (U) Complete programmability demonstration of both 8,000 and 2,000 gate, field programmable gate arrays.
  - (U) Evaluate the functionality, performance, and ability of both the 8,000 and 2,000 gate, field programmable gate arrays to perform in space environment.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology — PROJECT: 2181 |

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 11,171 | 10,300 | 10,400 | 10,800 | Cont |
| (U) Current President's Budget | 10,984 | 10,068 | 11,527 | 11,527 | Cont |

(U) Change Summary Explanation:

Funding: Changes reflect increased Air Force priority on space-related Science and Technology.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0303601F, MILSTAR Satellite Communications System.
- (U) PE 0305160F, Defense Meteorological Satellite Program (DMSP).
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603311F, Ballistic Missile Technology.
- (U) PE 0603215C, Limited Defense System.
- (U) PE 0603218C, Research and Support.
- (U) PE 0603226E, Experimental Evaluation of Major Innovative Technologies.
- (U) PE 0604609F, Reliability and Maintainability Technology Insertion Program (RAMTIP).
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology

PROJECT: 3784

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3784 Space Sensors and Satellite Communications Technology | 0 | 700 | 2,700 | 2,700 | 3,000 | 3,500 | 4,000 | 4,700 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project was refocused last year because of previous Congressional actions on the 60 GigaHertz (GHz) communication work and because the Air Force is assuming responsibility for spaceborne passive sensors from the Ballistic Missile Defense Organization (BMDO). This project develops military space-based ground surveillance and satellite communication technologies. The project focuses on advancing space-based application of commercial sensors and communication technologies while improving performance, schedule, maturity, cost, and/or risk to future Air Force systems. The primary focus of the sensor efforts is to meet spaceborne sensor needs for theater missile defense. The focus of the satellite communication effort is to develop radio frequency (RF) and laser technologies for future military intra-space and space-ground communication systems. This project seeks to improve affordability, reliability, and performance while significantly reducing space sensor and satellite communication size, weight, cost, cooling, and power requirements.

(U) FY 1994: Not Applicable.

(U) FY 1995:
- (U) Continue former BMDO space-based reconnaissance/surveillance passive sensor technology meeting Air Force high priority needs. ($700K)
  - (U) Initiate and complete design and fabrication of large format focal plane array for mid-wave infrared applications.

(U) FY 1996:
- (U) Continue space-based reconnaissance/surveillance sensor technology meeting high priority Air Force needs. ($2,400K)
  - (U) Evaluate and deliver large format focal plane arrays for mid-wave infrared applications.
  - (U) Complete passive sensor subsystem affordability analysis.
  - (U) Evaluate performance of advanced signal processing algorithms for surveillance sensors.
  - (U) Assess operational utility of candidate space-based surveillance technologies.
- (U) Develop satellite communication technology which supports space communications needs. ($300K)
  - (U) Develop ultra-lightweight radio frequency crosslink subsystem component technology.
  - (U) Assess commercial communication technology for transition to military systems.

(U) FY 1997:
- (U) Continue space-based reconnaissance/surveillance sensor technology meeting Air Force high priority needs. ($2,400K)
  - (U) Initiate design study for dual-band space-based reconnaissance sensors for missile defense applications.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603401F Advanced Spacecraft Technology<br>PROJECT 3784 |

- (U) Investigate efforts to increase yield and reliability of large format infrared focal plane arrays.
- (U) Evaluate performance of advanced signal processing algorithms for surveillance sensors.
- (U) Assess operational utility of candidate space-based surveillance technologies.

– (U) Develop satellite communication technology which supports space communications needs. ($300K)

- (U) Develop 150 megabit multi-mode modem technology.
- (U) Assess commercial communication technology for transition to military systems.

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 1,500 | 2,700 | 3,900 | Cont |
| (U) Current President's Budget | 0 | 700 | 2,700 | 2,700 | Cont |

(U) Change Summary Explanation:

Funding: The FY 1995 program continued former Ballistic Missile Defense Organization funded efforts critical to the Air Force. Changes reflect increased Air Force priority on various space-related Science and Technology efforts.

Schedule: Not Applicable.

Technical: Not Applicable,

**(U) C. Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0303601F, MILSTAR Satellite Communications System.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0602702F, Command/Control/Communication Technology.
- (U) PE 0603226E, Experimental Evaluation of Major Innovative Technologies.
- (U) PE 0604711F, Extremely High Frequency Satellite Communications Research and Development.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

**(U) D. Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology

PROJECT: 3834

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3834 Space Technology Integration and Demonstration | 4,672 | 3,300 | 8,500 | 12,967 | 15,442 | 17,913 | 19,355 | 19,500 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project integrates government and commercially developed technologies onto spacecraft and launch vehicles, demonstrating their value in addressing warfighter needs and in supporting the warfighter by defining new operational concepts, tactics procedures, and doctrine on the Integrated Space Technology Flight (ISTF) series. The highly successful Technology for Autonomous Operational Survivability (TAOS) program is the basis for the ISTF series. TAOS is the only DoD satellite autonomy and survivability demonstration. TAOS was launched in March 1994 and is currently demonstrating and validating advanced spaceborne computers, autonomous navigation hardware/software, laser sensors, radar sensors, advanced data buses, and other operational concepts. TAOS has allowed space system operators and users, for the first time, to conduct space exercises, directly leading to enhanced warfighter capabilities. In FY 1995, the space technology community is evaluating mission requirements and potential technology solutions in PE 0602601F, Project 8809. The results of this study will used to determine the final ISTF-1 space technology flight demonstration composition. ISTF-1 will demonstrate those selected technologies showing the greatest potential to meet Air Force Space Command's (AFSPC's) highest priorities as compiled in their current Mission Area Plans (MAPs) and MAP Deficiency lists.

(U) FY 1994:

- (U) Launched theTAOS flight experiment. ($2,600K)
  - (U) Completed TAOS launch vehicle and spacecraft bus integration and assembly.
  - (U) Conducted navigation, laser, and radar sensor experiments on-board the TAOS experiment.
  - (U) Supported and participated in several major U.S. Space Command exercises using the TAOS spacecraft.
- (U) Began data analysis of technology for autonomous operational survivability experiment. ($800K)
  - (U) Initiated analysis of navigation, laser, and radar sensor data.
  - (U) Analyzed major spacecraft anomalies and prepared recovery plan.
- (U) Began planning for next integrated space technology demonstration. ($1,272K)
  - (U) Completed briefing to industry for advanced space technology demonstration.
  - (U) Established integrated teams with Headquarters Space and Missiles System Center at Los Angeles AFB, the Space Warfare Center at Falcon AFB, Air Force Space Command at Peterson AFB, and Phillips Laboratory at Kirtland AFB for an advanced space technology demonstration program.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology / PROJECT: 3834 |

(U) FY 1995:
- (U) Complete the Technology for Autonomous Operational Survivability (TAOS) flight experiment. ($2,300K)
  - (U) Complete spacecraft anomaly recovery.
  - (U) Complete exercises and assessments.
  - (U) Complete navigation, laser, and radar sensor experimentation.
- (U) Perform TAOS post-mission analysis. ($1,000K)
  - (U) Conduct final technology (navigation, laser, and radar sensors) assessments and complete the draft final reports.

(U) FY 1996:
- (U) Complete the TAOS post-mission analysis. ($3,000K)
  - (U) Complete TAOS mission data analysis and deliver final report.
  - (U) De-orbit TAOS spacecraft, dispense mission unique equipment/software, and close out contract.
- (U) Begin Integrated Space Technology Flight ( ISTF-1) development. ($4,500K)
  - (U) Conduct ISTF-1 preliminary design.
  - (U) Complete ISTF-1 critical design.
  - (U) Begin ISTF-1 long-lead time hardware procurement.
- (U) Develop modeling/simulation for integrated satellite payloads, mission utility, and system engineering analysis. ($1,000K)
  - (U) Complete satellite prototype and environmental effects simulation software interfaces and demonstrate real-time throughput.

(U) FY 1997:
- (U) Continue ISTF-1 demonstration development. ($10,967K)
  - (U) Continue ISTF-1 long-lead time hardware procurement and fabrication.
  - (U) Begin ISTF-1 payload hardware fabrication.
  - (U) Start ISTF-1 payload module fabrication.
- (U) Perform requirements definition and technology studies to support ISTF-2. ($1,000K)
  - (U) Define concepts and technology objectives.
- (U) Develop modeling/simulation for integrated satellite payloads, mission utility, and system engineering analysis. ($1,000K)
  - (U) Establish real-time connectivity to synthetic operational test and evaluation environments.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603401F Advanced Spacecraft Technology | PROJECT<br>3834 |

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 4,858 | 7,300 | 7,730 | 10,700 | Cont |
| (U) Current President's Budget | 4,672 | 3,300 | 8,500 | 12,967 | Cont |

(U) Change Summary Explanation:

Funding: Changes reflect increased Air Force priority on space-related Science and Technology.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603402F, Space Test Program.
- (U) PE 0603438F, Satellite Systems Survivability.
- (U) PE 0604609F, Reliability and Maintainability Technology Insertion Program (RAMTIP).
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology

PROJECT: 4400

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4400 Space Control and Satellite Survivability Technology | 0 | 0 | 3,200 | 2,549 | 2,199 | 2,345 | 2,425 | 2,497 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project develops and demonstrates the technologies required to assure operation of U.S. space assets in hostile warfighting environments. It provides the resources necessary to perform threat susceptibility/vulnerability assessments of critical components, subsystems, and systems. This project also identifies and develop solutions to mitigate vulnerabilities. Further, it develops and demonstrates technology options to support balanced protection strategies to detect, avoid, and operate in hostile threat environments. Efforts under this project will be closely integrated with the core technologies development under Projects 1026, 2181, 3784, 682J, and, where appropriate, end products included in the demonstrations of Project 3834. This project assumes the Air Force's responsibility for spacecraft survivability technology from the Ballistic Missile Defense Organization (BMDO). Starting in FY 1996, PE 0603438F, Satellite Systems Survivability, was transferred to this PE as Project 4400.

(U) FY 1994: Not Applicable.

(U) FY 1995: Not Applicable.

(U) FY 1996:

- (U) Continue selected Directed Energy Weapon (DEW) threat environment susceptibility/vulnerability assessments on critical space-based sensor and communications subsystems. ($925K)
  - (U) Perform sensor laser jamming model refinements and vulnerability assessments.
  - (U) Perform sensor radio frequency (RF) susceptibility evaluations.
  - (U) Perform communication subsystems disruption/degradation modeling and susceptibility evaluations.
  - (U) Initiate ground-based observations of spacecraft environmental interactions.
- (U) Select candidate RF/high-powered microwave (HPM) detector technologies for threat warning sensor development. ($2,200K)
  - (U) Develop miniaturized radar warning detector.
  - (U) Evaluate communication intrusion/interference detection technologies.
  - (U) Evaluate HPM detection concepts.
  - (U) Develop/integrate sensor signal processor design.
- (U) Evaluate candidate DEW sensor jamming protection techniques for critical sensor optical components. ($75K)
  - (U) Assess candidate RF mitigation techniques for optical sensors.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology — PROJECT: 4400 |

(U) FY 1997:
- (U) Continue multi-threat assessments on critical space assets and evaluate the potential susceptibilities of evolving technologies. ($633K)
  - (U) Perform analytical and experimental verification of selected laser and radio frequency (RF) jamming sensor protection techniques.
  - (U) Perform analytical and experimental verification of RF interference mitigation techniques for advanced communication subsystems.
  - (U) Complete ground-based observations of spacecraft environmental interactions.
- (U) Perform RF/high-powered microwave (HPM) threat warning sensors testing. ($1,766K)
  - (U) Integrate radar warning, intrusion/interference, and HPM detector concepts.
  - (U) Optimize/integrate signal processor design.
  - (U) Integrate optimized antenna configuration.
  - (U) Test integrated RF/HPM threat warning sensor.
- (U) Continue evaluating and demonstrating Defense Early Warning (DEW) sensor jamming protection techniques. ($150K)
  - (U) Demonstrate communication subsystem front-end RF protection devices.

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| (U) Current President's Budget | 0 | 0 | 3,200 | 2,549 | Cont |

(U) Change Summary Explanation:

Funding: Starting in FY 1996, PE 0603438F, Satellite Systems Survivability, was transferred to this PE as Project 4400.

Schedule: Not Applicable.

Technical: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603401F Advanced Spacecraft Technology |
| | PROJECT<br>4400 |

(U) C. **Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603410F, Space Systems Environmental Interactions Technology.
- (U) PE 0603438F, Satellite Systems Survivability.
- (U) PE 0603605F, Advanced Weapons Technology.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology

PROJECT: 682J

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 682J Space Power and Thermal Management Technology | 4,244 | 4,400 | 5,500 | 5,500 | 6,000 | 6,800 | 7,500 | 7,800 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project develops and demonstrates compact, low-cost, spacecraft and ballistic missile power generation, storage, distribution, and thermal management technologies, including cryogenic cooling technologies. Power generation work focuses on lightweight, low-cost, low volume, and survivable solar cell arrays. Energy storage work focuses on lightweight nickel hydrogen ($NiH_2$) and sodium sulfur (NaS) spacecraft batteries for extended (five-ten year) satellite missions. Power distribution efforts focus on producing lightweight, high efficiency, standardized power busses for use on future Air Force space and missile programs. This project also develops and demonstrates the non-nuclear technologies associated with space nuclear power systems such as power conversion, conditioning, and power system thermal management. It investigates alternative technologies to increase space vehicle power subsystem performance, lifetime, survivability, and safety while reducing costs/risks. In FY 1995, this project assumed responsibility from the Ballistic Missile Defense Organization (BMDO) to develop spacecraft thermal management technologies such as cryogenic coolers necessary to maintain passive sensors in low optical backgrounds.

(U) FY 1994:

- (U) Continued development of space conventional power technologies such as advanced solar cell arrays. ($1,200K)
  - (U) Flight-qualified primary power (for the spacecraft) panels and experimental solar cell panels and integrated them onto a research satellite.
  - (U) Recorded record efficiency rating for gallium indium phosphide /gallium arsenide solar cells with 24.2% energy conversion.
  - (U) Demonstrated world record efficiency (9.3%) for copper-indium-diselenide solar cell on a flexible, electrically insulating substrate.
- (U) Continued development of space vehicle conventional power technologies such as compact volume/weight batteries. ($2,400K)
  - (U) Placed over 200 nickel hydrogen ($NiH_2$) batteries on test, achieving over 30,000 cycles.
  - (U) Demonstrated sodium sulfur (NaS) batteries with 150 watt hour/kilogram power density on low earth orbit profile.
  - (U) Developed standardized manufacturing, testing, and modeling procedures for nickel cadmium (NiCd) and $NiH_2$ cells.
  - (U) Completed thermal vacuum and cycle testing of the integrated power panel.
  - (U) Fabricated 85 watt fully populated (in solar cells) integrated power panels for ground- and flight-qualification.
- (U) Continued development of non-nuclear technologies associated with space nuclear power systems such as thermionics. ($644K)
  - (U) Characterized lithium heat pipe assembly for thermionic heat pipe module which indicated significantly reduced temperature asymmetrics.
  - (U) Vacuum tested an alkali metal thermal to electric conversion cell.
  - (U) Completed characterization of the emitter heat pipe.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603401F Advanced Spacecraft Technology / PROJECT: 682J |

(U) FY 1995:
- (U) Continue development of space conventional power technologies such as advanced solar cell arrays. ($1,100K).
  - (U) Investigate addition of active germanium bottom cell to gallium indium phosphide /gallium arsenide dual-junction cell to boost efficiency to >26%.
  - (U) Investigate all-back mounted electrical contact, thin gallium arsenide cells for improved efficiency and system integration.
- (U) Continue development of space vehicle conventional power technologies such as compact volume/weight batteries. ($2,100K)
  - (U) Complete abuse testing of sodium sulfur cells for flight test in FY 1996.
  - (U) Conduct solid state primary battery development program for launch vehicle applications.
  - (U) Initiate life test verification of nickel hydrogen battery first in a two-cell pressure vessel then in operationally more realistic 22-cell.
- (U) Continue development of non-nuclear technologies associated with space nuclear power systems such as thermionics technology. ($600K)
  - (U) Continue testing energy conversion technologies such as alkali-metal thermal to electric converter (AMTEC), cascade converters, thermionics, and liquid metal heat pipes.
- (U) Continue former Ballistic Missile Defense Organization space vehicle thermal management technology development such as cryogenic coolers. ($600K)
  - (U) Start development of cryogenic integration technologies.

(U) FY 1996:
- (U) Continue development of space conventional power technologies such as advanced solar cells and arrays. ($2,800K)
  - (U) Complete and transition multi-junction higher efficiency solar cells to the Manufacturing Technology office.
  - (U) Complete development of Thin-Film Roll-out Array for improved stowage and deployment.
  - (U) Flight test 'Channel Astro' edge concentrating array (150 watts/kilogram) on a small satellite.
- (U) Continue development of space vehicle conventional power technologies such as compact volume/weight batteries. ($1,400K)
  - (U) Perform life testing of nickel hydrogen ($NiH_2$) batteries.
  - (U) Flight test sodium sulfur (NaS) batteries.
- (U) Continue development of non-nuclear technologies associated with space nuclear power systems such as thermionics technology. ($300K)
  - (U) Initiate more efficient AMTEC cells (25%) development.
- (U) Continue space vehicle thermal management technology development such as cryogenic coolers. ($1,000K)
  - (U) Initiate single stage reverse Brayton cryocooler development.

(U) FY 1997:
- (U) Continue development of space conventional power technologies such as advanced solar cells and arrays. ($2,800K)
  - (U) Flight test Thin Film Roll-Out Array.
  - (U) Develop 30% efficient energy conversion devices.
- (U) Continue development of space vehicle conventional power technologies such as compact volume/weight batteries. ($1,400K)
  - (U) Continue $NiH_2$ low earth orbit life testing.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603401F Advanced Spacecraft Technology |
| | PROJECT<br>682J |

- (U) Develop 200 watt hour/kilogram (WHr/kg) solid state lithium battery for satellite applications.
- (U) Continue development of non-nuclear technologies associated with space nuclear power systems such as thermionics technology. ($300K)
  - (U) Develop 25% alkali metal thermal to electric conversion cells.
  - (U) Design and fabricate thermionic bed power system components for evaluation.
- (U) Continue space vehicle thermal management technology development such as cryogenic coolers. ($1,000K)
  - (U) Qualify single stage reverse Brayton cryocooler for space applications.

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 4,430 | 4,500 | 4,700 | 5,500 | Cont |
| (U) Current President's Budget | 4,244 | 4,400 | 5,500 | 5,500 | Cont |

(U) Change Summary Explanation:

Funding: Changes reflect increased Air Force priority on space-related Science and Technology.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602203F, Aerospace Propulsion.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603302F, Space and Missile Propulsion Technology.
- (U) PE 0603218C, Research and Support.
- (U) PE 0603226E, Experimental Evaluation of Major Innovative Technologies.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) **D. Schedule Profile:** Not Applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0603402F Space Test Program

PROJECT: 2617

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2617 Space Research Flight Support* | 41,473 | 65,477 | 57,710 | 36,120 | 38,210 | 40,599 | 40,892 | 42,772 | Continuing | Continuing |

*** FY95 submission referred to project 2617 as "Free-Flyer Spacecraft Missions." Projects 2620 and 4233 have been deleted and 2617 renamed in this submission. FY94 and FY95 funding reflect sums of all three projects.**

(U) A. **Mission Description and Budget Item Justification**

(U) Space Test Program (STP) is a Budget Activity/Research Category RDT&E Management Support program. It provides support to the DoD space research community by providing unique spaceflight testing opportunities for experiments whose scope ranges from basic research to advanced development. The experiments STP supports demonstrate new space system technologies, concepts and designs or determine space environmental effects on DoD space systems and search out methods for mitigating them. This DoD program provides the only substantial spaceflight capability to perform fly-before-buy demonstrations of advanced technologies in a space environment.

(U) The space research experiments STP accommodates are justified, developed and provided by various Service laboratories and DoD agencies whose goal is to improve DoD's current and future operational space system's performance. Experiments are considered for spaceflight based on the priority they are assigned by a DoD Space Experiment Review Board independent of the STP Program Office, which is comprised of representatives from the Air Force, Army, Navy, BMDO, and ARPA who have expertise in DoD operational space requirements. STP is given the resulting prioritized list of experiments and seeks out the least expensive means of spaceflight available to fly as many of the experiments it can within the constraints of priority, opportunity and available funding. Spaceflight opportunities utilized include piggybacking on military or commercial satellites, both foreign and domestic, and the Space Shuttle. For those experiments whose requirements cannot be satisfied with secondary opportunities, dedicated STP spacecraft and launch vehicle hardware are procured as required. This includes Small and Medium Launch Vehicle class satellites as determined by experiment requirements and available funding, as well as Small Launch Vehicle class boosters themselves. Medium Launch Vehicle class boosters are provided as required by PE 35119F. If a particular manifested experiment fails to materialize, or is deemed impractical to fly given current funding or the appropriate spaceflight opportunity becomes unavailable, STP shifts what resources remain to provide spaceflight support for the next highest priority experiments.

(U) The Air Force requires a stable pool of funds for this level of effort program which can be applied with flexibility to take advantage of whatever means of spaceflight is deemed most cost effective for a given experiment or complement of experiments. This flexibility is essential to take advantage of inexpensive "target of opportunity" space hardware , including operational spacecraft where margin is usually firmly identified during the later stages of spacecraft development. This assures the greatest amount of DoD space research accomplished with the limited funds available. Without the requested funding, DoD will lose its most successful and cost effective capability to launch and test new technologies prior to their initial incorporation into very expensive and demanding operational space systems. Furthermore, the individual Services and DoD agencies will be forced to duplicate this low cost, risk mitigating capability. This will result in the loss of the

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0603402F Space Test Program / PROJECT: 2617 |

contractual economy of scale a single space test organization provides as well as the filtering function of the STP Space Experiment Review Board to assure minimum duplication of the space research experiments themselves.

(U) FY 1994

– (U) Worked spaceflight opportunities for as many of the highest ranked experiments from the 1993 Space Experiment Review Board (SERB) list as possible consistent with the availability of practical spaceflight means and funding. Continued to develop the spaceflight missions for those experiments currently manifested and manage the launch effort for those ready for flight as appropriate. ($41,473)

(U) FY 1995

– (U) Work spaceflight opportunities for as many of the highest ranked experiments from the 1994 SERB list as possible consistent with the availability of practical spaceflight means and funding. Continue to develop the spaceflight missions for those experiments currently manifested and manage the launch effort for those ready for flight as appropriate. ($52,477)

– (U) Congressionally directed Miniature Sensor Technology Integration (MSTI) program unrelated to Space Test Program ($13,000)

(U) FY 1996

– (U) Work spaceflight opportunities for as many of the highest ranked experiments from the 1995 SERB list as possible consistent with the availability of practical spaceflight means and funding. Continue to develop the spaceflight missions for those experiments currently manifested and manage the launch effort for those ready for flight as appropriate. ($57,710)

(U) FY 1997

– (U) Work spaceflight opportunities for as many of the highest ranked experiments from the 1996 SERB list as possible consistent with the availability of practical spaceflight means and funding. Continue to develop the spaceflight missions for those experiments currently manifested and manage the launch effort for those ready for flight as appropriate. ($36,120)

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 43,274 | 62,084 | 68,533 | 64,746 | Continuing |
| (U) Appropriated Value | 43,918 | 67,998 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | - 644 | - 1,365 | | | |
| b. SBIR | - 601 | - 1,139 | | | |
| c. Omnibus or Other Above Threshold Reprogram | - 1,200 | | | | |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0603402F Space Test Program / PROJECT: 2617 |

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| d. Below Threshold Reprogramming | | - 17 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | - 10,823 | - 28,626 | |
| (U) Current Budget Submit/President's Budget | 41,473 | 65,477 | 57,710 | 36,120 | Continuing |

(U) Change Summary Explanation:

Funding: FY97 and the following outyears reflect a move to reimbursability from non-Air Force users and not a significant reduction in overall actual level of effort. The $10,823,000 reduction in FY96 represents an intermediate transition to reimbursability.

Schedule: Mission delay induced cost growth.

Technical: Not Applicable.

**(U) C. Other Program Funding Summary ($ in Thousands):**

Not Applicable.

**Related RDT&E:**

(U) PE #305119F, (Medium Launch Vehicles).

**(U) D. Schedule Profile** (Current projection. Experiments are added as new spaceflight opportunities and budget permits)

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) AMOS (STS-61) | X | | | | | | | | | | | | | | | |
| (U) CONCOP-1, APE-B (STS-60) | | X | | | | | | | | | | | | | | |
| (U) BETSU, AMOS, APE-B (STS-62) | | X | | | | | | | | | | | | | | |
| (U) ACRE (S93-2) | | X | | | | | | | | | | | | | | |
| (U) TAOS (P90-5) | | X | | | | | | | | | | | | | | |
| (U) STL (NASA), VFT-4 (STS-59) | | | X | | | | | | | | | | | | | |
| (U) SIDEX (P91-2) | | | X | | | | | | | | | | | | | |
| (U) DUCTED, ADS, CHAMPION, PEA (P90-1) | | | X | | | | | | | | | | | | | |
| (U) MAST, AMOS (STS-65) | | | | X | | | | | | | | | | | | |

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

DATE: February, 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0603402F Space Test Program

PROJECT: 2617

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) PASP Plus, CRUX, FERRO (P90-6/APEX) | | | | X | | | | | | | | | | | | |
| (U) MAST, AMOS, RME III, LITE-1 (STS-64) | | | | X | | | | | | | | | | | | |
| (U) CREAM, MAST (STS-68) | | | | X | | | | | | | | | | | | |
| (U) SWIM (S91-4) | | | | | X | | | | | | | | | | | |
| (U) MAHRSI (STS66/CRIS-SPAS: S90-4) | | | | | X | | | | | | | | | | | |
| (U) ACTEX II, EDMM, SQUOD, SAMMES, SAWAFE (P92-2) | | | | | X | | | | | | | | | | | |
| (U) FUVIS, AMOS, MSX, WINDEX, CREAMS(2), RME III, STL (STS-63) | | | | | | X | | | | | | | | | | |
| (U) MSX (STS-67) | | | | | | X | | | | | | | | | | |
| (U) HERCULES, STL-B, MSX, AMOS, VFT-4, RME III, WINDEX, MIS-B (STS-70) | | | | | | | X | | | | | | | | | |
| (U) CHARGECON-GEO (S90-3) | | | | | | | | X | | | | | | | | |
| (U) REX II (P94-2) | | | | | | | | X | | | | | | | | |
| (U) STL (NASA)/NIHL (STS-69) | | | | | | | | X | | | | | | | | |
| (U) BINRAD (RUSSIAN RESURS) | | | | | | | | X | | | | | | | | |
| (U) IRIM (STS-72) | | | | | | | | X | | | | | | | | |
| (U) LMTE (LiTE) (STS-XX/S93-5) | | | | | | | | TBD | | | | | | | | |
| (U) TRIS II (STS-XX/S85-2) | | | | | | | | TBD | | | | | | | | |
| (U) FLEX BEAM (STS-XX/P93-6) | | | | | | | | TBD | | | | | | | | |
| (U) FORTE (P94-1) | | | | | | | | | X | | | | | | | |
| (U) ESEX, USA, GIMI, SPADUS, HIRAAS, HTSSE II, CIV, EUVIP (P91-1/ARGOS) | | | | | | | | | | X | | | | | | |
| (U) POGS-II (S92-1) | | | | | | | | | | | | | | | X | |

*NOTE: NASA does not manifest shuttle flights (STS) beyond 18 months.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603410F Space Systems Environmental Interactions Technology Development

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 3,531 | 4,148 | 3,479 | 3,280 | 4,179 | 4,279 | 4,377 | 4,476 | Continuing | Continuing |
| 2821 Space Systems Design and Test Standards | 180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Continuing | Continuing |
| 2822 Space Environmental Impact Test | 2,368 | 3,158 | 2,194 | 1,747 | 2,764 | 3,229 | 3,827 | 4,076 | Continuing | Continuing |
| 2823 Space Hazards Mitigation | 983 | 990 | 1,285 | 1,533 | 1,415 | 1,050 | 550 | 400 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This Advanced Development program develops and demonstrates cost-effective solutions to mitigate hazardous space environmental interactions that degrade spacecraft operations. The information gained through these programs is directly transferred to operational users in the form of new and revised military standards, handbooks, and computer-aided engineering and assessment tools. Advanced technology products include: (1) an autonomous active charge control system to prevent charge buildup on high-altitude spacecraft; (2) a compact environmental anomaly sensor to provide warning to satellites of space-environmental conditions likely to cause anomalous operations; and (3) improved specifications for advanced solar array technologies from the Photovoltaic Array Space Power Plus Diagnostics experiment. Additional space experiments are the Charging Hazards and Wake Studies experiment to determine space environmental hazards to exposed high voltages, the Shuttle Potential and Return Electrons Experiment to investigate the effect of high current electron beams on the ambient space environment, and the Space Waves in Plasmas Experiment to look at space effects on high-frequency radio transmissions. This program's objective is to improve Air Force space system survivability and reliability and expedite the transfer of new technology into planned military capabilities. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development |

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 3,620 | 4,200 | 4,178 | 4,355 | Cont |
| (U) Appropriated Value | 3,640 | 4,200 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -20 | -52 | | | |
| b. SBIR | -42 | | | | |
| c. Below Threshold Reprogrammings | -47 | | | | |
| (U) Current President's Budget | 3,531 | 4,148 | 3,479 | 3,280 | Cont |

(U) Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:** Not Applicable.

(U) D. **Schedule Profile:** Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603410F Space Systems Environmental Interactions Technology Development

PROJECT: 2821

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2821 Space Systems Design and Test Standards | 180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project integrates the results of experiments conducted under Project 2822 into useful analysis tools for space system operators and designers. Project output improve design guidelines and test standards, help develop new radiation models and microelectronic test procedures, and enhance computer algorithm codes/models. Results are used by the Air Force Space and Missile Systems Center (SMC).

(U) FY 1994:
- (U) Completed Spacecraft Charging Model MIL-Standard documentation and final report. ($65K)
- (U) Analyzed the Combined Release and Radiation Effects Satellite low-energy electron data. ($50K)
- (U) Transferred Single Event Upset model to SMC. ($65K)

(U) FY 1995: Not Applicable.

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 180 | 0 | 0 | 0 | Cont |
| (U) Current President's Budget | 180 | 0 | 0 | 0 | Cont |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development |
| | PROJECT<br>2821 |

(U) Change Summary Explanation:

Funding: Effort incorporated into Projects 2822 and 2823 in FY 1995.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602101F, Geophysics.
- (U) NASA/Air Force Space technology Interdependency Group coordinates efforts and reviews programs annually.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) **D. Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development<br>PROJECT 2822 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2822 Space Environmental Impact Test | 2,368 | 3,158 | 2,194 | 1,747 | 2,764 | 3,229 | 3,827 | 4,076 | Continuing | Continuing |

(U) A. Mission Description and Budget Item Justification: To counter adverse spacecraft-environment interactions, experiments must be conducted to understand how new technologies are affected. Much remains unknown on the exact interaction mechanisms that cause plasma-induced current leakage and arcing at higher operating voltages, radiation damage to solar arrays and electronic sensors, and deep-dielectric charging arcs that cause spurious signals and upsets in microelectronics. This project will provide: (1) significant improvements in the Science and Technology base by developing space instrumentation to measure hazards posed by the natural environment; (2) increased performance and longer lifetimes for space systems; and (3) an earlier capability to withstand the effects of the space environment.

(U) FY 1994:
- (U) Developed and tested miniaturized space plasma sensors; characterized plasma in and around spacecraft wakes to improve low-earth environmental specifications to provide critical validation of charge analysis modeling codes necessary for spacecraft designers. ($680K)
  - (U) Launched space hazard sensors (Mission 1) as part the Wake Shield Facility on Space Transportation System-60; published preliminary report.
- (U) Demonstrated next-generation solar array technologies to provide the requisite pedigree of proven performance in space before being integrated into future power systems; characterized array interactions with natural space environment. ($710K)
  - (U) Launched Photovoltaic Array Space Power Plus Diagnostics on the APEX-satellite mission and began analysis of the flight data.
- (U) Determined vehicle charging and environmental interactions which will result in new preventive measures to protect spacecraft from charging hazards, enhanced analytical models of vehicle charging, and spacecraft environmental interactions directly applicable to future high-powered space systems. ($735K)
  - (U) Fabricated the Signature Identification and Contamination Interaction Measurements (SICIM) Infrared Imager (IRIM) flight unit; continued IRIM mission planning.
  - (U) Continued Shuttle Potential and Return Electrons Experiment data analysis, published final report, and validated large-structure charging algorithm.
- (U) Determined space environment interactions that limit performance of long-range, high frequency communications and radar systems, resulting in design and performance standards to counter scintillation effects and decrease radio systems susceptibility to plasma-induced environmental interactions. ($243K)
  - (U) Fabricated and delivered the instruments for flight aboard the Canadian Space Agency sounding rocket to study high-frequency radio propagation in space plasmas.

(U) FY 1995:
- (U) Develop and test miniaturized space plasma sensors; characterize plasma in and around spacecraft wakes to improve low-earth environmental specifications to provide critical validation of charge analysis modeling codes necessary for spacecraft designers. ($990K)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development<br>PROJECT 2822 |

- (U) Continue analysis on plasma data collected from the space hazard sensors Mission 1 and publish reports to validate charge analysis modeling codes.
- (U) Upgrade space hazard sensors hardware from Mission 1 and launch Mission 2 to demonstrate improved performance from Mission 1.
- (U) Begin analysis of plasma data collected during Mission 2 to verify performance of space plasma sensors and to further validate analysis modeling codes.
- (U) Based on Mission 1 and 2 performances, provide the Defense Meteorological Satellite Program a miniaturized space plasma sensor design.

- (U) Demonstrate next-generation solar array technologies to provide the requisite pedigree of proven performance in space before being integrated into future power systems; characterize array interactions with natural space environment. ($875K)
  - (U) Support on-orbit operations of advanced solar arrays to conduct the experiments and collect data required to prove the space performance.
  - (U) Analyze data and produce preliminary reports on high-voltage plasma interactions and on advanced solar array radiation degradation for use in updating space power design guidelines and test standards.
- (U) Determine vehicle charging and environmental interactions which will result in new preventive measures to protect spacecraft from charging hazards, enhanced analytical models of vehicle charging, and spacecraft environmental interactions directly applicable to future high-powered space systems. ($500K)
  - (U) Incorporate charging algorithm from Shuttle Potential and Return Electrons Experiment into modeling codes.
  - (U) Prepare hardware for reflight to obtain data on vehicle charging effects and environmental interactions of the very high-power generation created by a long tether in space and the associated high energy electron beam discharges.
- (U) Determine space environment interactions that limit performance of long-range, high frequency communications and radar systems, resulting in design and performance standards to counter scintillation effects and decrease radio systems susceptibility to plasma-induced environmental interactions. ($293K)
  - (U) Deliver and integrate hardware on a sounding rocket for data collection of space environment interactions with high frequency transmissions.
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. ($500K)
  - (U) Begin conceptual design of a miniaturized low-power electron telescope to provide charge buildup information during space tests of new space technologies.
  - (U) Begin conceptual design of a miniaturized low-power proton telescope to provide low energy dose information during space tests of new space technologies.
  - (U) Begin conceptual design of a miniaturized low-power dosimeter to provide high energy dose and single event upset information during space tests of new space technologies.

(U) FY 1996:

- (U) Develop and test miniaturized space plasma sensors; characterize plasma in and around spacecraft wakes to improve low-earth environmental specifications to provide critical validation of charge analysis modeling codes necessary for spacecraft designers. ($280K)
  - (U) Develop the Digital Ion Driftmeter (space plasma sensor designed for use on the Defense Meteorological Satellite) for space test to obtain the space qualification needed for operational use.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development<br>PROJECT 2822 |

- (U) Demonstrate next-generation solar array technologies to provide the requisite pedigree of proven performance in space before being integrated into future power systems; characterize array interactions with natural space environment. ($590K)
  - (U) Support on-orbit operations of advanced solar arrays to conduct the experiments and collect data required to prove the space performance.
  - (U) Analyze data and produce detailed reports on high-voltage plasma interactions and on advanced solar array radiation degradation for use in updating space power design guidelines and test standards.
- (U) Determine vehicle charging and environmental interactions which will result in new preventive measures to protect spacecraft from charging hazards, enhanced analytical models of vehicle charging, and spacecraft environmental interactions directly applicable to future high-powered space systems. ($234K)
  - (U) Complete integration and support launch and space operations to obtain data vehicle charging effects.
  - (U) Begin data analysis leading to improvements in modeling codes for vehicle charging effects and environmental interactions.
- (U) Determine space environment interactions that limit performance of long-range, high frequency communications and radar systems, resulting in design and performance standards to counter scintillation effects and decrease radio systems susceptibility to plasma-induced environmental interactions. ($490K)
  - (U) Support the sounding rocket launch and data collection.
  - (U) Conduct preliminary analysis data for eventual incorporation into design and performance standards to counter scintillation effects and decrease susceptibility to plasma interactions.
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. ($600K; additional funding is provided through Project 2823)
  - (U) Complete design and begin fabrication of a miniaturized, low-power electron telescope to provide charge buildup information during space tests of new space technologies.
  - (U) Complete design and begin fabrication of a miniaturized, low-power dosimeter to provide high energy dose and single event upset information during space tests of new space technologies.

(U) FY 1997:

- (U) Develop and test miniaturized space plasma sensors; characterize plasma in and around spacecraft wakes to improve low-earth environmental specifications to provide critical validation of charge analysis modeling codes necessary for spacecraft designers. ($400K)
  - (U) Deliver and integrate the Digital Ion Driftmeter and support launch operations to obtain the space qualification needed for operational use.
- (U) Demonstrate next-generation solar array technologies to provide the requisite pedigree of proven performance in space before being integrated into future power systems; characterize array interactions with natural space environment. ($410K)
  - (U) Complete analysis and publish final technical reports on high-voltage plasma interactions and on advanced solar array radiation degradation for use in updating space power design guidelines and test standards.
  - (U) Begin conceptual design of future solar array technologies to prove their space performance before being integrated into future space power systems.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development |
| | PROJECT<br>2822 |

- (U) Determine vehicle charging and environmental interactions which will result in new preventive measures to protect spacecraft from charging hazards, enhanced analytical models of vehicle charging, and spacecraft environmental interactions directly applicable to future high-powered space systems. ($110K)
  - (U) Continue data analysis and publish report to improve modeling codes for vehicle charging effects and environmental interactions.
- (U) Determine space environment interactions that limit performance of long-range, high frequency communications and radar systems. ($410K)
  - (U) Continue analysis of sounding rocket data for eventual incorporation into design and performance standards to counter scintillation effects and decrease susceptibility to plasma interactions.
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. ($197K; additional funding is provided through Project 2823)
  - (U) Complete fabrication of a miniaturized dosimeter to provide high energy dose and single event upset information during space tests of new space technologies.
- (U) Develop and test an engineering test module to provide improved monitoring, specification, and prediction of hazardous deep dielectric charging effects on new and emerging technologies, allowing more rapid transfer into operational. ($220K)
  - (U) Conduct concept design of an engineering test module to eliminate the uncertainties of how deep dielectric charging effects new and emerging technologies.

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 2,315 | 3,250 | 2,493 | 2,702 | Cont |
| (U) Current President's Budget | 2,368 | 3,158 | 2,194 | 1,747 | Cont |

(U) Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development<br>PROJECT 2822 |

(U) C. **Other Program Funding Summary:**

(U) Related Activities:

- (U) PE 0602101F, Geophysics.
- (U) PE 0603401F, Advanced Spacecraft Technology.
- (U) PE 0603402F, Space Test Program.
- (U) PE 0603428F, Satellite Systems Survivability.
- (U) NASA/Air Force Space technology Interdependency Group coordinates efforts and reviews programs annually.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development<br>PROJECT 2823 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2823 Space Hazards Mitigation | 983 | 990 | 1,285 | 1,533 | 1,415 | 1,050 | 550 | 400 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** The Air Force needs the capability to prevent electrical charge buildup and the resulting disabling discharges on operational satellites. For high-altitude and geosynchronous spacecraft, a Charge Control System has been developed; it has been integrated on a Defense Satellite Communications System satellite to validate the concept of autonomous active charge control and to baseline a basic engineering design. For low/medium orbit satellites, a Compact Environmental Anomaly Sensor is being developed to provide warnings on space conditions likely to produce anomalous operational behavior.

(U) FY 1994:
- (U) Developed and demonstrated an autonomous active charge control system to prevent hazardous charge buildup on high-altitude and geosynchronous orbit satellites, decreasing circuitry upsets and component damage, improving on-orbit reliability, and enhancing system performance. ($221K)
  - (U) Integrated the advanced charge control system onto the Defense Satellite Communications System B-7 satellite; programmed the flight software for the charging algorithm.
- (U) Developed and tested an autonomous, compact, lightweight, low-power instrument to monitor the space environment near a satellite and warn of hazardous conditions. ($762K)
  - (U) Completed detailed component design of the compact, lightweight, low-power instrument.
  - (U) Began fabrication of the compact, lightweight, low-power instrument system flight unit.

(U) FY 1995:
- (U) Develop and demonstrate an autonomous active charge control system to prevent hazardous charge buildup on high-altitude and geosynchronous orbit satellites, decreasing circuitry upsets and component damage, improving on-orbit reliability, and enhancing system performance. ($250K)
  - (U) Support testing of an advanced charge control system on the Defense Satellite Communications System B-7 satellite as a housekeeping device; plan on-orbit operations.
- (U) Develop and test an autonomous, compact, lightweight, low-power instrument to monitor the space environment near a satellite and warn of hazardous conditions. ($740K)
  - (U) Complete fabrication, calibration, and testing of autonomous, compact, lightweight, low-power instrument flight unit hardware to prove its space performance before being integrated into future space systems as a housekeeping device.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development |
| | PROJECT<br>2823 |

(U) FY 1996:
- (U) Develop and demonstrate an autonomous active charge control system to prevent hazardous charge buildup on high-altitude and geosynchronous orbit satellites, decreasing circuitry upsets and component damage, improving on-orbit reliability, and enhancing system performance. ($250K)
  - (U) Launch the advanced charge control system on Defense Satellite Communications System satellite; support initial on-orbit operations and begin evaluating performance.
- (U) Develop and test an autonomous, compact, lightweight, low-power instrument to monitor the space environment near a satellite and warn of hazardous conditions. ($500K)
  - (U) Support integration and testing with the Space Test Program and Milstar launch vehicles as a housekeeping device.
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. ($535K; additional funding is provided through Project 2822)
  - (U) Complete design and begin fabrication of a miniaturized low-power proton telescope to provide low energy dose information during space tests of new space technologies.

(U) FY 1997:
- (U) Develop and demonstrate an autonomous active charge control system to prevent hazardous charge buildup on high-altitude and geosynchronous orbit satellites, decreasing circuitry upsets and component damage, improving on-orbit reliability, and enhancing system performance. ($150K)
  - (U) Continue evaluation of the data from the Defense Satellite Communications System flight; produce preliminary report.
- (U) Develop and test an autonomous, compact, lightweight, low-power instrument to monitor the space environment near a satellite and warn of hazardous conditions. ($600K)
  - (U) Support launch and provide on-orbit support for the Space Test Program and Milstar launch vehicles; begin evaluating capability.
- (U) Develop and test a suite of miniaturized, low-power, scientific quality instruments to measure the populations of natural space particles responsible for radiation dose effects and hazardous charge buildups. ($783K; additional funding is provided through Project 2822)
  - (U) Complete fabrication of a miniaturized low-power electron telescope to provide charge buildup information during space tests of new space technologies.
  - (U) Complete fabrication of a miniaturized low-power proton telescope to provide low energy dose information during space tests of new space technologies.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603410F Space Systems Environmental Interactions Technology Development |
| | PROJECT<br>2823 |

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1,125 | 950 | 1,685 | 1,653 | Cont |
| (U) Current President's Budget | 983 | 990 | 1,285 | 1,533 | Cont |

(U) Change Summary Explanation:
Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:**

(U) Related Activities:
- (U) PE 0602101F, Geophysics.
- (U) PE 0603402F, Space Test Program.
- (U) NASA/Air Force Space technology Interdependency Group coordinates efforts and reviews programs annually.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. **Schedule Profile:** Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 4 - Demonstration Validation

PE NUMBER AND TITLE: 0603430F - Advanced MILSATCOM

PROJECT NO.: 4050

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4050 Advanced MILSATCOM | 0 | 21,674 | 30,038 | 34,816 | 44,733 | 114,405 | 236,809 | 609,971 | 7,099,000 | 8,191,823 |

(U) A. **Mission Description and Budget Item Justification**

Develop and acquire an advanced Military Satellite Communications (MILSATCOM) satellite and satellite mission control interface, and develop terminal technology for survivable, jam-resistant, world-wide, secure, high capacity communications for the strategic and tactical warfighter. This system provides the basis for the next generation military communications satellite system. Advanced MILSATCOM satellites will replenish existing Extremely High Frequency/Ultra High Frequency (EHF/UHF) (Milstar II) and Super High Frequency (SHF) (DSCS III) systems. It will incorporate standardized spacecraft components and modular EHF and SHF payloads, each to be launched separately on a Medium Launch Vehicle (MLV). The Advanced EHF or EHF/UHF payload will be available for first launch in 2006. The Advanced SHF payload will be available for first launch in 2007. This consolidated replenishment will make maximum use of commercial bus developments and reduce orbital support and launch integration costs. The activities funded under this program element implement the Secretary of Defense's 1993 MILSATCOM Bottom Up Review decision to field a lower cost, advanced MILSATCOM satellite. This program is in Budget Activity Research Category Demonstration and Validation based on direction from the FY95 Defense Planning Guidance. Acquisition steamlining approaches are being considered for implementation on the advanced MILSATCOM program. A SATCOM master plan will be provided to Congress in FY 95 which will address an integrated advanced MILSATCOM approach.

(U) FY 1994
- (U) None.

(U) FY 1995
- (U) MILSATCOM Technology Validation Program
  - (U) Start Industry contracted projects in support of advanced technology studies and development. ($17,074)
  - (U) Start Laboratory study and analysis support for technology program. ($4,200)
  - (U) Start basic Program Office support activities for advanced technology program. ($400)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration Validation | PE NUMBER AND TITLE: 0603430F - Advanced MILSATCOM | PROJECT NO.: 4050 |

(U) FY 1996
- (U) MILSATCOM Technology Validation Program
  - (U) Continue validation of advanced EHF technologies. ($23,500)
  - (U) Continue basic Program Office support activities for advanced technology program. ($1,500)
  - (U) Advanced MILSATCOM System Studies ($5,038)
  - (U) Develop architecture and requirements documentation for the Advanced MILSATCOM system.

(U) FY 1997
- (U) MILSATCOM Technology Validation Program
  - (U) Continue validation of advanced EHF technologies. ($13,316)
  - (U) Continue basic Program Office support activities for advanced technology program. ($1,500)
  - (U) Start Processing Subsystem Engineering Model Program. ($20,000)

**(U) B. Program Change Summary ($ in Thousands)**

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 22,095 | 21,421 | 28,766 |
| (U) Appropriated Value | | 22,095 | | |
| (U) Adjustments to Appropriated Value | | | | |
| a. Cong Gen Reduction | | -44 | | |
| b. SBIR | | -377 | | |
| c. Omnibus and Other Above Threshold Reprogram | | | | |
| d. Below Threshold Reprogramming | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | +8,617 | +6,050 |
| (U) Current Budget Submit/President's Budget | 0 | 21,674 | 30,038 | 34,816 |

(U) Change Summary Explanation:
Funding: Funding changes in FY96 and FY97 reflect increased scope in the program due to the addition of an EHF digital processing engineering model demonstration to reduce risk to the advanced EHF program.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration Validation | PE NUMBER AND TITLE: 0603430F - Advanced MILSATCOM / PROJECT NO.: 4050 |

Schedule: Not Applicable.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary ($ in Thousands)**

**Related RDT&E:**
(U) PE #604479F, Milstar LDR/MDR Satellite Communications
(U) PE #604577N, EHF Satellite Communications
(U) PE #303142A, Tactical Communications Ground Environment
(U) PE #303110F, Defense Satellite Communications System
(U) PE #603790D, International Military Satellite (INMILSAT)

(U) **D. Schedule Profile:**

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Technology Project Awards | | | | | | X | | | | | | | | | | |
| (U) Technology Project Awards/Renewals | | | | | | | | | | X | | | X | | | |
| (U) Start Processing Subsystem Engineering Model | | | | | | | | | | | | | X | | | |
| (U) Program Review | | | | | | | | X | | | | | | | | |
| (U) Milestone II - Mid FY00 | | | | | | | | | | | | | | | | |
| (U) EHF program EMD Start - Mid FY00 | | | | | | | | | | | | | | | | |
| (U) SHF program EMD Start - Mid FY01 | | | | | | | | | | | | | | | | |
| (U) EHF - First Delivery - Mid FY06 | | | | | | | | | | | | | | | | |
| (U) SHF - First Delivery - Mid-FY07 | | | | | | | | | | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 4 - Demonstration Validation

PE NUMBER AND TITLE: 0603430F - Advanced MILSATCOM

PROJECT NO.: 4050

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| (U) MILSATCOM Technology Validation Program | 0 | 21,674 | 25,000 | 14,816 |
| (U) Processing Subsystem Engineering Model | 0 | 0 | 0 | 20,000 |
| (U) Advanced MILSATCOM System Studies | 0 | 0 | 5,038 | 0 |
| (U) Total | 0 | 21,674 | 30,038 | 34,816 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations (System Development) | | | | | | | | | | | |
| MIT/LL* | MIPR | Feb 95 | 8,300 | 8,300 | 0 | 0 | 1,900 | 2,400 | 2,000 | 2,000 | 8,300 |
| Hughes* | CPFF | Jan 95 | 5,000 | 5,000 | 0 | 0 | 1,886 | 614 | 2,500 | 0 | 5,000 |
| TRW* | CPFF | Jan 95 | 4,923 | 4,923 | 0 | 0 | 1,511 | 1,900 | 1,512 | 0 | 4,923 |
| TRW* | CPFF | Feb 95 | 1,487 | 1,487 | 0 | 0 | 1,487 | 0 | 0 | 0 | 1,487 |
| HSC/Loral* | CPFF | Jan 95 | 4,777 | 4,777 | 0 | 0 | 1,398 | 1,798 | 1,581 | 0 | 4,777 |
| Boeing* | CPFF | Jan 95 | 3,750 | 3,750 | 0 | 0 | 1,307 | 1,568 | 875 | 0 | 3,750 |
| TRW* | CPFF | Feb 95 | 1,633 | 1,633 | 0 | 0 | 1,090 | 543 | 0 | 0 | 1,633 |
| Texas Instruments* | CPFF | Jan 95 | 3,172 | 3,172 | 0 | 0 | 1,042 | 1,390 | 740 | 0 | 3,172 |
| MIT/LL* | MIPR | Feb 95 | 3,800 | 3,800 | 0 | 0 | 1,000 | 1,400 | 1,200 | 200 | 3,800 |
| Various Tech Projects* | Various | 2 Qtr 95 | 37,947 | 37,947 | 0 | 0 | 8,653 | 11,887 | 2,908 | 14,500 | 38,325 |
| TBD | TBD | TBD | TBD | TBD | 0 | 0 | 0 | 5,038 | 20,000 | 7,549,218 | 7,574,256 |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration Validation | PE NUMBER AND TITLE<br>0603430F - Advanced MILSATCOM |
| | PROJECT NO.<br>4050 |

* Industrial technology projects have been selected through a broad area announcement process. Abstracts have been received, and proposals on high interest abstracts have been reviewed and selected for contract award.

**(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management Organizations | | | | | | | | | | | |
| Various | Various | 2 Qtr 95 | N/A | N/A | 0 | 0 | 400 | 1,500 | 1,500 | 539,000 | 542,400 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| TBD | | | | | | | | | | | |
| Subtotal Product Development | | | | | 0 | 0 | 21,274 | 28,538 | 33,316 | 7,565,918 | 7,649,423 |
| Subtotal Support and Management | | | | | 0 | 0 | 400 | 1,500 | 1,500 | 539,000 | 542,400. |
| Total Project | | | | | 0 | 0 | 21,674 | 30,038 | 34,816 | 8,104,918 | 8,191,823 |

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603434F National Polar-orbiting Operational Environmental Satellite System (NPOESS)

PROJECT: 4056

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4056 NPOESS | 0 | 7,374 | 23,861 | 41,550 | 55,276 | 192,724 | 209,134 | 186,669 | Continuing | TBD |

Note: FY94 and Prior Funding in PE #305160F.

(U) **A. Mission Description and Budget Item Justification**

Vice President Gore's National Performance Review (NPR) and subsequent Presidential Decision Directive/NSTC-2 (May 1994) direct the Departments of Defense (DoD), Commerce (DoC) and the National Aeronautics and Space Administration to establish a converged national weather satellite program. The converged program, called the National Polar-Orbiting Operational Environmental Satellite System (NPOESS), will combine the follow-on to the DoD's DMSP program and the DoC's Polar-Orbiting Operational Environmental Satellite (POES) program. An integrated tri-agency program office was established on 1 Oct 94 to manage the acquisition and operations of the converged satellite. PE #603434F funding reflects the DoD's share of the the converged program funding. NPOESS will provide operational military commanders and civilian leaders timely, quality weather information to effectively employ weapon systems and protect national resources. The converged program will be the nation's single source of global weather data for operational DoD and DoC use. It will provide visible and infrared cloud cover imagery and other meteorological, oceanographic, and solar-geophysical information. At least three satellites will be required in sun synchronous 450nm polar orbit at all times (sun synchronous means the satellites cross the equator at the same local sun time on each of their 14 orbits/day). This PE is Budget Activity Research Category Demonstration and Validation because it currently supports preparation for DoD/DoC convergence Demonstration/Validation efforts.

(U) FY 1994
- (U) Not Applicable.

(U) FY 1995
- (U) Prepare for a converged system requirements summit and Milestone I review. ($1,000)
- (U) Prepare for and conduct a System Requirements Review (SRR). ($6,000)
- (U) Prepare for Demonstration/Validation contract award. ($374)

(U) FY 1996
- (U) Conduct Milestone I review; support Demonstration/Validation contract award. ($1,000)
- (U) Conduct/evaluate preliminary system development efforts. ($9,361)
- (U) Conduct sensor/testbed demonstrations. ($13,500)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603434F National Polar-orbiting Operational Environmental Satellite System (NPOESS) |
| | PROJECT<br>4056 |

(U) FY 1997
- (U) Continue to support Demonstration/Validation efforts and prepare for an FY98 Milestone II review. ($2,000)
- (U) Conduct a System Design Review for the converged system. ($18,300)
- (U) Conduct primary sensor Preliminary Design Reviews. ($21,250)

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 7,601 | 24,481 | 54,758 |
| (U) Appropriated Value | | 7,601 | | |
| (U) Adjustments to Appropriated Value | | | | |
| a. Cong Gen Reductions | | - 97 | | |
| b. SBIR | | - 128 | | |
| c. Omnibus or Other Above Threshold Reprogram | | - 2 | | |
| d. Below Threshold Reprogramming | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | - 620 | - 13,208 |
| (U) Current Budget Submit/President's Budget | 0 | 7,374 | 23,861 | 41,550 |

(U) Change Summary Explanation:

Funding: In FY96 and FY97, funding was reduced to reflect the DoD's share of the converged budget as agreed upon with the Department of Commerce.

Schedule: No changes.

Technical: No changes.

**(U) C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

**Related RDT&E:**

(U) PE #305160F, Defense Meterological Satellite Program (DMSP)

(U) PE #305160N, DMSP (Navy and Army provided funds for Service specific studies)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603434F National Polar-orbiting Operational Environmental Satellite System (NPOESS) |
| | PROJECT<br>4056 |

(U) **D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Integrated Operational Requirements Document (IORD) Approved | | | | | | X | | | | | | | | | | |
| (U) A-Level Specifications Complete | | | | | | | | X | | | | | | | | |
| (U) Systems Requirements Review (SRR) 1 | | | | | | | | X | | | | | | | | |
| (U) Milestone 1 Review | | | | | | | | | X | | | | | | | |
| (U) Demonstration/Validation Contract Award | | | | | | | | | | X | | | | | | |
| (U) SRR 2 | | | | | | | | | | X | | | | | | |
| (U) Demonstrations Begin/End | | | | | | | | | | | X | | | X | | |
| (U) System Design Review (SDR) | | | | | | | | | | | | | | | X | |
| (U) Sensor Preliminary Design Review (PDR) | | | | | | | | | | | | | | | | X |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603434F National Polar-orbiting Operational Environmental Satellite System (NPOESS) |
| | PROJECT<br>4056 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Concept Studies | 0 | 7,374 | 0 | 0 |
| (U) Demonstration/Validation | 0 | 0 | 23,861 | 41,550 |
| (U) Total | | 7,374 | 23,861 | 41,550 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Marint-Marietta | C/CPAF/Allot | 2QFY95 | TBD | TBD | 0 | 0 | 700 | | | 700 | 700 |
| Lockheed | C/CPAF/Allot | 2QFY95 | TBD | TBD | 0 | 0 | 3,671 | | | 3,671 | 3,671 |
| Dem/Val Contractors | TBD | | | | | | | 17,661 | 34,050 | Cont | TBD |
| Support and Management Organizations | | | | | | | | | | | |
| Space and Missile Center (SMC) | | | | | | | 1,468 | 3,400 | 3,800 | Cont | TBD |
| FFRDC Support | | | | | | | 1,535 | 2,800 | 3,700 | TBD | TBD |
| Test and Evaluation Organizations | | | | | | | | | | | |
| TBD | | | | | | | | | | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603434F National Polar-orbiting Operational Environmental Satellite System (NPOESS) |
| | PROJECT<br>4056 |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:**
Not Applicable.

| | | | | | |
|---|---|---|---|---|---|
| Subtotal Product Development | 4,371 | 17,661 | 34,050 | Cont | TBD |
| Subtotal Support and Management | 3,003 | 6,200 | 7,500 | Cont | TBD |
| Subtotal Test and Evaluation | | | | | |
| Total Project | 7,374 | 23,861 | 41,550 | Cont | TBD |

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603438F Satellite Sys Survivability

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 4,245 | 1,906 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 71,382 |
| 2611 Technology Insertion Plan & Analysis | 448 | 100 | 0 | 0 | .0 | 0 | 0 | 0 | 0 | 5,300 |
| 2612 Prototype Demonstrations | 2,948 | 1,466 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39,282 |
| 2613 Component Level Tech Applications | 849 | 340 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26,800 |

(U) **A. Mission Description and Budget Item Justification**

This program has performed critical survivability planning, modeling, analysis, concept evaluations and technology prototyping to meet current and projected military space system survivability requirements. The program was structured to provide a balanced development of survivability capabilities for the space, ground, and communications segments of space systems. The program developed and demonstrated technologies and prototype hardware and software, as well as operational procedures, strategy, and tactics that will provide survivability capabilities for military space systems to meet both current and future threats. The current major prototyping effort of this program is Technology for Autonomous Operational Survivability (TAOS). TAOS is a one year, on-orbit, free-flying space demonstration of several autonomy and survivability technologies.

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 4,305 | 8,531 | 8,234 | 7,416 | Cont |
| (U) Appropriated Value | 4,432 | 2,131 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | - 127 | - 191 | | | |
| b. SBIR | - 60 | - 33 | | | |
| c. Omnibus or Other Above Threshold Reprogram | | | | | |
| d. Below Threshold Reprogramming | | - 1 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | - 8,234 | - 7,416 | |
| (U) Current Budget Submit/President's Budget | 4,245 | 1,906 | 0 | 0 | 71,382 |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603438F Satellite Sys Survivability |

(U) Change Summary Explanation:

Funding: FY 96 and on budget deleted to reflect Air Force decision to not proceed with further Dem/Val efforts.

Schedule: No change.

Technical: Congress zeroed and prohibited start of follow-on project.

**(U) C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

**Related RDT&E:**

(U) PE #0603218C, BMDO Research and Support Activities

(U) PE #0603401F, Advance Spacecraft Technology

**(U) D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) MSTRS | | | | | | | | | | | | | | | | |
| (U) Rqmts Review | | | | x | | | | | | | | | | | | |
| (U) TAOS | | | | | | | | | | | | | | | | |
| (U) Launch/On-orbit Ops | | | | | | x------- | -------- | -------- | ----x | | | | | | | |
| (U) Data Reduction/Analysis | | | | | | x- | -------- | -------- | -------x | | | | | | | |

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603438F Satellite Sys Survivability

PROJECT: 2611

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2611 Technology Insertion Plan & Analysis | 448 | 100 | 0 | 0 | .0 | 0 | 0 | 0 | 0 | 5,300 |

**(U) A. Mission Description and Budget Item Justification**

Planning, modeling, and analysis to meet current and projected space system survivability requirements versus both natural and hostile attack environments. Developed and applied software models and tools to evaluate and validate satellite survivability environmental responses and interactions to perform space asset survivability /vulnerability assessments. This activity was intended to provide the basis for identifying systems vulnerabilities and technology gaps. This program is Budget Activity Research Category Demonstration/Validation, because it supports on-orbit space prototype Dem/Val of advanced technologies.

(U) FY 1994

- (U) Update survivability technology insertion roadmap and investment strategy as required ($448)

(U) FY 1995

- (U) Update survivability technology insertion roadmap and investment strategy as required ($100).

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 448 | 0 | | | Cont |
| (U) Appropriated Value | 448 | 0 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | | | | |
| b. SBIR | | | | | |
| c. Omnibus or Other Above Threshold Reprogram | | | | | |
| d. Below Threshold Reprogramming | | + 100 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | | | |
| (U) Current Budget Submit/President's Budget | 448 | 100 | | | 5,300 |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603438F Satellite Sys Survivability |
| | PROJECT<br>2611 |

(U) Change Summary Explanation:

Funding: Below Threshold Reprogramming reflects a realignment of $100,000 from Project 2612 to Project 2611.

Schedule: No change.

Technical: No change.

(U) **C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

(U) **D. Schedule Profile**

Not Applicable.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603438F Satellite Sys Survivability<br>PROJECT 2611 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Sustaining Engineering Level of Effort | 448 | 100 | | |
| (U) Total | 448 | 100 | | |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**
Not Applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603438F Satellite Sys Survivability

PROJECT: 2612

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2612 Prototype Demonstrations | 2,948 | 1,466 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39,282 |

**(U) A. Mission Description and Budget Item Justification**

Develop satellite survivability technology prototypes and operational concepts to meet current and projected space system survivability validated mission requirements. This program is Budget Activity Research Category Demonstration/Validation, because it supports on-orbit space prototype Dem/Val of advanced technologies.

(U) FY 1994

- (U) Launched TAOS on Space Test Experiment Platform (STEP) Mission 0 using DARPA's Taurus launch vehicle; conduct on-orbit demonstrations of TAOS; begin TAOS payload mission analysis ($2,948).

(U) FY 1995

- (U) Complete TAOS on-orbit operations, analysis and reporting ($1,466).

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Previous President's Budget | 3,008 | 8,531 | 8,234 | 7,416 |
| (U) Appropriated Value | 3,008 | 2,131 | | |
| (U) Adjustments to Appropriated Value | | | | |
| a. Cong Gen Reductions | | - 191 | | |
| b. SBIR | - 60 | - 33 | | |
| c. Omnibus or Other Above Threshold Reprogram | | | | |
| d. Below Threshold Reprogramming | | - 441 | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | - 8,234 | - 7,416 |
| (U) Current Budget Submit/President's Budget | 2,948 | 1,466 | 0 | 0 |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603438F Satellite Sys Survivability | PROJECT<br>2612 |

(U) Change Summary Explanation:

Funding: Below Threshold Reprogramming reflects a realignment of $100,000 from this project to Project 2611, a realignment of $340,000 from this project to Project 2613, and a $1,000 reduction. Adjustments to Budget Years Since FY95 PB reflects decision to not proceed further with Dem/Val efforts.

Schedule: No change.

Technical: Congress zeroed and prohibited start of follow-on project.

**(U) C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

**(U) D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) TAOS | | | | | | | | | | | | | | | | |
| (U) Launch/On-orbit Ops | | | | | | x------- | -------- | -------- | ----x | | | | | | | |
| (U) Data Reduction/Analysis | | | | | | x- | -------- | -------- | -------x | | | | | | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603438F Satellite Sys Survivability | PROJECT<br>2612 |

(U) **A. Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Sustaining Engineering Level of Effort | 2,948 | 1,466 | | |
| (U) Total | 2,948 | 1,466 | | |

(U) **B. Budget Acquisition History and Planning Information ($ in Thousands)**

Not Applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603438F Satellite Sys Survivability

PROJECT: 2613

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2613 Component Level Tech Applications | 849 | 340 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26,800 |

**(U) A. Mission Description and Budget Item Justification**

Developed and demonstrated critical technologies to improve survivability of space, ground, and communications segments of space systems. Objective was to ready critical technology component-level efforts for insertion into prototype system demonstrations. This program is Budget Activity Research Category Demonstration/Validation, because it supports on-orbit space prototype Dem/Val of advanced technologies.

(U) FY 1994

- (U) Component-level technology applications critical to overcoming vulnerabilities to disruption or degradation ($849).

(U) FY 1995

- (U) Maintain key elements of the most promising component-level technologies for potential application to future space systems ($340).

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 849 | 0 | 0 | 0 | Cont |
| (U) Appropriated Value | 849 | 0 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | | | | |
| b. SBIR | | | | | |
| c. Omnibus or Other Above Threshold Reprogram | | | | | |
| d. Below Threshold Reprogramming | | + 340 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | | | |
| (U) Current Budget Submit/President's Budget | 849 | 340 | | | 26,800 |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603438F Satellite Sys Survivability | PROJECT<br>2613 |

(U) Change Summary Explanation:

Funding: Below Threshold Reprogramming reflects a realignment of $340,000 from Project 2612 to Project 2613

Schedule: No change.

Technical: No change.

(U) **C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

(U) **D. Schedule Profile**

Not Applicable.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603438F Satellite Sys Survivability<br>PROJECT<br>2613 |

(U) **A. Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Sustaining Engineering Level of Effort | 849 | 340 | | |
| (U) Total | 849 | 340 | | |

(U) **B. Budget Acquisition History and Planning Information ($ in Thousands)**

Not Applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603441F Space Based InfraRed (SBIR) Dem/Val

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 0 | 111,838 | 130,744 | 126,369 | 127,367 | 144,283 | 119,390 | 119,363 | Continuing | TBD |
| 0007 Space & Missile Tracking System | 0 | 106,838 | 114,824 | 119,404 | 124,382 | 144,283 | 119,390 | 119,363 | Continuing | TBD |
| 0008 Cobra Brass | 0 | 5,000 | 15,920 | 6,965 | 2,985 | 0 | 0 | 0 | 0 | 30,870 |

(U) A. **Mission Description and Budget Item Justification**

(U) The purpose of the Space Based InfraRed System (SBIRS) program is to develop a system which provides increased performance over the existing Defense Support Program (DSP) system. The system's primary mission is to provide initial warning of a ballistic missile attack on the US. SBIRS will incorporate new technologies that would enhance detection, provide direct reporting of ICBM/SLBM and tactical ballistic missile launches, and provide critical mid-course tracking and discrimination data for national and theater missile defense. The integrated system architecture consists of sensors located in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and Low Earth Orbits (LEO) and an integrated, centralized ground station serving all space elements of the SBIR System, as well as DSP. PE #604441F funds SBIRS Engineering and Manufacturing Development activities.

(U) This PE funds the SBIRS Development activities: Space and Missile Tracking System (SMTS) and Cobra Brass (CB). SMTS (formerly Brilliant Eyes) is the Dem/Val effort for the LEO component of SBIRS, CB will provide data for the GEO and HEO components. This program is in the demonstration and validation Budget Activity Research Category because it funds the risk reduction and an advanced technology demonstration system.

(U) **Acquisition Strategy:**

(U) The SBIRS program is managed through a single consolidated System Program Office (SPO) at the Space and Missile Systems Center, Los Angeles Air Force Base, CA. The SMTS Flight Demonstration System (FDS) acquisition plan was approved in Aug 92. The Flight Demonstration System (FDS) contract is scheduled to be awarded in 1995, and the two FDS satellites are scheduled to be launched into a low earth orbit by 4Q FY98.

(U) CB is currently being developed by Sandia National Laboratory, Albuquerque, NM. CB is planning to launch in FY98.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603441F Space Based InfraRed (SBIR) Dem/Val |

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | | 125,000 | 180,000 | 150,000 | Continuing |
| (U) Appropriated Value | | 117,000 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | - 2,968 | | | |
| b. SBIR | | - 2,165 | | | |
| c. Omnibus or Other Above Threshold Reprogram | | | | | |
| d. Below Threshold Reprogramming | | - 29 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | - 49,256 | - 23,631 | |
| (U) Current Budget Submit/President's Budget | | 111,838 | 130,744 | 126,369 | Continuing |

(U) Change Summary Explanation:

Funding: Adjustments to Budget Years Since FY95 PB in FY96 and FY97 reflect a decrease ($180,000,000 in FY96, $150,000,000 in FY97) due to the transfer of Project 3616 to PE #604441F, an increase ($131,400,000 in FY96, $127,000,000 in FY97) due to the combination of SBIRS Development activities, and a decrease ($656,000 in FY96, $631,000 in FY97) due to inflation changes.

Schedule: No Changes.

Technical: No Changes.

(U) **C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

**Related RDT&E:**

(U) PE #604441F - Space Based InfraRed $ystem (SBIRS) - EMD
(U) PE #305911F - Defense Support Program (DSP)
(U) PE #603871C - Advanced Tech. Dev. - National Missile Defense
(U) PE #604856C - Patriot PAC-3 EMD
(U) PE #603861C - THAAD Dem/Val
(U) PE #603867C - Navy Lower Tier Development
(U) PE #603868C - Navy Upper Tier Development

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603441F Space Based InfraRed (SBIR) Dem/Val |

**(U) D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) SBIRS Pre-EMD Review | | | | | | X | | | | | | | | | | |
| (U) SMTS FDS Authority To Proceed | | | | | | X | | | | | | | | | | |
| (U) SMTS FDS Preliminary Design Review (PDR) | | | | | | | | X | | | | | | | | |
| (U) SMTS FDS Critical Design Review (CDR) | | | | | | | | | | | | X | | | | |
| (U) Cobra Brass Launch (FY98) | | | | | | | | | | | | | | | | |
| (U) SMTS FDS Launch (4Q FY98) | | | | | | | | | | | | | | | | |

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603441F Space Based InfraRed (SBIR) Dem/Val

PROJECT: 0007

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0007 Space & Missile Tracking System | 0 | 106,838 | 114,824 | 119,404 | 124,382 | 144,283 | 119,390 | 119,363 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification**

(U) The Space and Missile Tracking System (SMTS), formerly known as Brilliant Eyes, represents the Low Earth Orbit (LEO) component of the Space Based InfraRed System (SBIRS). The objective SMTS constellation of low-earth orbiting satellites will provide global, below- and above-the-horizon access to strategic and tactical ballistic missiles in boost, post-boost, and midcourse phases of flight, and also track missile targets during reentry. SMTS will support the four SBIRS mission areas of Missile Warning, Missile Defense, Technical Intelligence, and Battle Space Characterization.

(U) Prior to FY94, the Ballistic Missile Defense Organization (BMDO) funded SMTS (then Brilliant Eyes) with PE #603217C. In FY94, management and funding responsibility of the Brilliant Eyes program was transferred to the Air Force. FY94 funding for Brilliant Eyes ($136,919) was provided in PE #603440F.

(U) FY 1994 ($136,919: Accomplished with funding in PE #603440F)
- (U) Restructured SMTS FDS Request For Proposals (RFP) Development
- (U) Continued life testing 60 Kelvin cryocoolers
- (U) Demonstrated focal plane arrays, processors, and 60 GHz communications components
- (U) Completed Anti-Ballistic Missile (ABM) Treaty compliance review (Apr 94)
- (U) Amended SMTS FDS RFP for downselect (Dec 94)

(U) FY 1995
- (U) Award SMTS FDS supplemental agreement for space and ground segment development (Mar 95)
- (U) Continue design & develop of the FDS satellite and ground segment ($62,096)
- (U) Non-flying contractor conduct ground experiments ($2,917)
- (U) Program office activities ($11,004)
- (U) Complete ABM Treaty compliance review (Mar 95)
- (U) Continue technology efforts in cryocoolers, focal plane arrays and 32 bit RAD hard processors ($7,500)
- (U) Simulation, Discrimination, and computer support ($15,464)
- (U) Data Analysis for Midcourse Space Experiment (MSX) and Support for RAMOS ($7,857)
- (U) Conduct Preliminary Design Review (PDR) (Sep 95)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration And Validation | PE NUMBER AND TITLE: 0603441F Space Based InfraRed (SBIR) Dem/Val — PROJECT: 0007 |

(U) FY 1996
- (U) Continue SMTS FDS satellite and ground segment development ($85,501)
- (U) Continue work for non-flying contractor ($5,000)
- (U) Program office activities ($13,523)
- (U) Simulation, Discrimination, and computer support ($10,800)
- (U) Conduct Critical Design Review (CDR) (Sep 96)

(U) FY 1997
- (U) Continue SMTS FDS satellite and ground segment development ($91,732)
- (U) Continue work for non-flying contractor ($5,000)
- (U) Program office activities ($13,522)
- (U) Simulation, Discrimination, and computer support ($9,150)

(U) **Acquisition Strategy:**

(U) The GEO component of the SBIRS program is a pilot for acquisition streamlining. For the GEO component the traditional Defense Acquisition Board (DAB) documentation for an ACAT ID program is being consolidated into a Single Acquisition and Management Plan (SAMP).

(U) While SMTS and Cobra Brass are part of the overall SBIRS, there are on going contracts for each of these efforts. The SMTS Flight Demonstration System (FDS) acquisition plan was approved in Aug 92. The streamlined acquisition program established by the SBIRS GEO component pre-EMD phase will be used by SMTS when it enters EMD, after a successful deployment decision in FY00.

(U) The developing organization for the SMTS FDS satellites is the Air Force Space and Missile Center, Los Angeles AFB, CA. An FDS flyer contract will be awarded to a single contractor who will design and build two FDS satellites to be launched in 4Q FY98. Major contractors competing for the FDS flyer contract are Rockwell International, Space Systems Division, Downey, CA and TRW, Redondo Beach, CA. An FDS non-flyer contract will also be awarded. There is a two year test period leading up an FY00 DoD deployment decision for an operational SMTS constellation for SBIRS. The non-flyer will participate with the FDS flying contractor in ground experiments to mitigate overall program technical risk as well as to maintain competition.

(U) Pre-EMD activities would begin in late FY99 with approximately three pre-EMD study contracts. The purpose of pre-EMD would be to develop specifications and designs for the objective SMTS. This period would also be used to re-optimize the SBIRS HEO, GEO, LEO constellations, and to revalidate the AFSPACECOM Operational Requirements Document. If a decision is made to deploy an operational SMTS in FY00, then the pre-EMD contractors would compete for the EMD contract - to be awarded in FY02. The same streamlined acquisition approach being used currently for the GEO EMD would be used as a baseline for the LEO EMD as well.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603441F Space Based InfraRed (SBIR) Dem/Val<br>PROJECT 0007 |

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 |
| (U) Appropriated Value | 112,000 | | | |
| (U) Adjustments to Appropriated Value | | | | |
| a. Cong Gen Reductions | - 2,968 | | | |
| b. SBIR | - 2,165 | | | |
| c. Omnibus or Other Above Threshold Reprogram | | | | |
| d. Below Threshold Reprogramming | - 29 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | + 114,824 | + 119,404 | |
| (U) Current Budget Submit/President's Budget | 106,838 | 114,824 | 119,404 | Continuing |

(U) Change Summary Explanation:

Funding: Project 0007 was created in FY94 under PE 63440F. In FY 95 the Project 0007 was moved to this PE. Adjustments to Budget Year Since FY95 PB reflects an increase for SMTS FDS which was transferred from BMDO to the Air Force.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

(U) **D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) SMTS FDS Downselect | | | | | | X | | | | | | | | | | |
| (U) SMTS FDS PDR | | | | | | | | X | | | | | | | | |
| (U) SMTS FDS CDR | | | | | | | | | | | | X | | | | |
| (U) FDS Launch (4Q FY98) | | | | | | | | | | | | | | | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603441F Space Based InfraRed (SBIR) Dem/Val |
| PROJECT<br>0007 | |

(U) **A. Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) FDS satellite and ground segment | | 62,096 | 85,501 | 91,732 |
| (U) Non-flying contractor () | | 2,917 | 5,000 | 5,000 |
| (U) Program office activities () | | 11,004 | 13,523 | 13,522 |
| (U) Technology efforts () | | 7,500 | 0 | 0 |
| (U) Sim., Discrim., & computer support () | | 15,464 | 10,800 | 9,150 |
| (U) Data Analysis for MSX and Support for RAMOS | | 7,857 | 0 | 0 |
| (U) Total | | 106,838 | 114,824 | 119,404 |

Note: FY94 Accomplished with funds from PE #603440F

(U) **B. Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| FDS Contract | CPAF | TBD | TBD | TBD | See Note | See Note | 62,096 | 85,501 | 91,732 | Continued | TBD |
| Misc. | Various | Various | Continued | Continued | See Note | See Note | 36,179 | 29,323 | 27,672 | Continued | TBD |
| Support and Management Organizations | | | | | | | | | | | |
| Aerospace | | Various | Continued | Continued | See Note | See Note | 8,563 | 8,563 | 8,563 | Continued | TBD |

Note: FY94 Accomplished with funds from PE 603440F

Test and Evaluation Organizations
Not Applicable

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | | | | | DATE February, 1995 | |
|---|---|---|---|---|---|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603441F Space Based InfraRed (SBIR) Dem/Val | | | | | | PROJECT<br>0007 |

(U) **B. Budget Acquisition History and Planning Information Continued ($ in Thousands)**

**Government Furnished Property:** Not Applicable.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | See Note | See Note | 98,275 | | | Continued | TBD |
| Subtotal Support and Management | See Note | See Note | 8,563 | 8,563 | 8,563 | Continued | TBD |
| Subtotal Test and Evaluation (Not Applicable) | | | | | | | |
| Total Project | See Note | See Note | 106,838 | 114,824 | 119,404 | Continued | TBD |

Note: FY94 Accomplished with funds from PE 603440F

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration And Validation | PE NUMBER AND TITLE: 0603441F Space Based InfraRed (SBIR) Dem/Val — PROJECT: 0008 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0008 Cobra Brass | 0 | 5,000 | 15,920 | 6,965 | 2,985 | 0 | 0 | 0 | 0 | 30,870 |

(U) A. **Mission Description and Budget Item Justification**

(U) The Cobra Brass (CB) Program is a DIA/CMO (Central MASINT Office) Research and Development program to explore the utility of staring, fast framing, multi-spectral electro-optical sensors. This approach represents a significant departure from the traditional approach of scanning, slow framing, single band sensors which have traditionally been used for Tactical Warning and Attack Assessment (TW/AA).

(U) Previous CB sensors have demonstrated the ability of this technology to contribute to both the Theater Missile Defense (TMD), Technical Intelligence (TI), and Battlespace Characterization (BC) missions. A major emphasis of this program will be to increase the timeliness of sensor tasking and reporting. This will allow CB data to be processed in real-time through the existing theater infrastructure. CB will support the GEO and HEO component of the SBIRS.

(U) FY 1995
- (U) System Concept Review (Feb 95)
- (U) Payload Design Review ($500)
- (U) Ground Station Design Review ($3,500)
- (U) Test Unit ($1,000)

(U) FY 1996
- (U) Payload ($10,320)
- (U) Test Unit ($1,000)
- (U) Ground Station Build 1 ($4,100)
- (U) Satellite (I&CO) ($500)

(U) FY 1997
- (U) Payload ($2,400)
- (U) Satellite Inspection & Checkout ($1,500)
- (U) Payload delivered (Dec 96)
- (U) Ground Station Build 1 & 2 ($3,065)
- (U) Ground Station testing complete (Mar 97)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603441F Space Based InfraRed (SBIR) Dem/Val |
| | PROJECT<br>0008 |

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost | |
|---|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | 0 | |
| (U) Appropriated Value | | 5,000 | | | | |
| (U) Adjustments to Appropriated Value | | | | | | |
| a. Cong Gen Reductions | | | | | | |
| b. SBIR | | | | | | |
| c. Omnibus or Other Above Threshold Reprogram | | | | | | |
| d. Below Threshold Reprogramming | | | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | + 15,920 | + 6,965 | | |
| (U) Current Budget Submit/President's Budget | 0 | 5,000 | 15,920 | 6,965 | Continuing | |

(U) Change Summary Explanation:

Funding: Project 0008 was established in FY94 under this Program Element. Adjustments to Budget Year Since FY95 PB reflects an increase for Cobra Brass which was transferred to this Program Element.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

(U) **D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) System Concept Review | | | | | | X | | | | | | | | | | |
| (U) Payload Design Review | | | | | | | | X | | | | | | | | |
| (U) Ground Station Design Review | | | | | | | | X | | | | | | | | |
| (U) Payload Consent to Ship Decision | | | | | | | | | X | | | | | | | |
| (U) Grd Station Build 1 Testing Complete at Sandia | | | | | | | | | X | | | | | | | |
| (U) Grd Station Build 1 Installed at Ground Site | | | | | | | | | | | | | | X | | |
| (U) CB Launch (FY98) | | | | | | | | | | | | | | | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603441F Space Based InfraRed (SBIR) Dem/Val<br>PROJECT 0008 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Payload | 0 | 500 | 10,320 | 2,400 |
| (U) Ground Station | 0 | 3,500 | 4,100 | 3,065 |
| (U) Test Unit | 0 | 1,000 | 1,000 | 0 |
| (U) Satellite I&CO | 0 | 0 | $500 | 1,500 |
| (U) Total | 0 | 5,000 | 15,920 | 6,965 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Sandia National Labs | Various | Various | $30,870 | $30,870 | $0 | $0 | $5,000 | $15,920 | $6,965 | $2,985 | $30,870 |

Support and Management Organizations
Not Applicable

Test and Evaluation Organizations
Not Applicable

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | | | | | DATE February, 1995 | |
|---|---|---|---|---|---|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603441F Space Based InfraRed (SBIR) Dem/Val | | | | | | PROJECT<br>0008 |

(U) B. **Budget Acquisition History and Planning Information Continued ($ in Thousands)**

**Government Furnished Property:** Not Applicable

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 0 | 0 | 5,000 | 15,920 | 6,965 | 2,985 | 30,870 |
| Subtotal Support and Management | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | 0 | 0 | 5,000 | 15,920 | 6,965 | 2,985 | 30,870 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total PE 0603601F Cost | 16,567 | 30,652 | 31,637 | 30,278 | 31,721 | 30,953 | 31,882 | 33,826 | Cont | Cont |
| Project 670A, Ordnance Technology | 11,847 | 17,754 | 18,812 | 17,994 | 19,544 | 15,684 | 16,505 | 16,964 | Cont | Cont |
| Project 670B, Guidance Technology | 4,720 | 12,898 | 12,825 | 12,284 | 12,177 | 15,269 | 15,377 | 16,862 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This Advanced Development program develops air-to-surface and air-to-air conventional weapons technologies including guidance, ordnance, and aeromechanics. This program develops the following technologies: autonomous, adverse-weather advanced guidance seekers; fuzes; insensitive and less sensitive explosives; hard target warheads; explosives, bombs, submunitions, and their dispensing mechanisms; guns and ammunition; air-to-surface composite weapon airframes; smart submunitions; weapon ordnance subsystems; and instrumentation. Hardware/software for advanced technologies are developed and evaluated to determine effectiveness and potential operational value. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 17,367 | 35,100 | 30,766 | 31,394 | Cont |
| Appropriated Value | 17,464 | 31,250 | | | |
| Adjustments to Appropriated Value: | | | | | |
| a. Congressional General Reductions | -97 | -598 | | | |
| b. SBIR | -200 | | | | |
| c. Omnibus Reprogramming | -500 | | | | |
| d. Below Threshold Reprogramming | -100 | | | | |
| Current President's Budget | 16,567 | 30,652 | 31,637 | 30,278 | Cont |

Change Summary Explanation:

Funding: Increase in FY 1995 and out funding due to increased Air Force priority in conventional weapons technology.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology

PROJECT NO.: 670A

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 670A, Ordnance Technology | 11,847 | 17,754 | 18,812 | 17,994 | 19,544 | 15,684 | 16,505 | 16,964 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates the feasibility, effectiveness, and operational utility of conventional (non-nuclear) ordnance technologies for current and future air-delivered weapons. The project develops the following technologies: fuzes; insensitive and less sensitive explosives; hard target warheads; explosives, bombs, submunitions, and their dispensing mechanisms; guns and ammunition; air-to-surface composite weapon airframes; smart submunitions; weapon ordnance subsystems; and instrumentation.

(U) FY 1994:

- (U) Continued to develop advanced air-delivered munition and submunition technologies for components, subsystems, and systems to increase performance, lethality, safety, affordability, and supportability. ($10,361K)
  - -- (U) Completed design of a multimode warhead that can detonate in long rod penetrators, aeroballistic slugs, or multiple fragments, depending upon the optimum kill mechanism for the target.
  - -- (U) Demonstrated an octant azimuthal-sensing target detection device for improved burst point control in future air-to-air missiles.
- (U) Continued to demonstrate advanced ordnance, weapon airframe and carriage, and instrumentation technologies for air-to-air and air-to-surface munitions and submunitions to demonstrate operational effectiveness. ($1,486K)
  - -- (U) Completed fabrication of a dual mode launcher and demonstrated compatibility for both missile ejection and rail launch which will reduce logistics costs associated with two separate launchers.
  - -- (U) Coupled a low-cost, anti-jam, Global Positioning System (GPS) with an Inertial Navigation System (INS) to investigate GPS guidance in a jammed environment.

(U) FY 1995:

- (U) Continue to develop advanced air-delivered munition and submunition technologies for components, subsystems, and systems to increase performance, lethality, safety, affordability, and supportability. ($12,663K)
  - -- (U) Perform integration of antimateriel multimode warhead components (case, explosive, and fireset) to develop a warhead for future antimateriel submunitions which is highly effective against all mobile ground targets.
  - -- (U) Perform large scale testing of agent defeat kill mechanism to develop weapon payloads for defeating chemical and biological weapons.
  - -- (U) Expand envelope for the smart hard target fuze to improve burst point control for different sized weapons.
  - -- (U) Complete the demonstration of an improved ordnance package, (i.e., target detection device, electronic safe and arm, and warhead) for future upgrades of air-to-air missiles.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology — PROJECT NO.: 670A |

- (U) Continue to demonstrate advanced ordnance, weapon airframe and carriage, and instrumentation technologies for air-to-air and air-to-surface munitions and submunitions to demonstrate operational effectiveness. ($5,091K)
  - -- (U) Design and begin fabrication of an affordable Global Positioning System/Inertial Navigation system (GPS/INS) system which improves GPS accuracy in a jammed environment.
  - -- (U) Evaluate concepts for advanced suspension and release equipment for future fighter aircraft which will reduce size, weight, and supportability issues associated with conventional pyrotechnic racks, maximize weapon loadout, and reduce drag and radar cross section.

(U) FY 1996:

- (U) Continue to develop advanced air-delivered munition and submunition technologies for components, subsystems, and systems to increase performance, lethality, safety, affordability, and supportability. ($12,271K)
  - -- (U) Complete final integrated design of an anti-material submunition (e.g., warhead, seeker, submunition airframe, etc.) to demonstrate advanced antimateriel submunition technology which is highly effective against all mobile ground targets.
  - -- (U) Complete design of a general purpose bomb with an insensitive explosive and an improved fuze that can be stored indefinitely with the fuze installed.
  - -- (U) Complete design and begin fabrication of an active hard target smart fuze to determine optimum burst point during the penetration event.
  - -- (U) Perform large scale testing of agent defeat kill mechanism to develop weapon payloads for defeating chemical and biological weapons.
- (U) Continue to demonstrate advanced ordnance, weapon airframe and carriage, and instrumentation technologies for air-to-air and air-to-surface munitions and submunitions to demonstrate operational effectiveness. ($6,541K)
  - -- (U) Complete subsystem testing of an affordable anti-jam GPS/INS and integrate it into a weapons airframe for flight test to enable GPS accuracy in a jammed environment.
  - -- (U) Complete design and begin fabrication an advanced suspension and release equipment for future fighter aircraft which will reduce size, weight, and supportability issues associated with conventional pyrotechnic racks, maximize weapon loadout, and reduce drag and radar cross section.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology — PROJECT NO.: 670A |

(U) FY 1997:

- (U) Continue to develop advanced air-delivered munition and submunition technologies for components, subsystems, and systems to increase performance, lethality, safety, affordability, and supportability. ($8,945K)
  - -- (U) Complete in-house testing of an anti-material submuntion and fabrication of instrumented and live-fire units for flight testing to demonstrate advanced antimateriel submunition technology which is highly effective against all mobile ground targets.
  - -- (U) Complete design of an active fuze for autonomous target identification and optimum detonation against hard targets such as runways, buildings, and above-ground bunkers to provide a single hard target ordnance package capable of defeating above-ground or shallow-buried hard targets.
  - -- (U) Fabricate a general purpose bomb with an insensitive explosive and an improved fuze that can be stored indefinitely with the fuze installed.
  - -- (U) Complete demonstration of an active hard target smart fuze to determine optimum burst point during the penetration event.
- (U) Continue to demonstrate advanced ordnance, weapon airframe and carriage, and instrumentation technologies for air-to-air and air-to-surface munitions and submunitions to demonstrate operational effectiveness. ($9,049K)
  - -- (U) Integrate and ground test an anti-jam Global Positioning System/Inertial Navigation system (GPS/INS) demonstration unit in a weapon flight test vehicle.
  - -- (U) Complete fabrication and initiate ground testing of suspension and release equipment for future fighter aircraft which will reduce size, weight and supportability issues associated with conventional pyrotechnic racks, maximize weapon loadout, and reduce drag and radar cross section.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology

PROJECT NO.: 670A

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 11,847 | 22,450 | 19,941 | 20,784 | Cont |
| Current President's Budget | 11,847 | 17,754 | 18,812 | 17,994 | Cont |

Change Summary Explanation:

Funding: Increase in FY 1995 and out due to increased Air Force priority in conventional weapons technology.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602602F, Conventional Munitions.
- (U) PE 0602111N, Anti-Air/Anti-Surface Warfare Technology.
- (U) PE 0603792N, Advanced Technology Demonstrations.
- (U) PE 0604407D, Joint Standoff Weapon.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology

PROJECT NO.: 670B

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 670B, Guidance Technology | 4,720 | 12,898 | 12,825 | 12,284 | 12,177 | 15,269 | 15,377 | 16,862 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates affordable, autonomous, and adverse-weather advanced guidance technologies for conventional air-to-air and air-to-surface armament. Objectives include: increased accuracy, adverse-weather operation; real-time targeting and battle damage assessment (BDA); enhanced target classification/identification; standoff delivery munitions; detection and "lock-on" of reduced signature targets; improved survivability; more reliable system operation; improved countermeasure performance; and enhanced affordability.

(U) FY 1994:

- (U) Continued to develop and demonstrate affordable, autonomous, and adverse-weather advanced guidance air-to-surface seekers. ($2,320K)
  - -- (U) Completed data analysis for laser radar (LADAR) seeker captive flight test and evaluated LADAR utility in steep approach angles for direct attack munitions.
  - -- (U) Evaluated synthetic aperture radar's utility in steep approach angles for direct attack munitions.
- (U) Continued to develop and demonstrate technologies for real-time targeting of advanced guidance seekers. ($1,400K)
- (U) Continued to develop technologies to distinguish enemy forces from friendly forces and provide real-time BDA. ($1,000K)
  - -- (U) Completed design and conducted subcomponent testing of a high-fidelity, wideband, two-color, infrared scene projector for use in imaging infrared sensor development and test.

(U) FY 1995:

- (U) Continue to develop and demonstrate affordable, autonomous, and adverse-weather advanced air-to-surface guidance technologies. ($9,398K)
  - -- (U) Complete preliminary design of a five-cubic-inch optical correlator (as powerful as a Cray supercomputer) coupled with a LADAR to enable autonomous target identification in a cluttered environment.
  - -- (U) Evaluate concepts for an advanced synthetic aperture radar guidance terminal seeker for upgrades of direct attack and standoff munitions.
  - -- (U) Complete preliminary design of an advanced digital electronic processor for weapons seeker applications, suitable for air-to-surface and counterair guided munition applications; tera-op ($10^{12}$ operations per second) throughput capability will be demonstrated.
  - -- (U) Complete low-cost anti-armor design of tactical size, solid-state, pulsed LADAR sensor for use in antimateriel submunition, and conduct flight test demonstrations for the LADAR sensor, guidance algorithms, and submunition airframe.
- (U) Continue to develop and demonstrate technologies for real-time targeting by advanced guidance seekers. ($2,000K)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology — PROJECT NO.: 670B |

- (U) Continue to develop and demonstrate advanced guidance technologies and affordable, reliable components to counter the next generation air-to-air threats. ($1,500K)
  - -- (U) Fabricate and test a high-fidelity, wideband, two-color, infrared scene projector for use in imaging infrared sensor development and test.
  - -- (U) Complete preliminary design of a conformal array seeker that utilizes an antenna that conforms to the missile aeroskin, enabling smaller missile diameters and improved aerodynamic performance.

(U) FY 1996:

- (U) Continue to develop and demonstrate affordable, autonomous, and adverse-weather advanced air-to-surface guidance technologies. ($9,025K)
  - -- (U) Complete detailed design of a five-cubic-inch optical correlator (as powerful as a Cray supercomputer) coupled with a LADAR to enable autonomous target identification in a cluttered environment.
  - -- (U) Conduct detailed integration analysis and design for an affordable, adverse-weather capable, autonomous, precision synthetic aperture radar (SAR) guidance seeker.
  - -- (U) Complete design and fabricate an advanced digital electronic processor for weapons seeker applications, suitable for air-to-surface and counterair guided munition applications; demonstrate tera-op ($10^{12}$ operations per second).
- (U) Continue to develop and demonstrate advanced guidance technologies for hardened, time-critical targets. ($2,900K)
  - -- (U) Demonstrate concepts for real-time targeting investigation in the advanced synthetic aperture radar seeker program.
- (U) Continue to develop and demonstrate advanced guidance technologies and affordable, reliable components to counter the next generation air-to-air threats. ($900K)
  - -- (U) Demonstrate initial operating capability for the primary high-fidelity, wideband, two-color, infrared scene projector for use in imaging infrared sensor development and test.
  - -- (U) Complete breadboard fabrication of a conformal array seeker that utilizes an antenna that conforms to the missile aeroskin, enabling smaller missile diameters and improved aerodynamic performance.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #3, Advanced Development | PE 0603601F, Conventional Weapons Technology | 670B |

(U) FY 1997:

- (U) Continue to develop and demonstrate affordable, autonomous, and adverse-weather advanced air-to-surface guidance technologies. ($9,784K)
  - -- (U) Fabricate and ground test an optical correlator and laser radar for autonomous target identification in a cluttered environment.
  - -- (U) Fabricate and captive flight test an affordable, autonomous, adverse-weather capable, synthetic aperture radar seeker.
  - -- (U) Demonstrate via simulation an advanced digital electronic processor for weapons seeker applications, suitable for air-to-surface and counter-air guided munition applications; demonstrate tera-op throughput capability.
- (U) Continue to develop and demonstrate advanced guidance technologies for hardened, time-critical targets. ($2,000K)
  - -- (U) Demonstrate for user evaluation real-time targeting in conjunction with the advanced SAR seeker program.
- (U) Continue to develop and demonstrate advanced guidance technologies and affordable, reliable components to counter the next generation air-to-air threats. ($500K)
  - -- (U) Complete secondary operating capability for the high-fidelity, wideband, two-color, infrared scene projector for use in imaging infrared sensor development and test.
  - -- (U) Complete demonstration of a conformal array seeker that utilizes an antenna the conforms to the missile aeroskin, enabling smaller missile diameters and improved aerodynamic performance.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603601F, Conventional Weapons Technology

PROJECT NO.: 670B

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,720 | 12,650 | 10,825 | 10,610 | Cont |
| Current Budget Submit/President's Budget | 4,720 | 12,898 | 12,825 | 12,284 | Cont |

Change Summary Explanation:

Funding: Increase in FY 1995 and out is due to priority placed on developing affordable, autonomous, and adverse-weather advanced guidance technologies.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602111N, Anti-Air/Anti-Surface Warfare Technology.
- (U) PE 0603792N, Advanced Technology Demonstrations.
- (U) PE 0604618F, Joint Direct Attack Munitions.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 3 - Advanced Development

PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 91,115 | 93,590 | 47,919 | 46,624 | 50,421 | 50,470 | 49,928 | 51,413 | Continuing | Continuing |
| 3150 Advanced Optics Technology | 32,968 | 30,242 | 2,210 | 2,118 | 2,811 | 2,914 | 2,923 | 3,111 | Continuing | Continuing |
| 3151 High Power Semiconductor Laser Technology | 9,057 | 10,292 | 7,994 | 8,175 | 9,567 | 9,567 | 9,566 | 9,862 | Continuing | Continuing |
| 3152 High Power Microwave Technology | 18,916 | 20,852 | 10,728 | 10,781 | 11,046 | 11,146 | 11,144 | 11,440 | Continuing | Continuing |
| 3277 Systems Survivability Technology | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,800 |
| 3647 High Energy Laser Technology | 29,874 | 32,204 | 26,987 | 25,550 | 26,997 | 26,843 | 26,295 | 27,000 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This Advanced Development program demonstrates advanced directed energy and optical imaging concepts. Speed-of-light weapons and long-range, high resolution optical imaging through the turbulent atmosphere offer significant payoffs for many Air Force missions, such as theater missile defense, suppression of enemy air defenses, and space control. This program has demonstrated many major technology breakthroughs such as removing atmospheric distortions from optical transmissions (e.g., laser beams) and in producing small, relatively high power laser diode phased arrays. Major emphasis areas include: high power microwave and high energy laser technologies; long-range optical imaging; and high power laser diodes and diode arrays. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603605F Advanced Weapons Technology |

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 93,690 | 59,500 | 56,120 | 57,368 | Cont |
| (U) Appropriated Value | 94,715 | 96,500 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -1,025 | -2,910 | | | |
| b. SBIR | -1,301 | | | | |
| c. Below Threshold Reprogrammings | -1,274 | | | | |
| (U) Current President's Budget | 91,115 | 93,590 | 47,919 | 46,624 | Cont |

(U) Change Summary Explanation:

Funding: For FY 1995, Congress added $20 million for excimer laser technology and $17 million for laser radar. The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary:** Not Applicable.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3150 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3150 Advanced Optics Technology | 32,968 | 30,242 | 2,210 | 2,118 | 2,811 | 2,914 | 2,923 | 3,111 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project develops advanced optical technologies for identifying distant or dim objects. This work supports high energy laser technologies since an imaging subsystem is required for target verification, accurate and sustainable laser beam placement on target, and damage assessment. Advanced technologies including nonlinear optics, adaptive optics, and specialized signal processing are being developed. The goal is high quality optical image reconstruction, concentrating on removing turbulent atmosphere-induced distortions. Many of these developed technologies (both techniques and hardware) also have significant application to astronomy research.

(U) FY 1994:

- (U) Continued advanced optical imaging technology development and demonstrations that support applications such as space object identification. ($2,935K)
  - (U) Demonstrated high resolution optical imaging of low earth orbit satellites in daytime.
  - (U) Fielded daytime imaging capability at Air Force Maui Optical Station to support operational tasking as a contributing sensor to the Space Surveillance Network.
  - (U) Completed development of low light visible sensor and image recovery algorithms to support daytime imaging applications.
- (U) Continued work to develop and implement techniques to exploit optical images of satellites to support space object identification/mission payload assessment applications. ($1,500K)
  - (U) Finalized design for first generation work station to exploit optical images.
- (U) Continued development of nonlinear optics technologies for optical imaging. ($1,286K)
  - (U) Transitioned nonlinear optics technology for sodium wavelength beacon laser from in-house development to a contracted effort for scaling to higher power.
  - (U) Transitioned nonlinear optics compensated imaging technology from in-house development and testing to a contracted effort for advanced development demonstration.
- (U) Continued upgrades/demonstrations at the Air Force Maui Optical Site, HI, and the Malabar, FL, optical sites. ($286K)
  - (U) Complete integration of daytime imagining capability at Maui site to support operational tasking as a contributing sensor to the Space Surveillance Network.
- (U) Continued development of the excimer-based active imaging technology. ($9,230K)
  - (U) Completed final design and began fabrication of receiver hardware for an Active Imaging Testbed.
  - (U) Completed risk reduction experiments for candidate illuminator laser concepts and selected one concept for fabrication.
  - (U) Began illuminator laser fabrication to support active imaging field tests.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3150 |

- (U) Continued development of the laser imaging, detection, and ranging field demonstration. ($17,731K)
  - (U) Completed initial field tests of tunable laser to evaluate performance.
  - (U) Conducted low-power laser ranging and remote sensing proof-of-concept field tests at the Air Force Maui Optical Station.
  - (U) Completed preliminary design of scaled laser source to support field demonstrations of laser ranging, imaging, and remote sensing.

(U) FY 1995:

- (U) Continue advanced optical imaging technology development and demonstrations that support applications such as space object imaging. ($850K)
  - (U) Produce first high resolution satellite images on 3.5 meter telescope using speckle image sensing and reconstruction.
  - (U) Conduct initial field tests of daylight imaging concepts using adaptive optics for atmospheric compensation.
  - (U) Evaluate alternatives and select most promising concept for accurate satellite temperature sensing from ground-based sensors.
  - (U) Begin formal Imaging and Sensors Mission Study to evaluate mission payoff and technology requirements for advanced optical imaging across the spectrum of military applications.
- (U) Continue work to develop and implement techniques to exploit optical images of satellites to support space object imaging/mission payload assessment applications. ($1,000K)
  - (U) Deliver first-generation workstation for optical image exploitation to U.S. Space Command Combined Intelligence Center.
- (U) Continue development of nonlinear optics technologies for non-mechanical corrections in optical imaging. ($980K)
  - (U) Demonstrate feasibility of nonlinear optics image compensation for laser guidestar applications using sodium wavelength laser concepts at ten watt power level.
- (U) Continue upgrades/demonstrations at the Air Force Maui Optical Site, HI, and the Malabar, FL, optical sites. ($412K)
  - (U) Demonstrate feasibility of optical site networking to rapidly produce multiplier optical images of low earth orbit satellites to support space object identification applications.
- (U) Continue development of the excimer-based active imaging technology. ($10,000K)
  - (U) Complete illuminator laser development and delivery.
  - (U) Complete active imaging receiver/tracker integration with 3.5 meter telescope at Starfire Optical Range.
  - (U) Conduct initial active imaging field tests and demonstrations.
- (U) Continue development of the laser imaging, detection, and ranging field demonstration. ($17,000K)
  - (U) Complete design, fabrication, and delivery of full-scale laser source.
  - (U) Conduct full-scale tests and demonstrations of laser ranging and imaging for low earth orbit satellites at the Air Force Maui Optical Station.
  - (U) Complete modifications to laser system to incorporate wavelength agility in support of remote sensing applications.

(U) FY 1996:

- (U) Continue advanced optical imaging technology development and demonstrations that support applications such as space object identification. ($1,549K)
  - (U) Demonstrate daylight imaging concepts using adaptive optics for atmospheric compensation.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3150 |

- (U) Downselect to single concepts for active and passive imaging for application to deep space (out to geosynchronous altitudes) space object imaging/mission payload assessment missions.
- (U) Identify and begin development of key concepts and technology for focused development and transition to high-payoff applications for optical sensing, imaging, and stand-off detection.
- (U) Define and demonstrate deep space imaging concepts.
- (U) Demonstrate advanced electro-optical exploitation software tool.

– (U) Continue development of nonlinear optics technologies for non-mechanical corrections in optical imaging. ($561K)
- (U) Integrate nonlinear optics imaging brassboard with 1.5 meter telescope at Starfire Optical Range.

– (U) Continue upgrades/demonstrations at Air Force Maui Optical Site, HI, and the Malabar, FL, optical sites. ($100K)
- (U) Evaluate the potential of laser imaging, detection, and ranging (LIDAR) technology as a permanent addition to the Maui capabilities for space object surveillance and identification.

(U) FY 1997:

– (U) Continue advanced optical imaging technology development and demonstrations that support applications such as space object imaging. ($1,638K)
- (U) Demonstrate accurate temperature sensing of low earth orbit satellites using ground-based sensors.
- (U) Continue demonstration programs to address requirements for space object identification/mission payload assessment out to geosynchronous altitudes.
- (U) Conduct initial demonstrations to address feasibility of specific high-payoff applications for optical sensing, imaging, and stand-off detection.

– (U) Continue development of nonlinear optics for non-mechanical corrections in optical imaging. ($380K)
- (U) Evaluate and demonstrate nonlinear optics brassboard for full-aperture compensation on 1.5 meter telescope at Starfire Optical Range.

– (U) Continue upgrades/demonstrations at the Air Force Maui Optical Site, HI, and the Malabar, FL, optical sites. ($100K)
- (U) Begin integration of newly-completed 3.67 meter telescope at Maui into site control systems to allow routine use as a new contributing sensor for the Space Surveillance Network.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603605F Advanced Weapons Technology |
| | PROJECT<br>3150 |

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 34,640 | 5,000 | 5,000 | 5,200 | Cont |
| (U) Current President's Budget | 32,968 | 30,242 | 2,210 | 2,118 | Cont |

(U) Change Summary Explanation:

Funding: The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter. FY 1995 includes $10 million Congressional add for excimer laser technology and $17 million Congressional add for the laser imaging, detection, and ranging field demonstration.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0305160F, Defense Meteorological Satellite Program.
- (U) PE 0602102F, Materials.
- (U) PE 0602601F, Phillips Laboratory.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3151 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3151 High Power Semiconductor Laser Technology | 9,057 | 10,292 | 7,994 | 8,175 | 9,567 | 9,567 | 9,566 | 9,862 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project continues to yield revolutionary breakthroughs in compact, robust, affordable laser system technology, which is being developed and transitioned for a wide range of military applications requiring small compact laser sources with low to moderate optical power. Near-term applications include compact, reliable infrared sources for use with night vision systems, battlefield surgery instruments, and covert communication systems. Longer term applications, up to and including weapon applications, focus on compact higher power sources. This project leads development and builds upon a wide range of commercial advancements. Commercially available semiconductor lasers (1/10 watt) are widely used due to their low-cost, small size and weight, high reliability, and high efficiency in converting electricity to laser energy. The project preserves these attractive features while scaling to the higher powers (one to ten watts and above) and/or military application-specific wavelengths required for a wide range of applications. The project is divided into three technology areas. First, it investigates methods to increase output power from individual semiconductor laser diodes. Second, it develops semiconductor laser array integration methods, which produce a single, high quality laser beam at significantly higher power levels. Third, it develops wavelength-specific laser diodes for military applications. This project also works directly with field users to develop proof-of-capability demonstrations and field tests for these revolutionary laser sources. This technology has many commercial applications, especially for eye-safe lasers.

(U) FY 1994:
- (U) Continued development of laser diodes for improved performance/higher power in single diode and array applications. ($1,890K)
  - (U) Achieved five watts (pulsed) near diffraction-limited power and 7.5 watts continuous wave power from a master oscillator power amplified single device.
- (U) Continued development of coherent laser diode arrays for improved performance/higher power in array applications. ($2,844K)
  - (U) Successfully phased a laser array of approximately 1000 diodes for improved performance/higher power in array applications.
  - (U) Successfully phased a 9x100 array of diode lasers in a master oscillator power amplifier configuration.
- (U) Continued development of high power laser diodes and diode arrays at alternate wavelengths that will be transitioned to military applications. ($4,323K)
  - (U) Successfully developed the first mid-infrared diode laser array.
  - (U) Demonstrated quantum-well diode laser operating at 40 degrees kelvin and four micron wavelength.
  - (U) Demonstrated room temperature operation of a single diode laser at over one watt output power and two microns wavelength.

(U) FY 1995:
- (U) Continue development of laser diodes for improved performance/higher power in single diode and array applications. ($2,213K)
  - (U) Demonstrate ten watts continuous wave power with good beam quality from a single broad-area diode laser.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3151 |

- (U) Complete development and demonstrate one kilowatt diode-pumped solid-state laser brassboard for active tracking illumination at the Starfire Optical Range.
- (U) Continue development of coherent laser diode arrays for improved performance/higher power in array applications. ($3,659K)
  - (U) Demonstrate a suitable array architecture that can be scaled to the 50-100 watt power level by FY 1996.
- (U) Continue development of high power laser diodes and diode arrays at alternate wavelengths that will be transitioned to military applications. ($4,120K)
  - (U) Demonstrate one watt continuous wave, diffraction-limited output at 2.1 microns wavelength.
  - (U) Demonstrate 0.1 watt continuous wave output power at 4.2 microns wavelength.
- (U) Continue to investigate applications for these advanced semiconductor laser diodes and diode arrays. ($300K)
  - (U) Transition the Field Medical Laser System and Medical (Med) Pen to a commercial partner for commercialization.

(U) FY 1996:

- (U) Continue development of laser diodes for improved performance/higher power in single diode and array applications. ($2,962K)
  - (U) Demonstrate three watts of continuous power from a single aperture.
  - (U) Demonstrate devices that will have the potential to be modulated and scaled to higher powers.
  - (U) Demonstrate coupling to single mode fibers at moderate power levels.
- (U) Continue development of coherent laser diodes and diode arrays for improved performance/higher power in array applications. ($2,577K)
  - (U) Demonstrate 50 watts continuous power from a phased array of diode lasers.
  - (U) Demonstrate the ruggedness and reliability of a high power system with a one cubic foot laser head.
- (U) Continue development of high power laser diode arrays at alternate wavelengths that will be transitioned to military applications such as sources for illuminators and infrared countermeasures. ($2,077K)
  - (U) Demonstrate lasing of one watt laser diode at a four micron wavelength.
  - (U) Demonstrate single longitudinal mode operation at a wavelength of 3.3 microns.
- (U) Continue to investigate applications for these advanced semiconductor laser diodes and diode arrays. ($378K)
  - (U) Transition semiconductor laser technology to the Ballistic Wind Program.
  - (U) Investigate visible laser technology to update access denial and medical devices.
  - (U) Demonstrate material systems and laser architectures that are scaleable to 50 watts at mid-infrared wavelengths.

(U) FY 1997:

- (U) Continue development of laser diodes for improved performance/higher power in single diode and array applications. ($2,805K)
  - (U) Demonstrate five watts of continuous power from a single aperture.
  - (U) Demonstrate coupling to single mode fibers at high power levels.
  - (U) Demonstrate devices that will have the potential to be modulated and scaled to high powers.
- (U) Continued development of coherent laser diode arrays for improved performance/higher power in array applications. ($2,300K)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603605F Advanced Weapons Technology |
| | PROJECT<br>3151 |

- (U) Demonstrate 100 watts of continuous power from a phased array of diode lasers.
- (U) Demonstrate the salability of a one cubic foot laser head to 200 watts.

– (U) Develop high power laser diodes and diode arrays at alternate wavelengths that will be transitioned to military applications such as sources for illuminators and infrared countermeasures. ($2,570K)
- (U) Demonstrate lasing of 100 milliwatts at a wavelength of five microns.

– (U) Continue to investigate applications for these advanced semiconductor laser diodes and diode arrays. ($500K)
- (U) Investigate blue/green diode laser technology for underwater communications, optical memory, and flat panel displays.
- (U) Investigate a space illuminator application.

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 10,250 | 6,348 | 6,900 | 6,900 | Cont |
| (U) Current President's Budget | 9,057 | 10,292 | 7,994 | 8,175 | Cont |

(U) Change Summary Explanation:

Funding: The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter.

Schedule: Not Applicable.

Technical: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3151 |

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602204F, Aerospace Avionics.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0602234N, Systems Support Technology.
- (U) Representatives from Army, Navy, Ballistic Missile Defense Organization, National Laboratories, and Air Force using commands are members of the government review team for this technology.
- (U) Joint field demonstrations of this technology are ongoing with: the Air Force Pararescue School; the Air Force Special Operations Command; the U.S. Coast Guard; and the U.S. Customs Service.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603605F Advanced Weapons Technology | PROJECT<br>3152 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3152 High Power Microwave Technology | 18,916 | 20,852 | 10,728 | 10,781 | 11,046 | 11,146 | 11,144 | 11,440 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project develops high power microwave generation technologies. It also develops a susceptibility/vulnerability/lethality data base to identify potential vulnerabilities of U.S. systems to high power microwave threat parameters and to provide a basis for future weaponization decisions. Representative U.S. and foreign assets will be tested to understand real system susceptibilities. Both wideband (wide frequency range) and narrowband (very small frequency range) technologies are being developed. The technologies developed in this project will demonstrate the applicability of high power microwaves to support various missions such as suppression of enemy air defense, counter-air, command and control warfare, and aircraft self-protection.

(U) FY 1994:
- (U) Continued technology development of generic high power microwave hardware. ($2,865K)
  - (U) Obtained 20 gigawatts power from ultra-wideband hydrogen switched source.
  - (U) Obtained one gigawatt peak power from ultra-wideband gallium arsenide solid-state source.
- (U) Continued efforts evaluating the susceptibility of military hardware and software to high power microwave. ($500K)
  - (U) Completed preliminary suicide/fratricide assessment of F-16.
  - (U) Completed initial susceptibility investigations for integrated air defense systems.
- (U) Began efforts addressing suppression of enemy air defense systems for burnout of enemy internal electronics. ($1,820K)
  - (U) Demonstrated radio frequency energy extraction from plasma filled magnetically insulated line oscillator.
  - (U) Began tests of specific air defense systems electronic hardware.
- (U) Continued efforts addressing aircraft self-protection technologies. ($3,931K)
  - (U) Completed in-depth analysis of F-16 testbed aircraft.
  - (U) Took delivery of electronically steerable ultra-wideband high power microwave source.
  - (U) Expanded high power microwave effects database with respect to infrared guided missiles.
  - (U) Adapted several engagement models to include high power microwave effects.
- (U) Completed experiment on active denial technology. ($1,300K)
  - (U) Completed L-band hardware for active denial technology demonstration.
- (U) Continued development of the laser-induced microwave emissions program using excimer laser technology. ($8,500K)
  - (U) Developed tailored laser sources for testing.
  - (U) Began testing materials and components.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3152 |

(U) FY 1995:
- (U) Continue technology development of generic high power microwave hardware. ($1,912K)
  - (U) Continue to develop narrowband and wideband high power microwave sources and antennas for various applications.
- (U) Continue efforts evaluating the susceptibility of representative military hardware and software to high power microwave effects. ($500K)
  - (U) Complete aircraft shelter radio frequency penetration effects.
  - (U) Complete ultra-wideband F-16 radio frequency effects.
  - (U) Characterize current-generation jet engine control systems.
  - (U) Transition frequency mode-stir techniques to aircraft and automobile industry that reduces time in conducting susceptibility tests by 90%.
- (U) Continue efforts addressing suppression of enemy air defenses systems. ($1,915K)
  - (U) Begin weapons application experiment design.
  - (U) Downselect high power microwave narrowband source.
  - (U) Conduct experiments on selected integrated air defense assets.
- (U) Continue efforts addressing aircraft self-protection technologies. ($3,025K)
  - (U) Develop detailed weapons application design.
  - (U) Downselect high power microwave wideband source.
  - (U) Continue testing and dynamic simulations of infrared and radio frequency guided missiles.
  - (U) Design an experiment proof-of-concept.
- (U) Complete active denial technology demonstration. ($1,800K)
  - (U) Complete X-band hardware for active denial technology demonstration.
- (U) Focus efforts addressing command and control warfare, space control, and counter-air technologies. ($1,200K)
  - (U) Begin development of wideband submunition concept for command and control warfare disruption mission.
  - (U) Explore ultra-high power wideband high power microwave weapons concept for electronics damage.
  - (U) Continue development of communications equipment effects database and begin database on aircraft maintenance and avionics equipment.
- (U) Continue development of the laser-induced microwave emissions program using excimer laser technology. ($10,500K)
  - (U) Perform laser-induced microwave emissions experiments on simulated systems.
  - (U) Develop short pulse source for laser-induced microwave emissions.

(U) FY 1996:
- (U) Continue technology development of generic high power microwave hardware. ($1,951K)
  - (U) Continue development of narrowband and wideband high power microwave sources and antennas.
- (U) Continue efforts evaluating the susceptibility of representative military hardware and software to high power microwave effects. ($500K)
  - (U) Conduct studies of electromagnetic propagation through facilities.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603605F Advanced Weapons Technology |
| | PROJECT<br>3152 |

- (U) Complete data base on various ground and flightline maintenance equipment.
- (U) Complete susceptibility report for large U.S. aircraft and begin hardening criteria development.
- (U) Complete experiments to determine coupling of high power microwave energy into hangers.

– (U) Continue efforts addressing suppression of enemy air defense systems. ($1,615K)
- (U) Conduct low power coupling and high power damage experiments on selected integrated air defense assets.
- (U) Refine system parameter requirements and perform go/no go decision.

– (U) Continue efforts addressing aircraft self-protection technologies. ($2,000K)
- (U) Develop host aircraft hardening criteria.
- (U) Complete wideband source/antenna design integration.
- (U) Design source experiment.
- (U) Continue testing and dynamic simulations of guided missiles.

– (U) Continue efforts addressing command and control warfare and counter-air technologies. ($2,310K)
- (U) Continue development of compact wideband sources and antennas for both damage and disruption missions.
- (U) Perform limited in situ experiments on command/control/communications equipment in building/facilities.
- (U) Extend materials studies to in situ effects applications.

– (U) Continue development of the laser-induced microwave emissions program. ($1,400K)
- (U) Develop an integrated response model of the laser-induced microwave emissions phenomenon.
- (U) Conduct experiments on actual systems.
- (U) Conduct feasibility experiments of laser-induced microwave emissions applications.

– (U) Continue development of high power microwave space control technologies. ($952K)
- (U) Initiate application concept studies.

(U) FY 1997:

– (U) Continue technology development of generic high power microwave hardware. ($1,771K)
- (U) Continue development of narrowband and wideband high power microwaves sources and antennas.

– (U) Continue efforts evaluating the susceptibility of representative military hardware and software to high power microwave effects. ($500K)
- (U) Complete database on foreign aircraft.
- (U) Complete hardening criteria on large U.S. aircraft.
- (U) Conduct experiments of electromagnetic propagation through facilities.

– (U) Continue efforts addressing suppression of enemy air defenses. ($2,100K)
- (U) Conduct experiments on selected integrated air defense assets.
- (U) Complete concept design of technology demonstration.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603605F Advanced Weapons Technology<br>PROJECT 3152 |

- (U) Begin source technology integration.

- (U) Continue efforts addressing aircraft self-protection technologies. ($1,755K)
  - (U) Initiate hardening requirements on the experimental platform.
  - (U) Conduct experiment to demonstrate protection technologies.
  - (U) Prepare plan to transition technology to system program offices.
- (U) Continue efforts addressing command and control warfare and counter-air technologies. ($2,125K)
  - (U) Finalize wideband source and pulse power designs.
  - (U) Continue equipment characterization.
  - (U) Develop effects database on foreign aircraft maintenance and avionics equipment.
- (U) Continue development of the laser-induced microwave emissions program. ($1,500K)
  - (U) Develop an integrated response model of the laser-induced microwave emissions phenomenon.
  - (U) Conduct experiments on actual systems and develop draft hardening specifications.
  - (U) Conduct feasibility experiments.
- (U) Continue development of high power microwave space control technologies. ($1,030K)
  - (U) Continue application concept studies.

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|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3152 |

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 20,000 | 11,500 | 11,000 | 11,300 | Cont |
| (U) Current President's Budget | 18,916 | 20,852 | 10,728 | 10,781 | Cont |

(U) Change Summary Explanation:

Funding: The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter. FY 1995 was increased by Congressional adds of $10 million for excimer laser technology and $1.5 million for enhanced high power microwave technology.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602202F, Human Systems Technology.
- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0602120A, Electronic Survivability and Fuzing Technology.
- (U) PE 0602111N, Anti-Air Warfare, Anti-Surface Warfare Technology.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | | | | | | | DATE: February 1995 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | | | | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology | | | | | PROJECT: 3277 | |
| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
| 3277 Systems Survivability Technology | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,800 |

(U) A. **Mission Description and Budget Item Justification:** This project developed technologies to evaluate and enhance Air Force systems electromagnetic pulse survivability. The project has been terminated.

(U) FY 1994:
- (U) Demonstrated technologies for simulating electromagnetic pulses. ($300K)

(U) FY 1995: Not Applicable.

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3277 |

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 300 | 0 | 0 | 0 | 1,800 |
| (U) Current President's Budget | 300 | 0 | 0 | 0 | 1,800 |

(U) Change Summary Explanation:

Funding: Project terminated in FY 1995.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary: Not Applicable.

(U) D. Schedule Profile: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | | DATE February 1995 |
|---|---|---|---|
| BUDGET ACTIVITY<br>3 - Advanced Development | PE NUMBER AND TITLE<br>0603605F Advanced Weapons Technology | | PROJECT<br>3647 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3647 High Energy Laser Technology | 29,874 | 32,204 | 26,987 | 25,550 | 26,997 | 26,843 | 26,295 | 27,000 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification:** This project develops and demonstrates technology and conducts detailed assessments needed for high energy laser weapons. The technology developed by this project is directly applicable to most high power applications. The project demonstrates the critical technologies for: scaleable laser devices; optical components; and laser beam control to efficiently compensate and propagate laser radiation through the atmosphere to a target. It also develops and uses detailed computational models to establish high energy laser weapon effectiveness and satellite and missile vulnerability. Correcting the laser beam for atmospheric disturbances is the key technology in most high energy laser applications. The beam control technology developed in this project had, and will continue to have, a significant benefit to the astronomy community.

(U) FY 1994:

- (U) Continued development and demonstration of high energy laser device components for potential weapon applications. ($3,339K)
  - (U) Demonstrated high pressure operation of small-scale chemical oxygen-iodine laser device, providing a concept to simplify and reduce weight of pressure recovery systems.
  - (U) Demonstrated long run times on small-scale chemical oxygen-iodine laser device with stable power output and thermal control.
  - (U) Optimized hardware configuration and operating conditions on small-scale chemical oxygen-iodine laser device, resulting in two times increase in laser power per unit flow area and three times increase in output laser power.
  - (U) Demonstrated high performance optical coatings for chemical oxygen-iodine laser wavelength with extremely low absorption while maintaining low scatter and excellent environmental stability.
- (U) Continued atmospheric compensation/beam control experiments, including activation of the new 3.5 meter telescope. ($12,142K)
  - (U) Demonstrated improved satellite and star tracking performance through the use of adaptive optics for atmospheric compensation.
  - (U) Completed integration and activation of new 3.5 meter telescope, including collecting first light images of astronomical objects and demonstrating the ability to accurately point to low earth orbit satellites.
  - (U) Began development of second-generation adaptive optics hardware for 3.5 meter telescope.
  - (U) Completed initial extended beacon atmospheric compensation test in ground-based field testing which simulates the high altitude propagation path for theater missile defense scenarios.
- (U) Continued atmospheric measurements and characterization of the high energy laser beam propagation environment from ground and airborne platforms. ($10,000K)
  - (U) Obtained coincident strength-of-turbulence measurements between airborne measurements and ground-based measurements to confirm the validity of radar turbulence measurements database.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3647 |

- (U) Built and integrated all hardware to support detailed airborne horizontal path atmospheric characterization experiments planned for FY 1995.

- (U) Continued vulnerability assessments for potential high energy laser targets. ($2,893K)
  - (U) Completed testing of sub-scale, mid-scale, and full-scale targets for laser vulnerability of theater missiles at three different government laser facilities.
  - (U) Completed assessments of three satellite targets.
  - (U) Developed methodology for quantifying systematic uncertainties in satellite component designs and system-level response to component-level degradation.
  - (U) Completed test program on four satellite components; identified temporary effects and energy thresholds for permanent instead of temporary effects.
  - (U) Acquired optical analysis codes and evaluated vulnerability of a satellite optical system.
- (U) Continued development of excimer laser technology supporting the laser-induced microwave emissions program. ($1,500K)
  - (U) Delivered moderate-power, frequency agile laser source which meets power requirements for laser-induced microwave emissions phenomenology tests.

(U) FY 1995:

- (U) Continue development and demonstration of high energy laser components for potential weapon applications. ($3,592K)
  - (U) Test advanced chemical oxygen-iodine laser spray generator concept at moderate-scale to measure key performance parameters.
  - (U) Evaluate beam quality of moderate-scale chemical oxygen-iodine laser devices operating at high pressure.
- (U) Continue atmospheric compensation/beam control experiments from ground-based platforms. ($19,028K)
  - (U) Complete development and installation of first-generation adaptive optics system on 3.5 meter telescope and conduct first atmospheric compensation experiments.
  - (U) Demonstrate real-time compensation for tilt anisoplanatism on 1.5 meter telescope.
  - (U) Conduct first field experiments on 1.5 meter telescope to evaluate hybrid beacon sensing for atmospheric compensation, validating the baseline concept for full-scale, ground-based laser beam control systems.
  - (U) Complete development of one kilowatt track illuminator laser and begin installation at Starfire Optical Range.
  - (U) Develop long-wave infrared sensor and demonstrate long-wave infrared sensor acquisition of satellites.
  - (U) Integrate improved tracker into existing ground-based hardware to evaluate performance of integrated tracking/atmospheric compensation in field testing which simulates the high altitude, horizontal propagation path for theater missile defense scenarios.
- (U) Continue atmospheric measurements and characterization of the high energy laser beam propagation environment from ground and airborne platforms. ($6,352K)
  - (U) Complete high altitude airborne flights to obtain optical measurements of atmospheric turbulence along long horizontal propagation paths.
- (U) Continue development of excimer laser technology supporting the laser-induced microwave emissions program. ($1,500K)
  - (U) Complete evaluation of laser-induced microwave emissions phenomenology to establish feasibility for operational applications.
- (U) Continue vulnerability assessments for potential high energy laser targets. ($1,732K)
  - (U) Complete ground tests against full-scale theater missile targets.
  - (U) Complete technical report documentation on assessment results on past six satellite targets.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3647 |

- (U) Incorporate uncertainty methodology into satellite vulnerability assessment process.
- (U) Complete three new satellite models and vulnerability assessments.
- (U) Perform vulnerability analysis on two satellite optical systems.

(U) FY 1996:

- (U) Continue development and demonstration of high energy laser components for potential weapon applications. ($4,245K)
  - (U) Integrate advanced chemical oxygen-iodine laser generator to demonstrate scaled performance.
- (U) Continue atmospheric compensation/beam control experiments from ground-based platforms to support applications ranging from weaponization to space object identification. ($21,230K)
  - (U) Using newly-installed one kilowatt track illuminator laser, demonstrate active tracking of low earth orbit satellites with 3.5 meter telescope.
  - (U) Evaluate synergistic effects between atmospheric compensation and active tracking of satellite targets.
  - (U) Demonstrate and evaluate the performance of hybrid beacon sensing on 3.5 meter telescope.
  - (U) Demonstrate 24-hour passive acquisition of low earth orbit satellites using long wavelength infrared acquisition sensor.
  - (U) Continue development of next generation adaptive optics for the 3.5 meter telescope.
  - (U) Complete integrated tracking/atmospheric compensation experiments in static ground testing.
  - (U) Conduct active tracking experiments against dynamic targets simulating the theater missile defense scenario.
- (U) Continue vulnerability assessments for potential high energy laser targets. ($1,512K)

(U) FY 1997:

- (U) Continue development and demonstration of high energy laser components for potential weapon applications. ($3,030K)
  - (U) Complete scaled experiments of chemical oxygen-iodine laser device to demonstrate performance of advanced generators and high pressure operation.
- (U) Continue atmospheric compensation/beam control experiments from ground-based platforms to support applications ranging from weaponization to space object imaging. ($21,020K)
  - (U) Complete development and installation of scaled sodium wavelength laser to support full-scale hybrid beacon sensing for 3.5 m telescope.
  - (U) Conduct initial ground-based laser integrated beam control demonstrations against selected low earth orbit satellites (up to 400 kilometers).
  - (U) Continue satellite active tracking experiments, to evaluate synergistic effects with atmospheric compensation, investigate phenomenology of satellite target illumination for various targets and engagements, and demonstrate 24-hour satellite tracking capability.
  - (U) Complete development and begin installation of next generation adaptive optics for the 3.5 meter telescope.
  - (U) Complete active tracking experiments with advanced hardware and track algorithms against dynamic targets simulating the theater missile defense scenario.
- (U) Continue vulnerability assessments for potential high energy laser targets. ($1,500K)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 3 - Advanced Development | PE NUMBER AND TITLE: 0603605F Advanced Weapons Technology — PROJECT: 3647 |

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 28,500 | 36,652 | 33,220 | 33,968 | Cont |
| (U) Current President's Budget | 29,874 | 32,204 | 26,987 | 25,550 | Cont |

(U) Change Summary Explanation:

Funding: The FY 1996 budget request reflects Air Force technology development needs that are required by the warfighter.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602601F, Phillips Laboratory.
- (U) PE 0603319F, Airborne Laser Demonstration.
- (U) PE 0305910F, SPACETRACK.
- (U) PE 0603217C, Ballistic Missile Defense, Advanced Development (High Altitude Balloon Experiment).
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

(U) D. Schedule Profile: Not Applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603617F Cmd Control & Comm Applics

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 9,107 | 5,218 | 6,437 | 7,902 | 8,202 | 8,550 | 8,805 | 9,067 | Continuing | TBD |
| 2314 Tactical Air Surveillance | 573 | 935 | 1,039 | 1,108 | 836 | 482 | 496 | 510 | Continuing | TBD |
| 2317 Tactical Air Information Production & Distribution | 3,541 | 1,143 | 1,581 | 3,912 | 2,938 | 3,339 | 3,439 | 3,542 | Continuing | TBD |
| 2321 Tactical Battle Information Management | 4,802 | 2,901 | 3,533 | 2,603 | 4,055 | 4,353 | 4,483 | 4,616 | Continuing | TBD |
| 3804 Tactical Air Forces Systems Integration | 191 | 239 | 284 | 279 | 373 | 376 | 387 | 399 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification :** Rapidly transitions development in the Science and Technology base to existing C3 programs or directly to warfighting commands. Projects are directly responsive to operational requirements for improved battle management, communications, theater missile defense, and surveillance capability. Takes advantage of advanced technology developments throughout the services and industry as well as off-the-shelf technology. This research is in Category, Demonstration and Validation. Its products are primarily advanced development models, rapid prototype efforts, and software developed through evolutionary acquisition methods. Program also defines system architectures and develops communications technology for modernization and improving the Air Force portion of the Tri-Service communications networks which the Defense Information Systems Agency (DISA) oversees. Beginning in FY 1994, the Tactical Air Information Production and Distribution project has included funding and tasks from PE 0303126F, Long Haul Communications, including the Secure Survivable Communications Network (SSCN).

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603617F Cmd Control & Comm Applics |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 9, 395 | 5,402 | 6,469 | 7,942 | Continuing |
| (U) Appropriated Value | 9,395 | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Deductions | (126) | (93) | | | |
| b. BTR | (33) | | | | |
| c. SBIR | | (91) | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | (32) | (40) | |
| (U) Current Budget Submit/President's Budget | 9,107 | 5,218 | 6,437 | 7,902 | Continuing |

(U) Change Summary Explanation:

Funding: N/A

Schedule: N/A

Technical: N/A

(U) C. **Other Program Funding Summary ($ in Thousands)** See individual projects.

**Related RDT&E:** See individual projects.

(U) D. **Schedule Profile** See individual projects.

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603617F Cmd Control & Comm Applics

PROJECT: 2314

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2314 Tactical Air Surveillance | 573 | 935 | 1,039 | 1,108 | 836 | 482 | 496 | 510 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification** Develops advanced technology and demonstrates equipment improvements to the Theater Air Control System (TACS) ground surveillance radars. Investigates non-radar and/or adjunct radar sensors to address the Combat Air Forces (CAF) surveillance, detection, and tracking requirements not satisfied by an active radar.

(U) FY 1994
- (U) Initiated multiple Sidelobe Canceller/Mainlobe Noise Canceller (MSLC/MNC) development/demonstration for AN/TPS-75 radar ($395).
- (U) Initiated solid state transmitter panel performance and reliability and maintainability (R&M) testing ($178).

(U) FY 1995
- (U) Assess near-term availability of solid state high power devices for the AN/TPS-75 Solid State Transmitter ($50).
- (U) Complete MSLC/MNC development ($560).
- (U) Complete solid state transmitter panel performance and R&M testing ($125).
- (U) Initiate design for distributed tube based transmitter for AN/TPS-75, and build one transmit panel ($200).

(U) FY 1996
- (U) Continue development of tube based transmitter panel for AN/TPS-75 ($900).
- (U) Develop specification for design/waveform signal processor ($139).

(U) FY 1997
- (U) Complete tube based transmitter panel for AN/TPS-75 ($208).
- (U) Initiate tube based transmitter panel performance evaluation ($200).
- (U) Initiate waveform and signal processor impact evaluation ($600).
- (U) Analyze solid state versus tube based transmitter ($100).

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603617F Cmd Control & Comm Applics<br>PROJECT<br>2314 |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 576 | 951 | 1,044 | 1,114 | Continuing |
| (U) Appropriated Value | 576 | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | | | | | |
| b. SBIR | (3) | (16) | | | |
| (U) Adjustments to Budget Years since FY95 PB | | | (5) | (6) | |
| (U) Current Budget Submit/President's Budget | 573 | 935 | 1,039 | 1,108 | Continuing |

(U) Change Summary Explanation:

Funding: See explanation, page 2

Schedule: Tube Based Development efforts combined into one contractual vehicle; causing contract award delay of 2 quarters.

Technical: N/A

(U) C. **Other Program Funding Summary ($ in Thousands): N/A**

Related Activities:

(U) PE 0602702F, Command, Control, and Communications
(U) PE 0603789F, C3I Advanced Development
(U) PE 0207412F, Tactical Air Control System Improvements
(U) PE 0603260F, Intelligence Advanced Development
(U) PE 0208010F, Joint Tactical Communications
(U) PE 0207438F, Theater Battle Management C4I
(U) There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration And Validation | PE NUMBER AND TITLE: 0603617F Cmd Control & Comm Applics — PROJECT: 2314 |

(U) D. **Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Multiple Sidelobe Cancellor/ Mainlobe Noise Cancellor development and demonstration | | | X* | | | | | X** | | | | | | | | |
| (U) Solid state transmitter panel performance and R&M testing | X* | | | | | | | X** | | | | | | | | |
| (U) Initiate tube based developments | | | | | | | X* | | | | | | | | | |
| (U) Initiate tube based versus solid state eval | | | | | | | | | | | | | | | | X* |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603617F Cmd Control & Comm Applics | PROJECT<br>2317 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2317 Tactical Air Information Production & Distribution | 3,541 | 1,143 | 1,581 | 3,912 | 2,938 | 3,339 | 3,439 | 3,542 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** Transitions advanced communications to the Theater Deployable Communications (TDC) program in support of Theater Battle Management (TBM) command and control enhancements. Capabilities include Multi-Level Security (MLS), survivability, deployability, interoperability, and control for communications networks ranging from base communications to the global Defense Information System Network (DISN). Project includes funding and tasks consolidated from PE 0303126F, Long Haul Communications, beginning in FY94.

(U) FY 1994
- (U) Initiated roadmap to transition networking technologies into AF needs in Theater Deployable Communications (TDC) ($105).
- (U) Continued development of the Secure Survivable Communications Network (SSCN) ($1,800).
- (U) Installed SSCN node at Langley AFB and integrate it into a joint demonstration ($287).
- (U) Continued development of the International Policy Gateway ($187).
- (U) Completed modeling and simulation for congestion control ($62).
- (U) Continued cooperative intelligent system for communications management ($100).
- (U) Completed TBM system integration simulation capability ($1,000).

(U) FY 1995
- (U) Complete SSCN development and prepare for joint demonstration ($574).
- (U) Complete cooperative intelligent system for communications management and transition to networking ($122).
- (U) Initiate SSCN Phase II for fielding and complete transition plan into Theater Deployable Comm Program ($447).

(U) FY 1996
- (U) Continue SSCN Phase II ($1,581).

(U) FY 1997
- (U) Complete SSCN Phase II ($3,394).
- (U) Prepare for joint demonstration ($518).

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration And Validation | PE NUMBER AND TITLE: 0603617F Cmd Control & Comm Applics — PROJECT: 2317 |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 4,505 | 1,174 | 2,089 | 4,932 | Continuing |
| (U) Appropriated Value | 4,505 | 1,174 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | (62) | (11) | | | |
| b. Below Threshold Reprogramming | (902) | | | | |
| c. SBIR | | (20) | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | (508) | (920) | |
| (U) Current Budget Submit/President's Budget | 3,541 | 1,143 | 1,581 | 3,912 | Continuing |

(U) Change Summary Explanation:

Funding: Required adjustments resulting from contractual negotiation and actions.

Schedule: N/A

Technical: N/A

(U) C. **Other Program Funding Summary ($ in Thousands): N/A**

**Related Activities:** See Project 2314

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603617F Cmd Control & Comm Applics<br>PROJECT 2317 |

(U) D. Schedule Profile

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Secure Survivable Comm Net Phase 1 | | | | | | | | | | | | | | | | |
| Transition Plan | | X* | | | | X** | | | | | | | | | | |
| Development | | | | | X** | | | | | | | | | | | |
| Joint Demo (On-going) | | | X* | | | | X** | | | | | | | | | |
| (U) International Policy Gateway | | | | | X** | | | | | | | | | | | |
| (U) M&S for Congestion Control | | | | X** | | | | | | | | | | | | |
| (U) Cooperative Intel System for Mgt | | | | | | | X** | | | | | | | | | |
| (U) Secure Survivable Comm Net Phase II | | | | | | | | | | | | | | | | |
| Transition Plan | | | | | | X* | X** | | | | | | | | | |
| Development | | | | | | | X* | | | | | | | | X** | |
| Joint Demo | | | | | | | | | | | | | | | | X* |

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603617F Cmd Control & Comm Applics

PROJECT: 2321

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2321 Tactical Battle Information Management | 4,802 | 2,901 | 3,533 | 2,603 | 4,055 | 4,353 | 4,483 | 4,616 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** Field automated decision support systems for the Air Operations Center (AOC). Initial capability was the Advanced Planning System (APS) decision aid. APS supplies combat planners with an automated capability to pull together the information on resources, weaponeering options, and the current battle situation that will reduce time to generate the Air Tasking Order (ATO) by a factor of ten. Current development focus is the Force Level Execution (FLEX) system in support of the Combat Operations Division of the AOC. FLEX will provide automated execution management and control of operations.

(U) FY 1994
- (U) Complete verification and validation of APS software ($188).
- (U) Initiate development of Force Level Execution (FLEX) automation for the Combat Operations Division of the Air Operations Center (AOC)($2,475).
- (U) Continue Theater Missile Defense prototyping ($1,945).
- (U) Initiate Theater Battle Management (TBM) systems integration evaluations ($194).

(U) FY 1995
- (U) Continue FLEX development ($2,444).
- (U) Transition Theater Missile Defense prototyping ($0).
- (U) Continue TBM systems integration evaluations ($242).
- (U) Initiate planning for Operations-Intelligence integration development ($215).

(U) FY 1996
- (U) Continue FLEX development ($2,967).
- (U) Initiate Operations-Intelligence integration development ($300).
- (U) Continue TBM systems integration evaluations ($266).

(U) FY 1997
- (U) Complete FLEX development and initiate integration into CTAPS ($256).
- (U) Continue Operations-Intelligence integration development ($2,138).
- (U) Continue TBM systems integration evaluations ($209).

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration And Validation | PE NUMBER AND TITLE: 0603617F Cmd Control & Comm Applics — PROJECT: 2321 |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 4,122 | 2,992 | 3,051 | 1,716 | Continuing |
| (U) Appropriated Value | 4,122 | 2,992 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Generic Congressional Reductions | (60) | (41) | | | |
| b. BTR | 869 | | | | |
| c. SBIR | (129) | (50) | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | 482 | 887 | |
| (U) Current Budget Submit/President's Budget | 4,802 | 2,901 | 3,533 | 2,603 | Continuing |

(U) Change Summary Explanation:

Funding: Required adjustments resulting from final contractual negotiations and adjustments.

Schedule: N/A

Technical: N/A

(U) C. **Other Program Funding Summary ($ in Thousands): N/A**

**Related Activities**: See Project 2314

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603617F Cmd Control & Comm Applics<br>PROJECT 2321 |

(U) D. Schedule Profile

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) APS Verification & Validation | | X** | | | | | | | | | | | | | | |
| (U) FLEX Development | | | X* | | | | | | | | | | | X** | | |
| (U) TBM Systems Integration Evaluations | | | X* | | | | | | | | | | | | | |
| (U) OPS-INTEL Integration Development | | | | | | | | | | | | | | | | |
| Advanced Technology Transition | | | | | | | X* | X** | | | | | | | | |
| Development | | | | | | | | | | | X* | | | | | |

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603617F Cmd Control & Comm Applics

PROJECT: 3804

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3804 Tactical Air Forces Systems Integration | 191 | 239 | 284 | 279 | 373 | 376 | 387 | 399 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification**: Project provides systems engineering and integration support to the Combat Air Forces (CAF). Project addresses integration and interoperability issues associated with TBM General Officers Steering Group (GOSG) directed efforts, makes recommendations, identifies deficiencies, or establishes requirements for development efforts. No capability is fielded. Project transitions products either to the CAF or to the development efforts.

(U) FY 1994
- (U) Continued analysis of TBM core systems theater integration ($90).
- (U) Expanded analysis of operations/intelligence interface to include issues of joint operations ($101).

(U) FY 1995
- (U) Continue support of TBM Core Systems integration ($120).
- (U) Complete operations/intelligence interface analysis and expand to Defensive Planning functions ($54).
- (U) Expand TBM force level system prototype evaluations to joint arena ($65).

(U) FY 1996
- (U) Continue support of TBM core systems integration ($120).
- (U) Complete analysis of Defensive Planning and expand to Management of Aggregated Sensors ($64).
- (U) Continue evaluation of Force Level joint interoperability issues ($100).

(U) FY 1997
- (U) Prepare for AOC Defensive Planning Development ($119).
- (U) Complete Sensor Management analysis ($160).

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603617F Cmd Control & Comm Applics<br>PROJECT 3804 |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 192 | 285 | 285 | 280 | Continuing |
| (U) Appropriated Value | 192 | 285 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | (1) | (41) | | | |
| b. SBIR | | (5) | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | (1) | (1) | |
| (U) Current Budget Submit/President's Budget | 191 | 239 | 284 | 279 | Continuing |

(U) Change Summary Explanation:

Funding: N/A

Schedule: N/A

Technical: N/A

(U) C. **Other Program Funding Summary ($ in Thousands)**: N/A

**Related Activities**: See Project 2314

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration And Validation | PE NUMBER AND TITLE: 0603617F Cmd Control & Comm Applics — PROJECT: 3804 |

(U) D. Schedule Profile

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Analysis of TBM Core Systems theater integration | X | | | | X | | | | X | | | | X | | | |
| (U) Ops-Intel Integration Technology Analysis | | | | | | | | | | | | | | | | |
| Interfaces | X* | | | X** | | | | | | | | | | | | |
| Joint Operations | X* | | | X** | | | | | | | | | | | | |
| (U) Defensive Planning | | | | | | | | | | | | | | | | |
| Analysis | | | | | X* | | | | X** | | | | | | | |
| Develop Plan | | | | | | | | | | | | | X* | | X** | |
| (U) Sensor Management | | | | | | | | | | | | | | | | |
| Analysis | | | | | | | | | X* | | | | X** | | | |
| Develop Plan | | | | | | | | | | | | | | | X* | |
| (U) TBM Force Level System prototype evals | | | | | | | | | | | | | | | | |
| AOC Combat Operations | X* | | | | | | | | | | | | X** | | | |
| Joint Operations | | | | | X* | | | | | | | | X** | | | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total PE 0603707F Cost | 4,317 | 4,983 | 4,577 | 4,378 | 4,478 | 4,577 | 4,576 | 4,576 | Cont | Cont |
| Project 2688, Weather Support Technology | 2,577 | 2,818 | 2,323 | 2,209 | 2,220 | 2,324 | 2,499 | 2,519 | Cont | Cont |
| Project 2781, Weather Radar Technology | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | Cont | Cont |
| Project 4026, Centralized Support Technology | 1,340 | 1,765 | 1,854 | 1,769 | 1,858 | 1,853 | 1,677 | 1,657 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This Advanced Development program demonstrates and transitions new technologies for weather support forces and their operational customers worldwide. Technologies include new data management and forecasting techniques to improve the accuracy and efficiency of weather support to battlefield commanders and peacetime training operations. The program also provides new technologies to improve centralized space/weather support capabilities at the Air Force's Global Weather Central and Space Forecast Center. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,427 | 5,100 | 5,712 | 5,896 | Cont |
| Appropriated Value | 4,452 | 5,100 | | | |
| Adjustments to Appropriated Value: | | | | | |
| a. Congressional General Reductions | -25 | -117 | | | |
| b. SBIR | -51 | | | | |
| c. Below Threshold Reprogramming | -59 | | | | |
| Current Budget Submit/President's Budget | 4,317 | 4,983 | 4,577 | 4,378 | Cont |

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development

PROJECT NO.: 2688

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2688, Weather Support Technology | 2,577 | 2,818 | 2,323 | 2,209 | 2,220 | 2,324 | 2,499 | 2,519 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project improves the Air Force's ability to gather, integrate, and forecast target weather information in data-denied battle areas. This is accomplished through the demonstration of tactical automated weather observations sensors, techniques to fuse weather data from different sources and times into a single "best available" analysis, and weather forecast models to address various levels of in-theater availability.

(U) FY 1994:
- (U) Developed target scenes for the advanced electro-optical (EO) weather impact decision aid. ($700K)
- (U) Demonstrated battlefield utility of the tactical weather observation sensors. ($280K)
- (U) Developed a first-in, limited data battlefield weather forecast model. ($200K)
- (U) Developed Tactical Forecast System (TFS) analysis and forecast models. ($550K)
- (U) Delivered Night Vision Goggle (NVG) Air Refueling Decision Aid (ARDA). ($697K)
- (U) Developed new Base Weather Station (BWS) technologies. ($150K)

(U) FY 1995:
- (U) Develop new capability for integrating all available in-theater weather observations into automated weather analyses. ($200K)
- (U) Complete/deliver weather impact decision aid for NVGs. ($180K)
- (U) Complete/deliver the first-in battlefield weather forecast model. ($200K)
- (U) Demonstrate weather impact decision aids on mission planning systems. ($683K)
- (U) Continue development of TFS analysis and forecast models. ($700K)
- (U) Develop NVG Operations Weather Software (NOWS) decision aids. ($235K)
- (U) Evaluate new TFS weather observation sensors; complete development of new BWS technologies. ($620K)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1994

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development

PROJECT NO.: 2688

(U) FY 1996:
- (U) Tactical Weather Technology. ($633K)
  - (U) Continue development of Tactical Forecast System (TFS) observations, analysis, and forecast technology.
- (U) Weather Impact Decision Aids (WIDA). ($1,690K)
  - (U) Develop electro-optical weather impact modules for automated mission planning.
  - (U) Incorporate new operational command mission scenarios into Night Vision Goggles (NVG) Operations Weather Software (NOWS).
  - (U) Complete evaluation of target/background weather sensitivity for infrared sensors.

(U) FY 1997:
- (U) Tactical Weather Technology. ($630K)
  - (U) Complete capability for automating integration of theater weather observations.
  - (U) Continue Tactical Forecast System (TFS) technology development.
- (U) Weather Impact Decision Aids (WIDA). ($1,579K)
  - (U) Develop scene simulation capability for infrared sensor and NVG weather impact decision aids.
  - (U) Develop new target acquisition software and mission impact modules for weather decision aid models.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development

PROJECT NO.: 2688

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,687 | 2,935 | 3,242 | 3,391 | Cont |
| Current Budget Submit/President's Budget | 2,577 | 2,818 | 2,323 | 2,209 | Cont |

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0305160F, Defense Meteorological Satellite Program.
- (U) PE 0602601, Phillips Laboratory.
- (U) PE 0305111F, Weather Service.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development 2781

PROJECT NO.: 2781

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2781, Weather Radar Technology | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops new technologies to fully exploit the capabilities of new operational DOD doppler weather radars. These technologies will be used by the Air Force to better observe and forecast severe weather such as wind shear, tornadoes, and hail.

(U) FY 1994:
- (U) Completed a technique to locate weather fronts. ($125K)
- (U) Developed a technique to correlate severe weather and observed wind fields. ($150K)
- (U) Developed new severe weather identification techniques. ($125K)

(U) FY 1995:
- (U) Develop/evaluate a new algorithm for tornado and hail detection. ($150K)
- (U) Evaluate relationship between precipitation structures and severe weather. ($125K)
- (U) Evaluate new severe weather quantification algorithm. ($125K)

(U) FY 1996:
- (U) Severe weather prediction software. ($400K)
  - (U) Complete a storm structure algorithm to predict severe weather.
  - (U) Complete an algorithm to determine location/intensity of weather fronts.
  - (U) Continue development of lightning algorithms.

(U) FY 1997:
- (U) Severe weather prediction software. ($400K)
  - (U) Continue development of hail identification algorithms.
  - (U) Begin development of advanced tropical cyclone algorithms.
  - (U) Develop three-dimensional storm structure algorithms.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development

PROJECT NO.: 2781

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 400 | 400 | 400 | 400 | Cont |
| Current Budget Submit/President's Budget | 400 | 400 | 400 | 400 | Cont |

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602601, Phillips Laboratory.
- (U) PE 0305111F, Weather Service.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development 4026

PROJECT NO.: 4026

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 4026, Centralized Support Technology | 1,340 | 1,765 | 1,854 | 1,769 | 1,858 | 1,853 | 1,677 | 1,657 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops technologies for space forecasting models for the earth's neutral atmosphere, ionosphere, and magnetosphere needed to provide critical support to Air Force surveillance, communications, and other satellite assets. This project also develops new global and theater weather forecast techniques to improve the Air Force's capability to provide centralized weather support to fixed-site and deployed weather forces worldwide.

(U) FY 1994:
- (U) Completed an enhanced global cloud prediction model. ($150K)
- (U) Delivered a neutral atmosphere model used for satellite orbital predictions. ($150K)
- (U) Completed a magnetospheric model for predicting satellite anomalies. ($150K)
- (U) Developed a model for predicting space upsets of microelectronics devices. ($150K)
- (U) Developed a neutral atmosphere/space specification and forecast model for the Air Force Space Forecast Center (AFSPC). ($590K)
- (U) Developed a global aviation weather hazard prediction model. ($150K)

(U) FY 1995:
- (U) Deliver a validated ionospheric model for understanding and forecasting communication systems outages. ($300K)
- (U) Deliver a global ionospheric forecast model for space track and communication predictions. ($200K)
- (U) Develop a model for coupling the ionosphere and neutral atmosphere. ($325K)
- (U) Continue development of a neutral atmosphere/space specification and forecast model for the AFSPC. ($625K)
- (U) Continue development of global aviation and battlefield weather hazard prediction models. ($315K)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development 4026 — PROJECT NO. 4026 |

(U) FY 1996:
- (U) Centralized weather support technology. ($791K)
  - (U) Deliver initial cloud layer and surface visibility diagnostic models.
  - (U) Continue development of aviation hazard diagnostic models.
- (U) Space weather models. ($1,063K)
  - (U) Continue development of advanced space weather models.
  - (U) Continue development of executive model to integrate space weather models.

(U) FY 1997:
- (U) Centralized weather support technology. ($728K)
  - (U) Deliver final cloud layer and surface visibility diagnostic models.
  - (U) Deliver initial aviation weather hazard diagnostic models.
- (U) Space weather models. ($1,041K)
  - (U) Deliver integrated space environmental model to link all space weather models.
  - (U) Begin development of a new coupled space model for space weather hazards.
  - (U) Continue development of advanced space weather forecast models.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603707F, Weather Systems Advanced Development

PROJECT NO.: 4026

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,340 | 1,765 | 2,070 | 2,105 | Cont |
| Current Budget Submit/President's Budget | 1,340 | 1,765 | 1,854 | 1,769 | Cont |

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0305160F, Defense Meteorological Satellite Program.
- (U) PE 0602601, Phillips Laboratory.
- (U) PE 0305111F, Weather Service.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: **February 1995**

BUDGET ACTIVITY: **#3, Advanced Development**

PE NUMBER AND TITLE: **PE 0603723F, Civil and Environmental Engineering Technology**

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total PE 0603723F Cost | 12,906 | 9,678 | 9,835 | 9,713 | 11,376 | 11,592 | 12,814 | 14,644 | Cont | Cont |
| Project 2103, Environmental Quality Advanced Technology | 7,839 | 5,224 | 8,469 | 8,463 | 10,201 | 10,442 | 11,564 | 13,494 | Cont | Cont |
| Project 2104, Air Base Operability Advanced Technology | 3,820 | 2,941 | -0- | -0- | -0- | -0- | -0- | -0- | Cont | Cont |
| Project 3037, Noise and Sonic Boom Impact Technology | 1,247 | 1,513 | 1,366 | 1,250 | 1,175 | 1,150 | 1,250 | 1,150 | Cont | Cont |

Note: Beginning in FY 1996, Project 2104 from this PE will be transferred to Wright Laboratory's PE 0603205F, Aerospace Vehicle Technology.

A. (U) Mission Description and Budget Item Justification: This Advanced Development program develops and demonstrates advanced technologies to address Air Force-unique environmental problems and determine the effect of aircraft noise and sonic boom stimuli on humans, animals, and structures. Specific projects advance and integrate environmental issues and operating concerns into air base design, support, and maintenance. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603723F, Civil and Environmental Engineering Technology

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 13,360 | 9,798 | 10,290 | 11,772 | Cont |
| Appropriated Value | 13,435 | 9,798 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -75 | -120 | | | |
| b. SBIR | -154 | | | | |
| c. Omnibus Reprogramming | -300 | | | | |
| Current President's Budget | 12,906 | 9,678 | 9,835 | 9,713 | Cont |

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603723F, Civil and Environmental Engineering Technology

PROJECT NO.: 2103

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2103, Environmental Quality Advanced Technology | 7,839 | 5,224 | 8,469 | 8,463 | 10,201 | 10,442 | 11,564 | 13,494 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates advanced technologies to solve environmental restoration problems, reduce hazardous emissions from weapon systems, minimize Air Force industrial waste, and eliminate toxic pollutant releases from Air Force operations.

(U) FY 1994:

- (U) Developed technologies and design criteria for improved monitoring, disposal characterization, and remediation techniques for contaminated Air Force sites. ($461K)
  - -- (U) Developed bioremediation technologies to clean up Air Force sites contaminated with fuels and solvents, including demonstrating the use of nitrate to enhance in situ anaerobic biodegradation.
- (U) Developed technologies to predict and reduce contamination in the environment by Air Force materials and operations. ($7,378K)
  - -- (U) Developed innovative technologies to treat/recycle hazardous wastes from Air Force industrial operations to reduce disposal costs and comply with regulatory limits, including a multi-metals recovery/recycle treatment system, techniques for propellant biodegradation, and methods for removing contaminants from plating baths,.
  - -- (U) Developed spray casting as an alternative to cadmium electroplating.
  - -- (U) Developed affordable technologies to control air pollutant emissions from Air Force industrial processes to comply with Clean Air Act Amendments (CAAA), including an integrated emissions dispersion database, and expert decision technology to aid environmental planners and air pollution managers.
  - -- (U) Determined the atmospheric chemistry of candidate and new Air Force fuels and chemicals; demonstrated an advanced monitoring capability to detect hazardous air pollutants at the part-per-billion (PPB) level.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603723F, Civil and Environmental Engineering Technology — PROJECT NO.: 2103 |

(U) FY 1995:

- (U) Continue to develop and demonstrate technologies and design criteria for improved monitoring, disposal characterization, and remediation techniques for contaminated Air Force sites. ($2,083K)
  - -- (U) Conduct validation of surfactants to contain a dissolved solvent plume combined with in-place biodegradation to destroy the contaminant; continue to develop and demonstrate in-place physical/chemical technologies to contain and treat dense, nonaqueous phase liquids and other contaminants.
  - -- (U) Develop application of bioventing to non-petroleum compounds and in-place remediation of solvents including Perchloroethylene (PCE) and Trichloroethelyne (TCE) in saturated soils; continue to develop and demonstrate in-place bioremediation technologies to clean up Air Force sites contaminated with fuels and solvents.
  - -- (U) Conduct field monitoring of parameters supporting bioremediation of fuels and solvents, and validating an in-place real-time laser spectrometer/fiber optic system; continue to develop in-place sensors and monitoring technologies to locate, identify, and monitor contaminant sources, plumes, and remediation activities.
- (U) Continue to develop and demonstrate technologies to predict and reduce contamination of the environment by Air Force materials and operations. ($3,141K)
  - -- (U) Complete verifications of solid rocket propellant biodegradation technologies to assist in disposal of large rocket motors; continue to develop and demonstrate innovative technologies to treat/recycle hazardous wastes from Air Force industrial operations to reduce disposal costs and comply with regulatory limits.
  - -- (U) Determine the atmospheric chemistry of candidate and new Air Force fuels and chemicals; develop advanced monitoring technology for hazardous air pollutants; and conduct atmospheric investigation to enhance risk assessment and model verification for Air Force space launch operations.
  - -- (U) Conduct verification of a low-back-pressure, Nitrous Oxide (NOx) control technology for jet engine test cells based on cold-plasma-induced chemical processes; continue to develop and demonstrate affordable technologies to control air pollutant emissions from Air Force industrial processes to comply with Clean Air Act Amendments (CAAA).

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603723F, Civil and Environmental Engineering Technology — PROJECT NO.: 2103 |

(U) FY 1996:

- (U) Continue to develop and demonstrate technologies and design criteria for improved monitoring, disposal characterization, and remediation techniques for contaminated Air Force sites. ($3,388K)
  - -- (U) Complete demonstration of bioventing for non-petroleum compounds; continue to develop and demonstrate in-place bioremediation technologies to clean up Air Force sites contaminated with fuels and solvents, including in-place remediation of solvents such as Perchloroethylene (PCE) and Trichloroethelyne (TCE) in saturated soils.
  - -- (U) Complete demonstration of a real time in-place laser spectrometer/fiber optic monitoring process; continue to develop and demonstrate in-place sensors and monitoring technologies to locate, identify, and monitor contaminant sources, plumes, and remediation activities.
  - -- (U) Apply natural attenuation findings to provide a scientific foundation for regulatory acceptance; continue to determine and validate the fate and transport characteristics of contaminants in soils and groundwater to enhance and validate models for development of remediation technologies and plans.
- (U) Continue to develop and demonstrate technologies to predict and reduce contamination of the environment by Air Force materials and operations. ($5,081K)
  - -- (U) Determine the atmospheric chemistry of candidate and new Air Force fuels and chemicals; develop advanced air monitoring technology.
  - -- (U) Characterize catastrophic space launch aborts and atmospheric diffusion to validate space launch toxic risk assessment models; begin characterization of JP-8 fuel emissions.
  - -- (U) Evaluate a recirculating paint booth to control Volatile Organic Compounds (VOC) emissions; continue to develop and demonstrate affordable technologies to control air pollutant emissions from Air Force industrial processes to comply with Clean Air Act Amendments.
  - -- (U) Conduct a technology demonstration to recycle hydraulic fluids, reducing hazardous waste and procurement and disposal costs; continue to develop cost-effective alternate processes and materials that reduce or eliminate the production of hazardous wastes and the use of hazardous materials.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603723F, Civil and Environmental Engineering Technology — PROJECT NO.: 2103 |

(U) FY 1997:

- (U) Continue to develop and demonstrate technologies and design criteria for improved monitoring, characterization, and remediation techniques for contaminated Air Force sites. ($3,392K)
  - -- (U) Complete validation of surfactants to contain a dissolved plume combined with in-place biodegradation to destroy the contaminant; continue to develop and demonstrate in-place physical/chemical technologies to contain and treat dense nonaqueous phase liquids (DNAPLs) and other contaminants.
  - -- (U) Complete demonstration of a method to direct site characterization by real-time data analysis and visualization; continue to develop and demonstrate in-place sensors and monitoring technologies to locate, identify, and monitor contaminant sources, plumes, and remediation activities.
  - -- (U) Demonstrate an enhanced model to accurately predict plume migration in a heterogeneous aquifer; continue to determine and validate the fate and transport characteristics of contaminants in soils and groundwater.
- (U) Continue to develop and demonstrate technologies to predict and reduce contamination of the environment by Air Force materials and operations. ($5,071K)
  - -- (U) Demonstrate an advanced air monitoring technology; continue to characterize catastrophic space launch aborts and atmospheric diffusion to validate space launch toxic risk assessment models; and determine the atmospheric chemistry of candidate and new Air Force fuels and chemicals.
  - -- (U) Demonstrating cost-effective Nitrous Oxide (NOx) emission control for Aerospace Ground Equipment (AGE); continue to develop and demonstrate affordable technologies to control air pollutant emissions from Air Force industrial processes to comply with the Clean Air Act Amendments.
  - -- (U) Develop an advanced chemical reactor to treat/recycle hazardous/energetic materials and the coupling of multiple technologies to treat complex chemical wastes; continue to develop and demonstrate innovative technologies to treat/recycle hazardous wastes.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #3, Advanced Development | PE 0603723F, Civil and Environmental Engineering Technology | 2103 |

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 8,039 | 5,448 | 5,693 | 6,583 | Cont |
| Current President's Budget | 7,839 | 5,224 | 8,469 | 8,463 | Cont |

Change Summary Explanation:

Funding: Increase due to increased emphasis on pollution prevention and environmental restoration.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602202F, Human Systems Technology.
- (U) PE 0602203F, Aerospace Propulsion.
- (U) PE 0603211F, Aerospace Structures.
- (U) PE 0603231F, Crew Systems and Personnel Protection Technology.
- (U) PE 0603716D, Strategic Environmental Research and Development Program.
- (U) PE 0604706F, Life Support Systems.
- (U) PE 0604708F, Other Operational Equipment.
- (U) PE 0708011F, Industrial Base Program.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603723F, Civil and Environmental Engineering Technology

PROJECT NO.: 2104

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2104, Air Base Operability Advanced Technology | 3,820 | 2,941 | -0- | -0- | -0- | -0- | -0- | -0- | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates advanced technologies to build air base facilities and utilities that can survive chemical, biological, and conventional weapons attack. It also develops advanced technologies to: construct and repair runways and air mobile structures; perform damage assessment and repair; perform crash rescue; suppression of aircraft and air base post-attack fires; and perform critical peacetime civil engineering construction, maintenance, and repair.

(U) FY 1994:
- (U) Demonstrated technologies and design criteria for improved bare-base/fixed-site applications (e.g., power and environmental utilities, survivable air base structures, and durable/repairable airfield surfaces). ($2,762K)
- (U) Demonstrated advanced aircraft/air base fire fighting technologies (e.g., clean, environmentally-safe fire fighting agents, vehicles, equipment, personnel protective clothing, fire risk assessment techniques, and fire fighter training). ($1,058K)

(U) FY 1995:
- (U) Continue to demonstrate technologies and design criteria for improved bare-base/fixed-site applications (e.g., power and environmental utilities, survivable air base structures, and durable/repairable airfield surfaces). ($2,210K)
- (U) Continue to demonstrate advanced aircraft/air base fire fighting technologies (e.g., clean, environmentally-safe fire fighting agents, vehicles, equipment, personnel protective clothing, fire risk assessment techniques, and fire fighter training). ($731K)

(U) FY 1996: Not Applicable.

(U) FY 1997: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #3, Advanced Development | PE 0603723F, Civil and Environmental Engineering Technology | 2104 |

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,028 | 3,050 | 3,231 | 3,794 | Cont |
| Current President's Budget | 3,820 | 2,941 | -0- | -0- | Cont |

Change Summary Explanation:

Funding: Beginning in FY 1996, this project will be transferred to Wright Laboratory's PE 0603205F, Aerospace Vehicle Technology.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602102F, Materials.
- (U) PE 0602202F, Human Systems Technology.
- (U) PE 0603231F, Crew Systems and Personnel Protection Technology.
- (U) PE 0603307F, Air Base Operability Advanced Development.
- (U) PE 0604617F, Air Base Operability.
- (U) PE 0604703F, Aeromedical/Chemical Defense Systems Development.
- (U) PE 0604708F, Other Operational Equipment.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603723F, Civil and Environmental Engineering Technology

PROJECT NO.: 3037

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 3037, Noise and Sonic Boom Technology | 1,247 | 1,513 | 1,366 | 1,250 | 1,175 | 1,150 | 1,250 | 1,150 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates technologies to predict and evaluate the environmental impacts of noise from aircraft operations, as directed by the National Environmental Policy Act. Improving this capability is essential for timely response to public concerns, preparation of accurate environmental impact statements, and minimizing unfavorable legal challenges to Air Force operations.

(U) FY 1994:
- (U) Demonstrated noise effects technologies. ($1,247K)
  - -- (U) Completed documentation and made version 1.0 of the Assessment System for Aircraft Noise (ASAN) available for transition.
  - -- (U) Developed and demonstrated technologies and procedures to measure and assess the effects of aircraft noise on humans, animals, and structures.
  - -- (U) Developed and demonstrated technologies for active noise control to include jet engine test facilities, ear plugs, and portable sources.

(U) FY 1995:
- (U) Demonstrate noise effects technology. ($1,513K)
  - -- (U) Complete documentation and make version 2.0 of ASAN available for transition.
  - -- (U) Verify and continue to evaluate technologies and procedures assessing the effects of aircraft noise on humans, animals, and structures.

(U) FY 1996:
- (U) Demonstrate noise effects technology. ($1,366K)
  - -- (U) Complete release of version 2.0 of ASAN and continue development of advanced models for integration into ASAN.
  - -- (U) Continue to refine technologies and procedures to measure the effects of aircraft noise on humans, animals, and structures.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603723F, Civil and Environmental Engineering Technology — PROJECT NO.: 3037 |

(U) FY 1997:
- (U) Demonstrate noise effects technology. ($1,250K)
  -- (U) Complete advanced releases of Assessment System for Aircraft Noise (ASAN); continue development of advanced models for integration into ASAN.
  -- (U) Continue to idemonstrate improvements in assessing the effects of aircraft noise on humans, animals, and structures.

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,293 | 1,300 | 1,366 | 1,395 | Cont |
| Current President's Budget | 1,247 | 1,513 | 1,366 | 1,250 | Cont |

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:
- (U) PE 0602202F, Human Systems Technology.
- (U) PE 0602203F, Aerospace Propulsion.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total PE 0603726F Cost | 8,547 | 10,814 | 12,008 | 10,971 | 12,950 | 14,411 | 14,930 | 15,465 | Cont | Cont |
| Project 2810, Advanced Image/Information Applications | 2,400 | 3,215 | 4,015 | 4,375 | 4,988 | 5,445 | 5,625 | 5,830 | Cont | Cont |
| Project 2863, Integrated Photonics | 4,014 | 4,179 | 4,320 | 2,870 | 3,222 | 3,724 | 3,799 | 3,933 | Cont | Cont |
| Project 3192, Advanced Optical Memory Technology | 2,133 | 3,420 | 3,673 | 3,726 | 4,740 | 5,242 | 5,506 | 5,702 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This Advanced Development program develops and demonstrates C3 technologies in the areas of spatial data manipulation of digital databases, photonics technology, optical disk storage/processing of digital information, and distributed processing technology for interoperability between dispersed command centers. These technologies provide increased storage, processing, and transmission of digital data that contains unlimited data content. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 8,617 | 11,050 | 15,568 | 18,531 | Cont |
| Appropriated Value | 8,882 | 11,050 | | | |
| Adjustments to Appropriated Value: | | | | | |
| a. Congressional General Reductions | -265 | -236 | | | |
| b. SBIR | -120 | | | | |
| c. Omnibus Reprogramming | -442 | | | | |
| d. Below Threshold Reprogramming | 492 | | | | |
| Current President's Budget | 8,547 | 10,814 | 12,008 | 10,971 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address C3 technology deficiencies identified by the user. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration

PROJECT NO.: 2810

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2810, Advanced Image/Information Applications | 2,400 | 3,215 | 4,015 | 4,375 | 4,988 | 5,445 | 5,625 | 5,830 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops and demonstrates techniques and algorithms to meet weapon systems requirements for digital image and spatial data required for mission planning, navigation, targeting, and terrain analysis. This project provides generic interrogation techniques, as well as standard applications algorithms for Air Force exploitation of digitally processed image and spatial database products. Additionally, it develops an automated capability to reference and display hypermedia communications.

(U) FY 1994:
- (U) Developed and demonstrated advanced imagery and information technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. ($1,500K)
  - (U) Delivered to the warfighter the Air Force Geographic Information Handling System which provides a common, unified map server in accordance with Defense Mapping Agency standards, replacing user-specific systems.
- (U) Developed and demonstrated automated capabilities to display hypermedia communications which fully exploit the data available to the field commander in a timely manner. ($500K)
  - (U) Developed hypermedia core algorithms, interface, and brassboard applications to provide improved automated access to large collections of digital multimedia data used by field commanders.
- (U) Developed and demonstrated advanced interrogative techniques which fully exploit the available information to the warfighter. ($400K)
  - (U) Designed an automated voice translation system for multi-language military interrogation and informant screening.

(U) FY 1995:
- (U) Develop advanced imagery information technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. ($2,070K)
  - (U) Develop methods to automatically maintain the currency and accuracy of databases used by a wide range of advanced weapons systems for planning, navigation, and mission strike purposes.
  - (U) Develop a an electronic information portable correlator for warfighter use in a tactical environment; develop fusion modules incorporating human-like reasoning to track mobile components of the electronic warfare environment.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration / PROJECT NO.: 2810 |

- (U) Develop and demonstrate automated capabilities to asses, process, and display hypermedia communications which fully exploit the data available to the field commander in a timely manner. ($925K)
  - -- (U) Complete and demonstrate Phase 1 hypermedia brassboard; implement hypermedia interface interim support video/audio and automated linking capability to provide automated integration of video and audio media with text and graphics media.
- (U) Develop and demonstrate advanced interrogative techniques which fully exploit the information available to the commander. ($220K)
  - -- (U) Demonstrate preliminary multilingual, bi-directional voice translation interrogation algorithms; develop an operational user demonstration system for field interrogation.

(U) FY 1996:

- (U) Develop and demonstrate advanced imagery information sensor fusion and spatial database technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. ($3,315K)
  - -- (U) Develop a transportable electronic information correlator and automated message update, filter, and retrieval processes; demonstrate Phase 1 multiple database integration and update capability using information and electronic messages; develop initial query robot for update analysis enhancement demonstration to support battlefield analysis.
  - -- (U) Develop an all-source fusion capability to locate, identify, and track mobile red, green, and blue military components; complete system design and equipment/algorithm integration for correlation demonstration using sensor cueing and information acquisition module.
- (U) Develop and demonstrate automated capabilities to access, process, and display hypermedia communications which fully exploit the data available to the field commander in a timely manner. ($600K)
  - -- (U) Complete integrated hypermedia demonstration to support video, audio, and automated linking; assess at operational exercises.
- (U) Develop and demonstrate advanced interrogative techniques which fully exploit the information available to the warfighter. ($100K)
  - -- (U) Complete delivery of expanded language modules for the automated voice translation system; demonstrate to the user automated, multi-language, voice translation for field interrogation.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration — PROJECT NO.: 2810 |

(U) FY 1997:

- (U) Develop and demonstrate advanced imagery information and spatial database technologies to enhance warfighter mission planning, navigation, targeting, and terrain analysis. ($4,100K)
  - -- (U) Conduct Phase 2 demonstration of multiple database integration and update capability to maintain a single uniform and current vector database for real-time access; perform a final operational evaluation of the update analysis demonstration using a query robot to locate, retrieve, and fuse distribute multisource intelligence data at the user site.
  - -- (U) Complete integration and installation testing of portable electronic information correlator for deployment with tactical communications systems to automatically correlate multisensor inputs on the battlefield; conduct final demonstration at user's site of the enhanced, all-source, sensor fusion capability to locate, identify, and track mobile friend and foe (i.e., threats and targets) battlefield components.
- (U) Develop and demonstrate automated capabilities to access, process, and display hypermedia communications which fully exploit the data available to the field commander in a timely manner. ($275K)
  - -- (U) Design and integrate hypermedia algorithms for use with additional operational user databases and navigational aids capabilities.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration

PROJECT NO.: 2810

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,400 | 3,295 | 6,030 | 7,630 | Cont |
| Current President's Budget | 2,400 | 3,215 | 4,015 | 4,375 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address added emphasis of image/information technologies to meet user-identified deficiencies. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602702F, C3.
- (U) PE 0603789F, C3 Advanced Development.
- (U) PE 0603728F, Advanced Computer Technology.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration

PROJECT NO.: 2863

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2863, Integrated Photonics | 4,014 | 4,179 | 4,320 | 2,870 | 3,222 | 3,724 | 3,799 | 3,933 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: Current electronic systems are susceptible to electromagnetic interference, electromagnetic pulse, and radio frequency (RF) interference. Size constraints, speed, and reliability also limit traditional electronic systems. Photonics-based systems, which process information in the form of light (photonic) signals, will provide major improvements in tactical and strategic C3 systems by providing small-size, high-performance, high-capacity, survivable alternatives to electronic-based systems. This project demonstrates advanced hardware technology in optical processing, adaptive transmission, and nonlinear optical processing.

(U) FY 1994:
- (U) Developed and demonstrated analog and digital optical processing technologies to provide real-time data for pre- and post-mission analysis, as well as jam-resistant sources for tactical and C3 systems. ($1,200K)
  - -- (U) Developed an optical steering processor to provide reduced susceptibility from jamming of communications and surveillance antennas.
- (U) Developed and demonstrated microwave/millimeter-wave photonics processing and subsystems essential for advanced optically-controlled RF systems; designed an optically-controlled phased array for super high frequency (SHF) operations. ($2,814K)
  - -- (U) Developed two 18-giga Hertz optical link antenna remoting functions for imagery/information and communications.
  - -- (U) Demonstrated (in the L-band) feasibility of using SHF optically-controlled antenna phased arrays for surveillance radars.

(U) FY 1995:
- (U) Develop and demonstrate analog and digital optical processing technologies to provide real-time data for pre- and post-mission analysis, as well as sensor integration and automatic target identification using multispectral surveillance systems. ($755K)
  - -- (U) Develop residual number system optical processor for multijammer nulling system; provide a faster processing algorithm for radar systems.
  - -- (U) Design an integrated, optical processor to provide agile, all optical, general purpose processors for current and future radars.
- (U) Develop and demonstrate microwave/millimeter-wave photonics processing and subsystems essential for advanced optically-controlled radio frequency (RF) systems at increased frequencies. ($3,424K)
  - -- (U) Conduct design and trade-off analyses for SHF phased array antenna beamformers to provide the optimum design for a new method of steering SHF communications systems.
  - -- (U) Demonstrate coherent, optically-controlled phased array for advanced multiband communications and surveillance missions.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration — PROJECT NO.: 2863 |

(U) FY 1996:
- (U) Develop and demonstrate analog and digital optical processing technologies to provide the warfighter with real-time data for pre- and post-mission analysis, as well as sensor integration and automatic target identification using multispectral surveillance systems. ($1,008K)
  -- (U) Develop, fabricate, and integrate photonic C3 processor providing reliable, agile, all-optical, general purpose processors for current and future radars.
- (U) Develop and demonstrate microwave/millimeter-wave photonics processing and subsystems essential for advanced optically-controlled radio frequency (RF) systems at increased frequencies. ($3,312K)
  -- (U) Fabricate super high frequency (SHF) optically-controlled phased array antenna demonstrating the agility necessary to steer communications antennas.
  -- (U) Conduct first stage development of 100 giga-Hertz (GHz) RF photonic interconnect system extending the frequency and bandwidth of previous microwave link programs to support communications.

(U) FY 1997:
- (U) Develop and demonstrate analog and digital optical processing technologies to provide real-time data for pre- and post-mission analysis, as well as sensor integration and automatic target identification using multispectral surveillance systems. ($800K)
  -- (U) Complete development and integration of a photonic C3 processor into a technology demonstrator; task will demonstrate the advantages of all-optical, high-speed agile processors in a variety of radar and communications functions.
- (U) Develop and demonstrate microwave/millimeter-wave photonics processing and subsystems for advanced optically-controlled RF systems at increased frequencies. ($2,070K)
  -- (U) Fabricate and conduct initial integration testing of SHF, optically-controlled phased array antenna components.
  -- (U) Test 100-GHz-RF photonic interconnect system; conduct preliminary testing of extra high frequency optically-controlled, phased array antenna system, extending the frequency and bandwidth of previous microwave link programs.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration

PROJECT NO.: 2863

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,064 | 4,255 | 4,950 | 5,000 | Cont |
| Current President's Budget | 4,014 | 4,179 | 4,320 | 2,870 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address added emphasis of photonics technologies to meet future user requirements. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602702F, C3.
- (U) PE 0603789F, C3 Advanced Development.
- (U) PE 0603728F, Advanced Computer Technology.
- (U) PE 0603203F, Advanced Avionics for Aerospace Vehicles.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration

PROJECT NO.: 3192

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 3192, Advanced Optical Memory Technology | 2,133 | 3,420 | 3,673 | 3,726 | 4,740 | 5,242 | 5,506 | 5,702 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: Present C3 systems lack low-cost, high-density data storage capacity and performance required for advanced operations and near-real-time sensor inputs. This project develops the Strategic/Tactical Optical Disk System (S/TODS) a family of erasable data optical storage systems with high capacity and fast input/output speed. S/TODS includes a single 5.25-inch optical disk recorder/player, a single 14-inch optical disk recorder/player, and a ten-disk automated Optical Jukebox. The 5.25-inch S/TODS is for fighter aircraft operation and provides fast airborne access to mission-oriented data and the digital terrain system. The 14-inch S/TODS is for on-board sensor data recording in electronic surveillance aircraft and will be used to develop a deployable optical Jukebox for operational mission planning requirements. For large storage requirements, the Optical Jukebox will be expanded for Air Combat Command's (ACC) Contingency Airborne Reconnaissance System (CARS). In addition, the Optical Jukebox can be applied to ACC's requirements for high-volume, soft-copy, digital imagery exploitation. Algorithms will be provided to automate the selection, retrieval, and downloading of information/image data to combat systems. An array of optical disk drives will be developed for high throughput speed and fault-tolerant requirements. Three-dimensional (3D) optical memory systems will be developed for volumetric digital data storage. This new mass storage technology will demonstrate ultra-high data density and fast, parallel data access within a low-cost, compact system.

(U) FY 1994:
- (U) Developed and demonstrated optical information data handling, storage, and access technologies for strategic and tactical applications. ($433K)
  -- (U) Designed an array of optical disk drives for high-speed, fault-tolerant computational system applications which provide analysts with immediate access to critical data bases.
- (U) Designed, developed, and demonstrated optical disk and interface technologies which can be implemented in joint theater operations. ($1,700K)
  -- (U) Designed and fabricated a deployable Optical Jukebox system to store and retrieve digital maps, charts, and imagery needed to perform mission planning via combat aircraft and satisfy storage requirements for on-line imagery/information systems.

(U) FY 1995:
- (U) Develop and demonstrate optical information data handling, storage, and access technologies for strategic and tactical applications. ($1,800K)
  -- (U) Fabricate an advanced optical disk array using commercial storage items, reducing life-cycle costs associated with mass data storage and increase analyst productivity.
  -- (U) Design an optical three-dimensional (3D) computer memory, to store more imagery/information in a smaller package while providing fast, parallel access to large data bases.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration — PROJECT NO.: 3192 |

- (U) Design, develop, and demonstrate optical disk and interface technologies which can be implemented in joint theater operations. ($1,620K)
  - -- (U) Design high-capacity Optical Jukebox to provide terabytes of data storage and automated, robotic access to hundreds of erasable optical disks, reducing personnel requirements needed to maintain digital storage library holdings.
  - -- (U) Demonstrate a deployable Optical Jukebox through interface with the COMBAT TALON mission planning system.
  - -- (U) Conduct preliminary design for mass storage/retrieval and dissemination to allow the analyst to handle data management functions and eliminate redundant information.

(U) FY 1996:
- (U) Develop and demonstrate optical information data handling, storage, and access technologies for strategic and tactical applications. ($1,323K)
  - -- (U) Develop a high-fault-tolerant array of optical disk drives providing 10 gigabytes of on-line storage, data access time less than 50 milliseconds, and three megabytes per second data transfer speeds to interface with data bases.
  - -- (U) Develop a three-dimensional (3-D) optical computer memory system, addressing architectural issues and storage media performance; provide needed storage capacity and input/output bandwidth for next-generation aircrew training and data handling.
- (U) Design, develop, and demonstrate optical disk and interface technologies which can be implemented in joint theater operations. ($2,350K)
  - -- (U) Develop an automated, high-capacity Optical Jukebox that can store and retrieve several 14-inch diameter, rewritable optical disks; examine large diameter rewritable media capable of storing 15-gigabytes/disk and an optical drive capable of high-speed data recording, playback, and erasure as a means of providing critical data storage to meet user's growing requirements.
  - -- (U) Design and develop a mass storage retrieval algorithm-based approach used to query and retrieve information from a large mass storage system; algorithms will control all mass data storage operations and provide user access to multiple terabytes of data.

(U) FY 1997:
- (U) Develop and demonstrate optical information data handling, storage, and access technologies for strategic and tactical applications. ($2,169K)
  - -- (U) Fabricate pre-brassboard model of a 3-D optical memory capable of storing 100 gigabytes of information and reconstructing it using a parallel optical readout technique; exploit virtual reality technology using digital data stored and accessed via 3D optical memories.
- (U) Design, develop, and demonstrate optical disk and interface technologies which can be implemented in joint theater operations. ($1,557K)
  - -- (U) Complete the fabrication and demonstration of high-capacity Optical Jukebox interfaced with an information network.
  - -- (U) Complete algorithm development and demonstrate capability to select, retrieve, and store digital data from different sources and transfer such data to field units.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603726F, Command, Control, and Communications (C3) Subsystems Integration

PROJECT NO.: 3192

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,153 | 3,500 | 4,588 | 5,901 | Cont |
| Current President's Budget | 2,133 | 3,420 | 3,673 | 3,726 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address added emphasis of optical memory technology to meet user needs. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0602702F, C3.
- (U) PE 0603789F, C3 Advanced Development.
- (U) PE 0603728F, Advanced Computer Technology.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total PE 0603728F Cost | 9,012 | 9,013 | 11,005 | 10,076 | 11,248 | 11,504 | 12,142 | 12,037 | Cont | Cont |
| Project 2527, Software Life Cycle Tools | 2,924 | 3,275 | 3,160 | 2,927 | 3,348 | 3,411 | 3,670 | 3,637 | Cont | Cont |
| Project 2530, Distributed Systems Reliability and Survivability | 2,076 | 2,000 | 3,445 | 2,999 | 3,400 | 3,500 | 3,742 | 3,700 | Cont | Cont |
| Project 2532, Knowledge-Based Systems | 4,012 | 3,738 | 4,400 | 4,150 | 4,500 | 4,593 | 4,730 | 4,700 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This Advanced Development program develops and demonstrates technologies needed to control cost, reduce risk, and increase efficiency and effectiveness of software and computers required for mission critical combat systems. DOD has experienced a dramatic escalation in the cost of acquiring and maintaining embedded computer software for increasingly complex military systems which must be reliable and survivable in the battlefield environment. The requirement for survivable tactical and strategic computing systems has driven the need for automatic integration and interoperability of multiple processing elements, automatic redistribution of data and functions, and location-independent access of data. Air Force is the lead DOD agency developing distributed systems and data bases which are essential to meet future requirements. Distributed processing techniques, which can dynamically reconfigure assets to accommodate lost components or nodes, are required to ensure survivable mission critical command and control functions. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 8,074 | 9,125 | 15,060 | 18,127 | Cont |
| Appropriated Value | 8,119 | 9,125 | | | |
| Adjustments to Appropriated Value: | | | | | |
| a. Congressional General Reductions | -45 | -112 | | | |
| b. SBIR | -112 | | | | |
| c. Below Threshold Reprogrammings | 1,050 | | | | |
| Current President's Budget | 9,012 | 9,013 | 11,005 | 10,076 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address computer technology user-identified deficiencies. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology

PROJECT NO.: 2527

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2527, Software Life Cycle Tools | 2,924 | 3,275 | 3,160 | 2,927 | 3,348 | 3,411 | 3,670 | 3,637 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: Advanced computer systems in Air Force weapon systems require software life cycle tools and software engineering technology to reduce costs, improve quality and enhance productivity. This project develops, evaluates, and transitions new software engineering technology that reduces cost, while improving software, systems, and productivity factors. It develops software life cycle support environments which incorporate both off-the-shelf and laboratory products. These environments provide a vehicle for software technology integration, transition, and evaluation under operational and field conditions. Technologies for system requirements analysis, reuse of software components, software quality specification, measurement, assessment, and high performance (parallel) computer software engineering are also produced.

(U) FY 1994:

- (U) Developed and demonstrated system software support environments which address the system life cycle for parallel and concurrent systems while emphasizing affordability and software reuse certification technologies. ($916K)
  - -- (U) Developed the Process Oriented Software Life Cycle Support Environment (ProSLCSE) with improved windows-based user interface and facilities for defining and managing critical software production and post-development support.
  - -- (U) Developed Phase 1 advanced system engineering components and integrated them into a software/system engineering architectural environment.
- (U) Developed and demonstrated system definition technologies to provide the user the means to address total system requirements engineering for large-scale systems. ($1,145K)
  - -- (U) Successfully demonstrated the software and systems requirements engineering environment (REE) and transitioned it to the product center for application to systems safety.
- (U) Developed and demonstrated software and system quality enhancements through automated tools and methods. ($613K)
  - -- (U) Completed design of a software quality information repository which can handle large scale data storage and production technology.
- (U) Developed high performance computer software and architecture for weapon system applications. ($250K)
  - -- (U) Incorporated FORTRAN and "C++" languages into the Parallel Assessment Windowing System (PAWS).
  - -- (U) Developed preliminary testing techniques for parallel software tools.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology — PROJECT NO.: 2527 |

(U) FY 1995:
- (U) Develop and demonstrate system software support environments which address the system life cycle for parallel and concurrent systems while emphasizing affordability and software reuse certification technologies. ($835K)
  - -- (U) Complete development of the process description, simulation, and enactment portions of the Process Oriented Software Life Cycle Support Environment (ProSLCSE) Enhancements program and transition to the user.
  - -- (U) Develop Phase 2 advanced system engineering components, based on industry standards, and integrate them into the software/system engineering architectural environment.
  - -- (U) Develop a certification framework for reusable software; demonstrate the capability of reusable software components to estimate software size, reliability, maintainability, and flexibility.
- (U) Develop and demonstrate system definition technologies to provide the user the means to address total system requirements engineering for large-scale systems. ($1,605K)
  - -- (U) Develop preliminary requirements engineering workstation (Block 1) for requirements specification and assessment.
  - -- (U) Develop additional technology demonstration applications for requirements engineering technology transfer.
- (U) Develop and demonstrate software and system quality enhancements through automated tools and methods. ($585K)
  - -- (U) Expand development of information on software quality assessment and complete the initial set of software metric baselines.
  - -- (U) Develop preliminary case for a software quality technology demonstration; provide the first increment of software information for the repository.
- (U) Develop high performance computer software and architecture for weapon system applications. ($250K)
  - -- (U) Complete development of testing techniques for parallel software tools.
  - -- (U) Develop level one architecture parallel design tools.
  - -- (U) Conduct Phase 1 effort to optimize parallel software upgrades to the Parallel Assessment Windowing System (PAWS); provide a "user friendly" interface for adding new architectures and execution criteria.

(U) FY 1996:
- (U) Develop and demonstrate system software support environments which address the system life cycle for parallel and concurrent systems while emphasizing affordability and software reuse certification technologies. ($1,085K)
  - -- (U) Develop Phase 3 advanced system engineering components, based on industry standards, and integrate them into the software/system engineering architectural environment.
  - -- (U) Complete the certification framework for reusable software; demonstrate the capability to expand the framework for domain-specific reuse environments.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology — PROJECT NO.: 2527 |

- (U) Develop and demonstrate system definition technologies to provide the user the means to address total system requirements engineering for large-scale systems. ($887K)
  - -- (U) Develop a performance modeling demonstration of advanced requirements engineering workstation (Block 1).
  - -- (U) Conduct requirements engineering demonstrations to transfer technology to industry.
- (U) Develop and demonstrate software and system quality enhancements through automated tools and methods. ($200K)
  - -- (U) Develop additional case studies for the software quality technology demonstration; provide second increment of repository software information installation.
- (U) Develop high performance (parallel) computer software and architecture for weapon system applications. ($988K)
  - -- (U) Conduct Phase 2 effort to optimize parallel software upgrades to the Parallel Assessment Windowing System (PAWS); provide a "user friendly" interface for adding new architectures and execution criteria.
  - -- (U) Develop level two architecture-independent parallel design tool.

(U) FY 1997:
- (U) Develop and demonstrate system software support environments which address the system life cycle for parallel and concurrent systems while emphasizing affordability and software reuse certification technologies. ($861K)
  - -- (U) Complete level one advanced systems engineering components integration demonstration; provide tool building kit for the automation of specialized system engineering tools.
  - -- (U) Conduct preliminary design development of level two advanced system engineering environment.
  - -- (U) Develop Phase 1 domain-specific reusable software components and integrate into the certification framework as a general reuse capability.
- (U) Develop and demonstrate system definition technologies to provide the user the means to address total system requirements engineering for large-scale systems. ($974K)
  - -- (U) Complete the development performance modeling aspect of the Block 1 advanced requirements engineering workstation.
  - -- (U) Based on industry comments, user feedback, and the need for addressing system-level requirements engineering, conduct a program assessment of the requirements engineering environment/workstation and identify needed improvements.
- (U) Develop and demonstrate software and system quality enhancements through automated tools and methods. ($387K)
  - -- (U) Complete all case studies for software quality technology demonstration; provide third increment of repository software information.
- (U) Develop high performance (parallel) computer software and architecture for weapon system applications. ($705K)
  - -- (U) Conduct Phase 3 effort to optimize parallel software upgrades to the PAWS; provide a "user friendly" interface for adding new architectures and execution criteria.
  - -- (U) Complete development efforts for on architecture-independent parallel design tool.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology

PROJECT NO.: 2527

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,624 | 3,325 | 4,060 | 5,127 | Cont |
| Current President's Budget | 2,924 | 3,275 | 3,160 | 2,927 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address added emphasis on software life cycle tool development to meet user requirements. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0604740F, Computer Resource Management.
- (U) PE 0701112F, Inventory Control Point Operation.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology

PROJECT NO.: 2530

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2530, Distributed Systems Reliability and Survivability | 2,076 | 2,000 | 3,445 | 2,999 | 3,400 | 3,500 | 3,742 | 3,700 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This project develops technology to provide the distributed information handling for future Command, Control, Communications, and Computer (C4) systems which integrate numerous heterogeneous processing clusters and provides secure, seamless access to any information. The system must be reconfigurable, operate in real-time, and be survivable, as well as capable of integrating the full spectrum of multimedia data. The system will operate in an "information pull" mode where the users' requests for information are filled without explicit action on the part of the user to locate, retrieve, or merge data. An object-oriented architecture will be used to provide a common perspective which will serve as the basis for the merger between the communications control system and the distributed computing environment.

(U) FY 1994:

- (U) Developed and demonstrated distributed computing systems for survivability using computer cluster technologies. ($700K)
  - -- (U) Demonstrated fault tolerance capability in a distributed computing environment to support high reliability applications.
  - -- (U) Successfully demonstrated the first level application of distributed computing technologies to generate air tasking orders during the Joint Warrior Integrated Demonstration 94 (JWID 94).
  - -- (U) Developed an enhanced distributed computing environment through the integration of new technologies into current models.
- (U) Developed and demonstrated database system techniques for managing multimedia data in distributed systems. ($500K)
  - -- (U) Developed data models for object definitions for use in multimedia data systems.
  - -- (U) Developed storage and retrieval concepts for distributed multimedia objects.
  - -- (U) Developed object management techniques for information packets and asynchronous switching based networks.
- (U) Developed and demonstrated real-time distributed computing to support crisis management. ($876K)
  - -- (U) Developed real-time capability for distributed computing environment by integration of new system software.
  - -- (U) Demonstrated crisis support through transparent distributed data access for planning in JWID 94.
  - -- (U) Developed system capabilities for commercially compatible switching technology support for real-time computing in crisis management.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology — PROJECT NO.: 2530 |

(U) FY 1995:
- (U) Develop and demonstrate distributed computing systems for survivability using computer cluster technologies. ($800K)
  - -- (U) Demonstrate second level use of distributed computing to support the field commander in generating air tasking orders.
  - -- (U) Demonstrate a distributed computing infrastructure for developing collaborative planning which can be incorporated into Joint Warrior Integrated Demonstration 95 (JWID 95).
  - -- (U) Demonstrate the first object-based distribution computing environment which is compliant with established standards.
- (U) Develop and demonstrate database system techniques for managing multimedia data in distributed systems. ($580K)
  - -- (U) Develop uniform object model for multimedia data management.
  - -- (U) Develop storage and retrieval capability for multimedia objects.
  - -- (U) Demonstrate an asynchronous switching-based testbed to support management of text, graphics, and video imagery.
- (U) Develop and demonstrate real-time distributed computing to support crisis management. ($620K)
  - -- (U) Demonstrate feasibility of using intelligent agents to provide adaptive fault management.
  - -- (U) Demonstrate single cluster, homogeneous, real-time distributed computing.
  - -- (U) Demonstrate adaptive resource allocation in an object-based distributed computing environment.

(U) FY 1996:
- (U) Develop and demonstrate heterogeneous, secure, multi-clustered distributed computing environments for interoperability and survivability. ($1,645K)
  - -- (U) Demonstrate distributed computing environment for a distributed air operations center.
  - -- (U) Demonstrate commercially compatible switching-based distributed computing environment.
  - -- (U) Develop distributed virtual computing architecture and computation model.
- (U) Develop and demonstrate distributed database management system techniques for multimedia data in distributed information systems. ($800K)
  - -- (U) Develop distributed query capability for multimedia database management system.
  - -- (U) Demonstrate concurrence mechanisms for multimedia database management in a distributed information system.
  - -- (U) Establish tri-Service testbed for the development of multimedia distributed database management.
- (U) Develop real-time, adaptive distributed computing environments to support crisis management and survivability. ($1,000K)
  - -- (U) Demonstrate use of intelligent agents for adaptive distributed resource management.
  - -- (U) Demonstrate real-time distributed computing across multiple local clusters.
  - -- (U) Develop standard specification for real-time computing in an object based distributed computing environment.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology — PROJECT NO.: 2530 |

(U) FY 1997:
- (U) Develop and demonstrate heterogeneous, secure, multi-clustered distributed computing environments for interoperability and survivability. ($1,000K)
  - -- (U) Demonstrate the integration of security mechanisms into multi-clustered distributed computing environments.
  - -- (U) Demonstrate the ability to establish a distributed computing environment across a limited bandwidth interconnection.
  - -- (U) Demonstrate the integration of mobile computing nodes into a heterogeneous distributed computing environment.
- (U) Develop and demonstrate distributed database management system techniques for multimedia data in distributed information systems. ($1,000K)
  - -- (U) Develop intelligent agents for retrieval of multimedia data across a wide area network.
  - -- (U) Demonstrate the incorporation of speech as a managed object in an object-based multimedia database management system.
  - -- (U) Demonstrate multimedia database management across multiple locally netted clusters.
- (U) Develop real-time, adaptive distributed computing environments to support crisis management and survivability. ($999K)
  - -- (U) Demonstrate an adaptive reconfigurable distributed computing environment based upon an application-derived parameter.
  - -- (U) Demonstrate real-time distributed computing across heterogeneous clusters.
  - -- (U) Demonstrate dynamic process and data migration across a multi-clustered distributed information system.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology

PROJECT NO.: 2530

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,738 | 2,000 | 5,000 | 6,000 | Cont |
| Current President's Budget | 2,076 | 2,000 | 3,445 | 2,999 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address added emphasis on distributed systems technology to solve user-identified deficiencies. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0604740F, Computer Resource Management.
- (U) PE 0701112F, Inventory Control Point Operation.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology

PROJECT NO.: 2532

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2532, Knowledge-Based Systems | 4,012 | 3,738 | 4,400 | 4,150 | 4,500 | 4,593 | 4,730 | 4,700 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: Knowledge-based computer systems provide the capability to automatically solve reasoning problems. This effort develops computer technologies which automate the problem solving process associated with human thought. It has three major thrusts. The first, knowledge-based systems engineering, provides software tools and techniques to develop and evaluate knowledge-based systems. The second, knowledge-based planning, applies artificial intelligence (AI) technology to provide increased cost-effectiveness in diverse planning applications involving decision support to employment and deployment planning, logistics planning, resource allocation, and scheduling processes. The third, Knowledge-Based Software Assistant (KBSA), exploits knowledge-based methods to effect orders of magnitude improvements in software development and support activities.

(U) FY 1994:
- (U) Developed and demonstrated knowledge-based systems engineering technologies to support robust, real-time, large-scale knowledge-based systems. ($612K)
  - -- (U) Developed framework for integration of independently developed software components
- (U) Developed and demonstrated knowledge-based planning technologies to automate manpower-intensive tasks to allow rapid, accurate, and efficient planning. ($2,300K)
  - -- (U) Completed in-house installation of a common environment to support development, testing, and integration of planning and scheduling tools for use in military planning.
  - -- (U) Demonstrated integrated crisis-action planning system, via distributed collaborative planning, during Joint Warrior Integrated Demonstration 94 (JWID 94).
- (U) Developed and demonstrated Knowledge-Based Software Assistant (KBSA) technologies to effect a ten-fold improvement in software development and support. ($1,100K)
  - -- (U) Developed pre-brassboard of KBSA technology.

(U) FY 1995:
- (U) Develop and demonstrate knowledge-based systems engineering technologies to support robust, real-time, large-scale knowledge-based systems. ($200K)
  - -- (U) Extend the architectural framework and demonstrate the capability to "mix and match" intelligent components in a dynamic information integration environment.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology — PROJECT NO.: 2532 |

- (U) Develop and demonstrate knowledge-based technologies to automate labor-intensive tasks to allow rapid, accurate, and efficient planning. ($1,700K)
  - -- (U) Develop initial version of in-theater airlift scheduler, using constraint based scheduling techniques; demonstrate the scheduler during the Joint Warrior Integrated Demonstration 95 (JWID 95).
  - -- (U) Develop and integrate case-based force generation capabilities; demonstrate automated plan generation capabilities and end-to-end force and time-phased force deployment data generation.
  - -- (U) Demonstrate seamless access to heterogeneous databases in support of deployment and operations planning.
- (U) Develop and demonstrate knowledge-based software assistant (KBSA) technologies to effect a ten-fold improvement in software development and support. ($1,838K)
  - -- (U) Develop brassboard KBSA demonstrating a formal methods, machine-mediated approach to the full cycle software development process.

(U) FY 1996:

- (U) Develop and demonstrate knowledge-based systems engineering technologies to support robust, real-time, large-scale knowledge-based systems. ($200K)
  - -- (U) Develop high level tools for rapid composition and integration of large bodies of existing code, data/knowledge bases, and subsystems.
- (U) Develop and demonstrate knowledge-based technologies to automate labor-intensive tasks to allow rapid, accurate, and efficient planning. ($2,200K)
  - -- (U) Complete model for mixed initiative planning incorporating computer learning techniques and "intelligent" computer based agents to support the air campaign planning process.
  - -- (U) Integrate constraint based scheduling and modeling capabilities to support in-theater and strategic airlift.
  - -- (U) Integrate knowledge-based planning technologies into the Joint Forces Air Component Commander planning system; demonstrate the integrated system.
- (U) Develop and demonstrate,KBSA technologies to effect a ten-fold improvement in software development and support. ($2,000K)
  - -- (U) Demonstrate final KBSA advanced development model, supporting process representation, configuration management, text generation, instrumentation, and project management.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology — PROJECT NO.: 2532 |

(U) FY 1997:
- (U) Develop and demonstrate knowledge-based systems engineering technologies to support robust, real-time, large-scale knowledge-based systems. ($300K)
  -- (U) Develop high level tools and methodology facilitating the evolution and integration of information sources and intelligent systems.
- (U) Develop and demonstrate knowledge-based technologies to automate labor-intensive tasks to allow rapid, accurate, and efficient planning. ($2,100K)
  -- (U) Demonstrate generative planning and intelligent automated assistance for both planning and monitoring of joint air campaign.
  -- (U) Complete development of next-generation scheduling tool that enables developments of a wide range of schedules in support of problems with both resource and time constraints. Tools will support user modification of the scheduler based on changes in requirements, lift capabilities, and other scheduling parameters; demonstrate for Air Mobility Command strategic airlift.
  -- (U) Develop strategies for efficient planning scenario generation in various military domains.
- (U) Develop and demonstrate knowledge-based software assistant (KBSA) technologies to effect a ten-fold improvement in software development and support. ($1,750K)
  -- (U) Extend KBSA integration; demonstrate and evaluate in mission critical application.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603728F, Advanced Computer Technology

PROJECT NO.: 2532

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 3,712 | 3,800 | 6,000 | 7,000 | Cont |
| Current President's Budget | 4,012 | 3,738 | 4,400 | 4,150 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to address added emphasis on knowledge-based systems and technology to resolve user-identified deficiencies. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0604740F, Computer Resource Management.
- (U) PE 0701112F, Inventory Control Point Operation.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603742F:Combat Identification Technologies

PROJECT NO.: 2597

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Combat ID Technologies/ 2597 | 27,507 | 12,834 | 4,571 | 4,425 | 6,564 | 6,766 | 6,968 | 7,176 | Cont. | Cont |

A. Mission Description and Budget Item Justification:

(U) The U.S. Combat Air Forces have a critical requirement to identify enemy, friendly, and neutral aircraft. Timely and reliable identification allows optimum employment of modern air-to-air weapons, reduces fratricide, and enables the battlefield commander to effectively manage and control the air battle. Positive identification (ID) is in the top ten of the Air Force's combat ID requirements. Aircraft may be placed at risk of being shot down or are at risk of mistakenly identifying targets unless reliable systems are developed. Such consequences have fostered the following operational requirements for combat ID systems:

- High confidence of ID
- High probability of ID (friend, foe, & neutral)
- Day/night capable
- Worldwide ops capable
- All weather capable

(U) Project Number: 2597: Combat Identification Technologies: The Combat ID Technologies program element develops, demonstrates, and transitions promising target identification technologies to meet the requirements cited above. Project 2597 primarily funds an identification technique code named HAVE CENTAUR. Current and planned accomplishments by Fiscal Year are as follows:

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #4 - Demonstration & Validation | PE NUMBER AND TITLE: #0603742F:Combat Identification Technologies — PROJECT NO.: 2597 |

(U) FY 1994 (Millions of $)
- (U) Continued HAVE CENTAUR advanced technology demonstration and initial design verification. Large funding increment required due to bulk of Dem/Val activity. Provides tech support to include engineering, test and evaluation, configuration control, and other program office operations ($21.4).
- (U) Design and Analysis of Reference Threat Systems (DARTS) synthetic database development continues ($1.8).
- (U) Continued to demonstrate impact of fusing sensor data ($0.9).
- (U) Continued development of system to document, manage, validate, and disseminate radar signatures ($0.7).
- (U) Funded CID program management and low cost, high leverage demonstrations to increase CID capability through the Combat ID Integration Management Team (CID IMT) at Hanscom AFB, MA (ESC/ZJI) ($2.7).

(U) FY 1995 (Millions of $)
- (U) Continue HAVE CENTAUR development, completes system development and installs test hardware in roofhouse facility ($10.0).
- (U) Begin ground-to-air roofhouse testing on UHRR capability at contractor facility ($1.2).
- (U) Funds CID program management and low cost, high leverage demonstrations to increase CID capability-CID IMT ($0.4).
- (U) Begin initial air-to-air UHRR hardware testing ($1.2).

(U) FY 1996 (Millions of $)
- (U) Complete air-to-air hardware testing and finalize hardware transition package ($2.0).
- (U) Continue combat ID calssifier development for UHRR radar and continue ground-to-air ID classifier qualitative testing ($2.2).
- (U) Supports CID IMT for program management and low cost, high leverage CID demos ($0.4).

(U) FY 1997 (Millions of $)
- (U) Complete UHRR ground-to-air ID classifier testing and begin airborne testing ($3.1).
- (U) Twenty-five target database library expansion continues ($0.3).
- (U) Supports CID IMT for CID program management ($1.0).

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603742F:Combat Identification Technologies

PROJECT NO.: 2597

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 27,948 | 13,453 | 4,594 | 4,447 | Cont. |
| Appropriated Value | 27,948 | 13,453 | 4,594 | 4,447 | Cont. |
| Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | -441 | -396 | -23 | -22 | |
| b. SBIR | | -223 | | | |
| c. Omnibus or Other Above Threshold Reprog | | | | | |
| d. Below Threshold Reprogramming | | | | | |
| Adjustments to Budget Years Since FY95 PB | | | | | |
| Current Budget Submit/President's Budget | 27,507 | 12,834 | 4,571 | 4,425 | Cont. |

Change Summary Explanation:

Funding: FY 94-97 reductions for Congressional reductions (FY94-95) and inflation (FY96-97).

Schedule: No changes.

Technical: No changes.

C. (U) Other Program Funding Summary: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #4 - Demonstration & Validation | PE NUMBER AND TITLE: #0603742F:Combat Identification Technologies — PROJECT NO.: 2597 |

(U) Work Performed By: Hughes Aircraft, Los Angeles, CA; Westinghouse, Baltimore, MD; and Veda, Dayton, OH. Management: Air Force Wright Laboratory, F-15 and F-22 System Program Offices, Wright Patterson AFB, OH; AWACS System Program Office, Hanscom AFB, MA; and Rome Laboratory, Griffiss AFB, NY.

(U) Related Activities: None.

(U) Other Appropriation Funds ($ in Thousands): Not Applicable.

(U) International Cooperative Agreements: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603742F:Combat Identification Technologies

PROJECT NO.: 2597

D. (U) Schedule Profile: **HAVE CENTAUR - UHRR Technology Transition Plan:**

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| 1. (U) H/W Dev/Qual | | | | | | | | | | | | | | | | |
| Design & Development Complete* | | | | | | X | | | | | | | | | | |
| Ground-to-Air Test #1 (Roofhouse) | | | | | | X | X | | | | | | | | | |
| Airborne H/W Qual | | | | | | | | X | X | | | | | | | |
| Target Signature Library | | | | | | | | | X | | | | | | | |
| 2. (U) H/W EMD/Production | | | | | | | PDR | | | CDR | | | | | | |
| EMD | | | | X | | X | | | | X | | | | | | |
| LRIP & Production **(IQFY98-1QFY02)** | | | | | | | | | | | | | Prod. FY98-02 >> | | | |
| 3. (U) Classifier Dev/Qual | | | | | | | | | | | | | | | | |
| Ground-to-air Test #2 (Tyndall RTF) | | | | | | | | | X | | | | X | | | |
| Airborne Data Collection | | | | | | | | | | | | | X | | X | |
| Classifier/Target Library (Ends 4QFY98) | | | | | | | | | | X | | | | | | |
| 4. (U) Radar OFP Build (Develop, Test, Retrofit) | | | | | | | | | | | | | X (OFP 1) | | | |

**(U) Other:** H/W EMD complete: , 1QFY00
LRIP start: 1QFY98 finish: 2QFY99
Production Complete: 4QFY02
IOC of UHRR capability for APG-63U: 4QFY98

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603742F:Combat Identification Technologies

PROJECT NO.: 2597

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| 1. HAVE CENTAUR | | | | |
| H/W EMD and Classifier Dev/Qual | 20,500 | 12,480 | 4,200 | 3,400 |
| Synthetic Database Dev | 1,800 | 0 | 0 | 0 |
| 2. Database Management (NAIC Support) | | 700 | 0 | 0 |
| 3. AWACS Fusion Eval Testbed | 960 | 0 | 0 | 0 |
| 4. Combat ID Integ. Mgmt Team (CID IMT) (ESC/ZJI) | 3,548 | 354 | 371 | 1,025 |
| Total | 27,507 | 12,834 | 4,571 | 4,425 |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #4 - Demonstration & Validation | PE NUMBER AND TITLE: #0603742F:Combat Identification Technologies / PROJECT NO.: 2597 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands): Not Applicable.

C. (U) Funding Profile ($ in Thousands): Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603771F, Industrial Preparedness Manufacturing Technology 2865

PROJECT NO.

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| PE 0603771F Cost | 0 | 83,311 | 53,332 | 51,841 | 55,436 | 56,133 | 58,513 | 60,987 | Cont | Cont |
| Project 2865, Industrial Base Manufacturing Technology (ManTech) | 0 | 83,311 | 53,332 | 51,841 | 55,436 | 56,133 | 58,513 | 60,987 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This Advanced Development program develops and demonstrates new manufacturing process technologies and transition of processes into weapon systems design, development, acquisition, and sustainment. The purpose of the Manufacturing Science and Technology (MS&T) program is to make affordable mission capability a practical reality by expanding access to a capable, responsive, multi-use industrial base with efficiencies comparable to world-class enterprises. Accelerating shop floor manufacturing process maturation at every stage of development will be enhanced by an increased emphasis on cost, time, and quality risks in transition. Best processes will be evaluated and adapted for application. Where mature processes are not available, laboratory-developed initial process capabilities will be matured and inserted into weapon systems. The MS&T program goes beyond factory floor manufacturing processes to encompass every activity within an industrial enterprise, ranging from above-the-shop floor activities to supplier base interactions and performance. The strategies and best practices of world-class enterprises will be analyzed and the performance of defense suppliers benchmarked. The world's best industrial practices will be adapted and proven in multiple pilot projects and deployed in defense applications. The program's investment strategy emphasizes the selection of generic projects that will have broad application across multiple systems. The manufacturing technology effort was funded as part of PE 0708011F, Industrial Preparedness, in prior years. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

(U) FY 1994: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #3, Advanced Development | PE 0603771F, Industrial Preparedness Manufacturing Technology 2865 | |

(U) FY 1995:

- (U) Develop and demonstrate advanced processes for the manufacture of metals; demonstrate work cells and process maturation which improve precision, yield, and affordability of military hardware and establish repair processes to enable the life extension of high value, aging components and structures. ($31,295K)
  - -- (U) Initiate supplier base focused effort to improve quality and reduce cost of precision investment castings.
  - -- (U) Continue effort to establish automated repair processes for gas turbine engine components.
- (U) Develop and demonstrate an integrated capability for design and manufacture of low-cost composites; demonstrate in situ process control systems; and develop process technologies for cost drivers in military composite structures. ($6,989K)
  - -- (U) Complete effort to define manufacturing process sensitivities on composite overwrap pressure vessels' performance.
  - -- (U) Continue effort on affordable manufacture of thermoplastic spare parts.
- (U) Develop and demonstrate process modeling and statistical process control metrics for electronic system components, materials, test, and inspection techniques; develop standard process solutions for military unique modules, sensors, arrays, solar cells, automatic test systems, and devices. ($9,665K)
  - -- (U) Continue effort to establish a manufacturing process to produce affordable tactical grade fiber optic gyroscopes.
  - -- (U) Continue effort on electronic manufacturing process improvement for low-cost ferrite circulators and for maintenance-free batteries.
- (U) Develop and demonstrate tools for product exchange and producibility engineering; methodologies for interoperable information systems; and tools that establish the utility and affordability of networked data exchange among prime contractors and suppliers. ($15,525K)
  - -- (U) Continue effort on methodologies for the use of simulatable specifications for design of complex electronics test.
  - -- (U) Continue effort to provide the tools needed to prepare spare parts procurement packages.
- (U) Continue pathfinder programs in new areas to validate benefits in flexible manufacturing, commercial-military integration, quality processing, supplier improvements, and integrated product and process development; continue a limited number of industrial base pilot programs which address business policies and practices, manufacturing infrastructure, affordable sustainment of existing systems, application of best commercial manufacturing practices to military products, and affordability of Air Force weapon system (aircraft and missile) components. ($19,837K)
  - -- (U) Implement the Lean Aircraft Initiative findings in support of Air Force needs.
  - -- (U) Establish integrated sector enterprises within the organic industrial base levering on "best practices".

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603771F, Industrial Preparedness Manufacturing Technology

PROJECT NO.: 2865

(U) FY 1996:

- (U) Develop and demonstrate advanced processes for the manufacture of metals; demonstrate work cells and process maturation which improve precision, yield, and affordability of military hardware and establish repair processes to enable the life extension of high value, aging components and structures. ($12,404K)
  - -- (U) Establish manufacturing capacity for large welded titanium assemblies for fighter aircraft.
  - -- (U) Demonstrate thin-wall casting manufacturing process leading to product validation.
- (U) Develop and demonstrate an integrated capability for design and manufacture of low-cost composites; demonstrate in situ process control systems; and develop process technologies for cost drivers in military composite structures. ($8,498K)
  - -- (U) Demonstrate rapid manufacture of thermoplastic radomes.
  - -- (U) Validate reproducible and affordable processes for the manufacture of multi-functional structures.
- (U) Develop and demonstrate process modeling and statistical process control metrics for electronic system components, materials, test, and inspection techniques; develop standard process solutions for military unique modules, sensors, arrays, solar cells, automatic test systems, and devices. ($7,785K)
  - -- (U) Continue effort to establish a manufacturing process to produce affordable tactical grade fiber optic gyroscopes.
  - -- (U) Demonstrate electronic manufacturing process improvements for low-cost ferrite circulators and for maintenance-free batteries.
  - -- (U) Initiate manufacturing efforts on multi-bandgap solar cells to complement Phillips Laboratory development effort.
- (U) Develop and demonstrate tools for product exchange and producibility engineering; methodologies for interoperable information systems; and tools that establish the utility and affordability of networked data exchange among prime contractors and suppliers. ($7,580K)
  - -- (U) Continue efforts to develop and demonstrate the methodologies and tools for the capture of tester-independent test requirements.
  - -- (U) Complete effort to provide Air Logistics Centers with the tools needed to prepare spare parts procurement packages.
- (U) Continue pathfinder programs in new areas to validate benefits in flexible manufacturing, commercial-military integration, quality processing, supplier improvements, and integrated product and process development; continue a limited number of industrial base pilot programs which address business policies and practices, manufacturing infrastructure, affordable sustainment of existing systems, application of best commercial manufacturing practices to military products, and affordability of Air Force weapon system (aircraft and missile) components. ($17,065K)
  - -- (U) Continue pilot efforts to demonstrate manufacture of military electronics components on a commercial line.
  - -- (U) Continue effort to implement Lean Aircraft Initiative findings in support of Air Force needs.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603771F, Industrial Preparedness Manufacturing Technology 2865 — PROJECT NO. |

(U) FY 1997:

- (U) Develop and demonstrate advanced processes for the manufacture of metals; demonstrate work cells and process maturation which improve precision, yield, and affordability of military hardware and establish repair processes to enable the life extension of high value, aging components and structures. ($9,364K)
  - -- (U) Complete effort to simulate the Guerin sheet metal forming process for Air Force Logistics Centers.
  - -- (U) Establish automated repair processes for gas turbine engine components.
  - -- (U) Continue supplier base focused effort to improve quality and reduce the cost of precision investment castings.
- (U) Develop and demonstrate an integrated capability for design and manufacture of low-cost composites; demonstrate in situ process control systems; and develop process technologies for cost drivers in military composite structures. ($4,953K)
  - -- (U) Continue effort on design and manufacture of low-cost composites for engines and wings.
  - -- (U) Demonstrate affordable manufacture of thermoplastic spares.
- (U) Develop and demonstrate process modeling and statistical process control metrics for electronic system components, materials, test, and inspection techniques; develop standard process solutions for military unique modules, sensors, arrays, solar cells, automatic test systems, and devices. ($5,629K)
  - -- (U) Complete effort to establish a manufacturing process to produce affordable tactical grade fiber optic gyroscopes.
- (U) Develop and demonstrate tools for product exchange and producibility engineering; methodologies for interoperable information systems; and tools that establish the utility and affordability of networked data exchange among prime contractors and suppliers. ($7,456K)
  - -- (U) Demonstrate methodologies for the use of simulatable specifications for design of complex electronics test.
- (U) Continue pathfinder programs in new areas to validate benefits in flexible manufacturing, commercial-military integration, quality processing, supplier improvements, and integrated product and process development; continue a limited number of industrial base pilot programs which address business policies and practices, manufacturing infrastructure, affordable sustainment of existing systems, application of best commercial manufacturing practices to military products, and affordability of Air Force weapon system (aircraft and missile) components. ($24,439K)
  - -- (U) Continue pilot efforts to manufacture military products using best commercial practices in defense production facilities.
  - -- (U) Continue effort to establish integrated sector enterprises within the organic industrial base leveraging on "best" practices.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603771F, Industrial Preparedness Manufacturing Technology

PROJECT NO.: 2865

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| Appropriated Value | 0 | 84,317 | 0 | 0 | Cont |
| Adjustments to Appropriated Value: | | | | | |
| a. Congressional General Reductions | | -1,006 | | | Cont |
| Current Budget Submit/President's Budget | 0 | 83,311 | 53,332 | 51,841 | Cont |

Change Summary Explanation:

Funding: In FY 1995, program was submitted as part of a consolidated OSD Program Element, however, funds were appropriated to the Services. This Program Element replaces Manufacturing Technology portion of PE 0708011F, Industrial Preparedness. Funding in FY 1996 reflects only the Air Force core Manufacturing Science and Technology (MS&T) program and does not reflect Congressional interest programs from FY 1995.

Schedule: Not Applicable.

Technical: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: **#3, Advanced Development** | PE NUMBER AND TITLE: **PE 0603771F, Industrial Preparedness Manufacturing Technology 2865** — PROJECT NO. |

C. (U) Other Program Funding Summary:

(U) Related Activities:
- (U) PE 0602102F, Materials.
- (U) PE 0708045A, Manufacturing Science and Technology.
- (U) PE 0708011N, Industrial Preparedness.
- (U) PE 0708011S, Industrial Preparedness.
- (U) PE 0708054F, Pollution Prevention.
- (U) PE 0603716D, Environmental.
- (U) PE 0603112F, Advanced Materials for Weapon Systems.
- (U) PE 0708011F, Industrial Base Preparedness.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total PE 0603789F Cost | 9,073 | 10,691 | 12,617 | 11,179 | 13,466 | 14,044 | 14,577 | 16,668 | Cont | Cont |
| Project 2335, Advanced C3 Technology | 3,885 | 4,721 | 5,311 | 5,313 | 6,013 | 6,114 | 6,300 | 7,400 | Cont | Cont |
| Project 4072, Correlation and Fusing | 5,188 | 5,970 | 7,306 | 5,866 | 7,453 | 7,930 | 8,277 | 9,268 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This Advanced Development program demonstrates ground and aerospace C3 technology required to maintain Air Force capabilities in a fast-paced, sophisticated, high threat, and intense jamming environment. Enhanced surveillance and communications technology must be developed to counteract an enemy's jamming and to restore critical communications links to the warfighter. The technologies developed in this program include: detection, identification, and tracking of hostile targets at long ranges under combat conditions; reliable, secure, jam resistant communications; and battle management technology that assimilates crucial C3 information into a form which facilitates and supports the military leader's combat decisions in response to the dynamics of the battlefield. All efforts in this program element contain the resources necessary, including civilian salaries, to manage, conduct, and document the technical activities.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 8,673 | 9,925 | 16,180 | 19,140 | Cont |
| Appropriated Value | 8,900 | 10,925 | | | |
| Adjustments to Appropriated Value: | | | | | |
| a. Congressional General Reductions | -227 | -234 | | | |
| b. SBIR | -100 | | | | |
| c. Below Threshold Reprogramming | 500 | | | | |
| Current President's Budget | 9,073 | 10,691 | 12,617 | 11,179 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to conduct key enhanced surveillance and communications demonstrations for the user. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development

PROJECT NO.: 2335

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 2335, Advanced C3 Technology | 3,885 | 4,721 | 5,311 | 5,313 | 6,013 | 6,114 | 6,300 | 7,400 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This program develops C3 technology for contingency and joint operations focusing on the concepts of force deployment, sustainment, and employment. Dynamic, extremely hostile battlefield environments demand near instantaneous transmission and processing of vast amounts of C3 information for real-time decision making. This project develops and integrates: low probability of intercept/anti-jam information and data processing; modular, programmable, multi-level secure communications; secure and distributed networks; advanced displays and interfaces; and battle management decision support capabilities for survivable, distributed C3 facilities. Multiband/multimode programmable radios will be enhanced to address the transmission link requirements of joint combat theater communications.

(U) FY 1994:

- (U) Developed and demonstrated critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers. ($1,935K)
  - -- (U) Performed initial Phase 1 of the SPEAKEASY multiband, multimode programmable radio technology demonstration using an Army SINCGARS and an Air Force HAVE QUICK operational wave form generator; using only algorithm modifications, SPEAKEASY demonstrated secure voice communications of Army-to-Army, Air Force-to-Air Force, and Army-to-Air Force systems at fixed frequencies, dissimilar frequencies, and while each system used frequency hopping techniques over separate and overlapping wave bands.
  - -- (U) Integrated the Quad-C40 multichip coprocessor module and a brassboard programmable secure information device into the SPEAKEASY programmable radio advance development model for multimode and multiband operational demonstration.
- (U) Demonstrated distributed processing technologies to provide efficient, secure, interoperable, and deployable communications systems. ($850K)
  - -- (U) Installed six (6) asynchronous transfer switching nodes at Air Force, Army, Navy, and Defense Information Systems Agency sites and continued information management/control technology development.
- (U) Developed and demonstrated theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. ($1,100K)
  - -- (U) Completed force level execution decision support system and transitioned it to the user's operational advanced planning tool.
  - -- (U) Generated concept design and development plan for an integrated operations and surveillance capability to enhance real-time mission planning.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development — PROJECT NO.: 2335 |

(U) FY 1995:
- (U) Develop and demonstrate critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers. ($3,000K)
  - -- (U) Conduct final testing of Phase I SPEAKEASY programmable radio advanced development models employing technology insertion modules to demonstrate programmability and interoperability with existing legacy radios.
  - -- (U) Develop preliminary Phase 2 SPEAKEASY reprogrammable, multiband, multimode radio design for joint forces application.
- (U) Demonstrate distributed processing technologies to provide efficient, secure, interoperable, and deployable communications systems. ($460K)
  - -- (U) Develop advanced switching technology brassboard with system management/control capabilities for a joint-Service demonstration.
  - -- (U) Conduct preliminary design phase of a survivable asynchronous switch, focusing on the development of a family of integrated multi-level secure tactical switches.
- (U) Demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. ($1,261K)
  - -- (U) Complete operations and surveillance integration concept design plan development.
  - -- (U) Conduct preliminary computational configuration design analysis needed for the first operations and surveillance integration brassboard.
  - -- (U) Develop a concept plan to define approaches for operational advanced planning tool processes which employ information management technology.

(U) FY 1996:
- (U) Develop and demonstrate critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers. ($3,000K)
  - -- (U) Establish Phase 2 SPEAKEASY programmable radio architecture and modular definition supporting development of a reprogrammable, multiband, multimode capability.
  - -- (U) Demonstrate Phase 2 SPEAKEASY programmable radio man-machine interface compatibility with existing user radios and capability to support future requirements.
- (U) Demonstrate distributed processing technologies to provide efficient, secure, interoperable, and deployable communications networks. ($550K)
  - -- (U) Revise the tactical switch low-rate interface module specifications, develop protocols, and test for survivable operation.
  - -- (U) Complete design, development, and testing of translation interface between tactical and commercially compatible switches to support operational voice user requirements.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development — PROJECT NO.: 2335 |

- (U) Demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. ($1,761K)
  - -- (U) Complete the first brassboard operations and surveillance integration design and demonstrate it; develop a concept design for the second operations and surveillance integration brassboard.
  - -- (U) Develop functional and technical analyses leading to a system/segment specification for use in advanced planning tools.

(U) FY 1997:

- (U) Develop and demonstrate critical ground and aerospace communications technology advances in programmable devices and monolithic microwave integrated circuits to provide survivable radios and transceivers. ($3,000K)
  - -- (U) Demonstrate compatibility between the limited capacity, preliminary brassboard Phase 2 SPEAKEASY programmable radio development module with legacy military radio wave forms.
  - -- (U) Demonstrate information routing between military radios using Phase 2 SPEAKEASY programmable radio module.
- (U) Demonstrate distributed processing technologies to provide efficient, secure, interoperable, and deployable communications systems. ($1,000K)
  - -- (U) Develop, integrate, and test field management system survivability and security features in an existing standards-based management platform system.
  - -- (U) Establish baseline management system requirements for military quality-of-service, survivability, and performance.
  - -- (U) Develop a standard peer management system interface allowing seamless interoperation with other standards-based military and commercial systems.
- (U) Demonstrate theater battle management and time-critical air operations technologies to provide field commanders essential operational decision support and rapid response capabilities. ($1,313K)
  - -- (U) Complete designs and demonstration of operations and surveillance integration brassboards #2 and #3; complete preliminary/final acceptance test and host the operations and surveillance integration brassboard technology demonstration to the user.
  - -- (U) Develop concept plan for developing defensive advanced planning technology brassboard; create brassboard development algorithm design document.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development

PROJECT NO.: 2335

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 3,685 | 4,855 | 6,815 | 7,505 | Cont |
| Current President's Budget | 3,885 | 4,721 | 5,311 | 5,313 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to conduct key enhanced surveillance and communications demonstrations for the user. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0603617F, C3 Applications.
- (U) PE 0603737D, Advanced Research Projects Agency.
- (U) PE 0603006A, C3 Technology.
- (U) PE 0602702F, C3.
- (U) PE 0602232N, C3 Technology.
- (U) PE 0603726F, C3 Subsystems Integration.
- (U) PE 0603728F, Advanced Computer Technology.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development

PROJECT NO.: 4072

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 4072, Correlation and Fusing | 5,188 | 5,970 | 7,306 | 5,866 | 7,453 | 7,930 | 8,277 | 9,268 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: The Air Force must be able to detect, positively identify, and track hostile targets in combat to gain maximum advantage of all strategic and tactical warning sensors and beyond-visual-range weapons to ensure maximum target engagement ranges and a first-shot, first-kill capability. Effective sensor processing improvements using advanced open architecture processors, spatial coordinate and time adaptive processing techniques, tracking/fusion algorithms, bistatic sensor technology, and correlation techniques will be pursued to enhance target detection and tracking ranges. Indirect hostile target identification capabilities are essential to achieve high-confidence identification to control the air battle and provide the warfighter with the necessary information to use beyond-visual-range weapons. This project develops and integrates the necessary suite of complementary passive and active hostile target identification capabilities for command and control platforms. These technologies will enhance the performance of identification and threat assessment systems for enhanced acquisition, tracking, and target engagement ranges for theater operations.

(U) FY 1994:
- (U) Developed high-confidence hostile airborne target identification and tracking technologies and concepts. ($1,888K)
  - -- (U) Integrated Rome Laboratory surveillance and intelligence facility assets in order to enhance target identification experiments; developed advanced algorithms for passive identification of air targets using bistatic radar.
  - -- (U) Developed advanced fusion algorithms to improve tracking and identification attributes.
- (U) Developed and demonstrated advanced sensor technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors. ($3,300K)
  - -- (U) Developed off-board cueing methodologies.
  - -- (U) Completed algorithm sizing for real-time correlation; demonstrated on an operational surveillance platform.

(U) FY 1995:
- (U) Develop high-confidence hostile airborne target identification and tracking technologies and concepts. ($2,470K)
  - -- (U) Complete development of track and identification fusion capability and begin experiments using laboratory assets and targets; conduct first stage installation of multi-sensor integration algorithm on an operational surveillance platform for FY 1997 demonstration testing.
  - -- (U) Develop passive techniques to exploit intelligence data to identify hostile air targets.
  - -- (U) Develop advanced tracking algorithms for surveillance using advanced radar processing techniques to improve target tracking and new concepts that determine target position, direction, and altitude.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development — PROJECT NO.: 4072 |

- (U) Develop and demonstrate advanced passive sensor technologies and concepts for increased survivability of fielded systems and assured detection and tracking of combat threats. ($200K)
  - -- (U) Conduct first stage development of advanced bistatic tracking algorithm and preliminary testbed design.
- (U) Develop and demonstrate advanced sensor technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors. ($2,300K)
  - -- (U) Implement enhanced surveillance algorithms, using off-board sensor inputs, in a workstation environment; develop assessment/exit criteria.
  - -- (U) Evaluate parallel processing architecture performance and define requirements for incorporating: sensor management; enhanced surveillance algorithms, using off-board sensor inputs; synthetic aperture radar; and inverse algorithmic capabilities.
  - -- (U) Complete real-time on-board sensor management algorithm architecture development for the allocation of resources using an advanced computer system.
- (U) Conduct technology demonstration on decision support technology. ($1,000K)

(U) FY 1996:
- (U) Develop high-confidence hostile airborne target identification and tracking technologies and concepts. ($3,520K)
  - -- (U) Install multi-sensor integration algorithm on an operational surveillance platform for FY 1997 demonstration testing.
  - -- (U) Complete advanced surveillance tracking algorithms utilizing advanced radar processing techniques to improve target tracking and the incorporation of new concepts that determine target attitude (position, direction, altitude).
  - -- (U) Investigate methods to incorporate advances in cueing technology using a distributed architecture to perform real-time target identification.
- (U) Develop and demonstrate advanced passive sensor technologies and concepts for increased survivability of fielded systems and assured detection and tracking of combat threats. ($985K)
  - -- (U) Integrate hardware, computational methods, and detection/tracking algorithms into an advanced multichannel passive sensor testbed supporting bistatic system performance evaluation and future airborne test risk reduction efforts.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #3, Advanced Development | PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development — PROJECT NO.: 4072 |

- (U) Develop and demonstrate advanced sensor technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors. ($2,801K)
  - -- (U) Demonstrate multiple observation and information platform data fusion using enhanced surveillance algorithms (based on off-board sensor inputs) and operating in a workstation environment to detect, track, and identify targets with data from existing surveillance platforms.
  - -- (U) Assess detection, track, and fusion enhancement gains via real-time laboratory demonstration, defining the radar processing elements and fusion requirements to support real-time parallel processing.
  - -- (U) Develop and test 20-billion-operations-per-second real-time signal processor enhancement Standard Electronic Module - E (SEM-E) format board required to demonstrate real-time high resolution processing.

(U) FY 1997:

- (U) Develop and demonstrate advanced sensor technologies and concepts for assured detection and tracking of hostile airborne targets using multiple off-board sensors. ($2,550K)
  - -- (U) Complete installation of multi-sensor integration algorithm on an operational surveillance platform and demonstrate on-board and off-platform sensor fusion and integration.
  - -- (U) Develop automated tools built upon knowledge-based systems incorporating operator experience and advanced cueing theory techniques to minimize airborne target identification time.
- (U) Develop and demonstrate advanced passive sensor technologies and concepts for increased survivability of fielded systems and assured detection and tracking of combat threats. ($654K)
  - -- (U) Demonstrate the advanced, multichannel passive sensor testbed capability to identify range, band width, coherency, receiver channel matching/calibration, array multipath effects, and integration issues in order to reduce technical risks of future technology demonstrations.
- (U) Develop and demonstrate advanced sensor technologies and concepts for assured detection and tracking of hostile ground targets using multiple off-board sensors. ($2,662K)
  - -- (U) Complete the evaluation of real-time parallel processing enhancements assessments of cueing and correlation to operational systems.
  - -- (U) Conduct field test and demonstration of real-time signal processor enhancement hardware running enhanced synthetic aperture radar and inverse algorithms on an operational systems testbed.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #3, Advanced Development

PE NUMBER AND TITLE: PE 0603789F, Command, Control, and Communications (C3) Advanced Development

PROJECT NO.: 4072

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,988 | 5,070 | 9,365 | 11,635 | Cont |
| Current President's Budget | 5,188 | 5,970 | 7,306 | 5,866 | Cont |

Change Summary Explanation:

Funding: Increases from FY 1995 to FY 1996 are to conduct key enhanced surveillance and communications demonstrations for the user. This technology directly supports the Joint Chiefs of Staff Future Joint Warfighting Capability: "To maintain near perfect real-time knowledge of the enemy and communicate that to all forces in near-real-time."

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary:

(U) Related Activities:

- (U) PE 0603203F, Advanced Avionics for Aerospace Vehicles.
- (U) PE 0602702F, C3.
- (U) PE 0603742F, Combat Identification Technology.
- (U) PE 0603726F, C3 Subsystems Integration.
- (U) PE 0603728F, Advanced Computer Technology.
- (U) This project has been coordinated through the Project Reliance process to harmonize efforts and eliminate duplication.

D. (U) Schedule Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603800F Joint Advanced Strike Technology (JAST) Program

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 0 | 83,801 | 151,186 | 199,831 | 304,263 | 413,616 | 196,967 | 0 | 0 | 1,349,664 |
| Project Number 2025 Total Cost | 0 | 83,801 | 151,186 | 199,831 | 304,263 | 413,616 | 196,967 | 0 | 0 | 1,349,664 |

A. Mission Description and Budget Item Justification

(U) The Joint Advanced Strike Technology (JAST) Program has been chartered to facilitate the evolution of fully-validated affordable operational requirements and proven operational concepts, and also transition the key technologies to enable the successful development and production of affordable next-generation strike aircraft weapon systems for the Air Force, Navy, Marine Corps, and our allies. The JAST Program is a joint program with no executive service. Air Force and Navy each provide approximately equal shares of annual funding for the program effective in FY 1995. The Advanced Research Projects Agency (ARPA) contributes funding for the concept flight demonstration effort commencing in FY 1996.

(U) FY 1994 Accomplishments - Conducted concept exploration studies and provided in-house support as follows (Navy only funding in FY 1994 -- $29,663):

- (U) ($11,597) Strike warfare concept studies.
- (U) ($5,935) Program operations support, including program office functions.
- (U) ($5,049) Strategy-to-technology analysis.
- (U) ($2,017) Supportability.
- (U) ($1,570) Flight Systems.
- (U) ($1,000) Propulsion.
- (U) ($988) Avionics.
- (U) ($704) Weapons integration.
- (U) ($439) Technology integration planning support.
- (U) ($259) Structure and materials.
- (U) ($105) Manufacturing.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration & Validation | PE NUMBER AND TITLE: #0603800F Joint Advanced Strike Technology (JAST) Program |

A. Mission Description and Budget Item Justification (cont.)

(U) FY 1995 Plans - Complete concept exploration, begin concept development, and provide in-house support as follows: (Reflects combined Air Force & Navy funding -- total $182,073.)

- (U) ($55,670) Strike warfare systems design development.
- (U) ($37,819) Advanced Short Take Off and Vertical Landing (ASTOVL).
- (U) ($18,622) Avionics.
- (U) ($17,754) Propulsions.
- (U) ($10,150) Flight Systems.
- (U) ($9,837) Structures and Materials.
- (U) ($7,410) Strategy-to-technology analysis.
- (U) ($7,247) Weapons integration.
- (U) ($6,325) Program operations, including program office functions.
- (U) ($5,017) Supportability.
- (U) ($4,973) Manufacturing and Producibility.
- (U) ($1,249) Technology integration planning support.

(U) FY 1996 Plans - Continue concept development, begin advanced aircraft concept demonstrations, and provide in-house support as follows: (Reflects combined Air Force, Navy, and Advanced Research Projects Agency (ARPA) funding -- total $331,156)

- (U) ($77,058) Concept flight demonstration efforts.
- (U) ($56,284) Strike warfare systems design development.
- (U) ($36,096) Avionics.
- (U) ($33,488) Propulsion.
- (U) ($31,200) Flight Systems.
- (U) ($25,054) Structures and Materials.
- (U) ($20,000) Supportability.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration & Validation | PE NUMBER AND TITLE<br>#0603800F Joint Advanced Strike Technology (JAST) Program |

A. Mission Description and Budget Item Justification (cont.)

(U) FY 1996 Plans - Continue concept development, begin advanced aircraft concept demonstrations, and provide in-house support as follows: (Reflects combined Air Force, Navy, and ARPA funding.) (cont.)

- (U) ($17,300) Weapons integration.
- (U) ($12,000) Manufacturing and Producibility.
- (U) ($7,639) Strategy-to-technology analysis.
- (U) ($6,983) Program operations, including program office functions.
- (U) ($6,900) Advanced Short Take-Off and Vertical Landing (ASTOVL).
- (U) ($1,154) Technology integration planning support.

(U) FY1997 Plans - Continue advanced aircraft concept demonstrations and provide in-house support as follows: (reflects combined Air Force, Navy, and ARPA funding -- total $480,061.)

- (U) ($193,580) Concept flight demonstrations.
- (U) ($66,450) Structures and Materials.
- (U) ($60,000) Propulsion.
- (U) ($55,000) Avionics.
- (U) ($31,900) Flight Systems.
- (U) ($23,900) Supportability.
- (U) ($22,700) Weapons integration.
- (U) ($11,000) Manufacturing and Producibility.
- (U) ($7,600) Strategy-to-technology analysis.
- (U) ($6,777) Program operations support.
- (U) ($1,154) Technology integration planning support.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603800F Joint Advanced Strike Technology (JAST) Program

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 101,354 | 151,975 | 200,860 | CONT |
| (U) Appropriated Value | 0* | 86,354 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| (U) a. General Reductions | | -1,096 | | | |
| (U) b. SBIR | | -1,457 | | | |
| (U) Adjustments to Budget Years Since FY 1995 PB | | | -789 | -1,029 | |
| (U) Current Budget Submit/President's Budget | 0* | 83,801 | 151,186 | 199,831 | 1,349,664 |

(U) Change Summary Explanation:

(U) Funding: FY 1995 adjustments include General Reductions of: non-FFRDC; FFRDC; Univ. Research; Travel. FY 1996 &1997 adjustments are due to lower inflation projections.

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

(U) * $30,000 was appropriated for the Navy to initiate JAST Program; FY1995 PB reflected $29,663 for Navy.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603800F Joint Advanced Strike Technology (JAST) Program

C. Other Program Funding Summary ($ in Thousands)

(U) JAST is a joint program with no executive service. Air Force and Navy each provide approximately equal shares of annual funding for the program effective in FY1995. ARPA contributes funding for the concept flight demonstration effort commencing in FY 1996.

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Related RDT&E | | | | | | | | | | |
| (U) PE# 0603800N | 29,663 | 98,272 | 149,295 | 199,305 | 292,426 | 409,349 | 196,921 | 0 | 0 | 1,375,231 |
| (U) PE# 0603800E | 0 | 0 | 30,675 | 80,925 | 83,922 | 19,000 | 16,000 | 10,000 | CONT | CONT |
| (U) PE# 0604800F * | 0 | 0 | 0 | 0 | 0 | 0 | 127,324 | 464,441 | CONT | CONT |
| (U) PE# 0604800N * | 0 | 0 | 0 | 0 | 0 | 0 | 127,295 | 464,456 | CONT | CONT |

* Milestone II for a joint follow-on EMD program for the next generation strike aircraft weapon system(s) is planned in FY 2000. The follow-on aircraft weapon system(s) program will develop a family of aircraft from concepts proven under the JAST Program, incorporating affordable technologies transitioned from the JAST Program.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 4 - Demonstration & Validation | PE NUMBER AND TITLE: #0603800F Joint Advanced Strike Technology (JAST) Program |

D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Concept Exploration (May 94 - Nov 94) | | | X | | | | | | | | | | | | | |
| * Concept Development (Dec 94 - mid-96) | | | | | X | | | | | | | | | | | |
| ** Concept Demonstration (mid-96 - 2000) | | | | | | | | | | | X | | | | | |

(U) Acquisition Milestones: Not applicable; not an acquisition program.

(U) Engineering Milestones: Not applicable; not an acquisition program.

(U) T & E Milestones: Not applicable; not an acquisition program.

(U) Contract Milestones: Not applicable; not an acquisition program.

(U) Other Program Events:

(U) Transition to joint follow-on Engineering and Manufacturing Development (EMD) program with Milestone II (FY 2000 ).

(U) Continue technology maturation demonstration/transition under the JAST Program.

* Concept Development (Definition and Design Research)
** Concept Demonstration (includes Flying Concept Demonstrations)

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603800F Joint Advanced Strike Technology (JAST) Program

PROJECT NO.: 2025

A. Project Cost Breakdown ($ in Thousands)

(U) The JAST Program is a joint program with no lead service. Air Force and Navy have each budgeted approximately equal shares of annual funding effective in FY 1995. ARPA contributes funding for the concept flight demonstration effort commencing in FY 1996. Funding resource breakdown is provided following project cost breakdown.

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Strike warfare concept studies | 11,597 | | | |
| Strike warfare systems design development | | 55,670 | 56,284 | |
| Concept flight demonstrations | | | 77,058 | 193,580 |
| ASTOVL | | 37,819 | 6,900 | |
| Strategy-to-technology analysis | 5,049 | 7,410 | 7,639 | 7,600 |
| Structures and materials | 259 | 9,837 | 25,054 | 66,450 |
| Flight Systems | 1,570 | 10,150 | 31,200 | 31,900 |
| Manufacturing | 105 | | | |
| Manufacturing and producibility | | 4,973 | 12,000 | 11,000 |
| Propulsion | 1,000 | 17,754 | 33,488 | 60,000 |
| Avionics | 988 | 18,622 | 36,096 | 55,000 |
| Weapons integration | 704 | 7,247 | 17,300 | 22,700 |
| Supportability | 2,017 | 5,017 | 20,000 | 23,900 |
| Technology integration planning support | 439 | 1,249 | 1,154 | 1,154 |
| Program Operations support | 5,935 | 6,325 | 6,983 | 6,777 |
| Total | 29,663 | 182,073 | 331,156 | 480,061 |

* Cost breakdown summary reflects combined Air Force, Navy and ARPA funding.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 4 - Demonstration & Validation

PE NUMBER AND TITLE: #0603800F Joint Advanced Strike Technology (JAST) Program

PROJECT NO.: 2025

A. Project Cost Breakdown ($ in Thousands) (cont.)

| * Funding Resources | FY 1994 | FY 1995 | FY 1996 | FY1997 |
|---|---|---|---|---|
| (U) Air Force PE#0603800F | 0 | 83,801 | 151,186 | 199,831 |
| (U) Navy PE#0603800N | 29,663 | 98,272 | 149,295 | 199,305 |
| (U) ARPA PE#0603800E | 0 | 0 | 30,675 | 80,925 |
| (U) Total | 29,663 | 182,073 | 331,156 | 480,061 |

B. Budget Acquisition History and Planning Information: Not applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 2,504 | 17,877 | 20,265 | 30,638 | 38,502 | 42,419 | 44,152 | 45,091 | LOE | LOE |
| 1020 ICBM Guidance Applications | 0 | 11,870 | 11,544 | 17,216 | 19,604 | 19,604 | 20,099 | 20,094 | LOE | LOE |
| 1021 ICBM Propulsion Applications | 0 | 301 | 200 | 200 | 200 | 200 | 200 | 200 | LOE | LOE |
| 1022 ICBM Reentry Vehicle Applications | 0 | 2,200 | 5,673 | 10,549 | 15,723 | 19,704 | 20,994 | 21,785 | LOE | LOE |
| 1023 Rocket System Launch Program* | 0 | 0 | 30 | 31 | 31 | 32 | 34 | 36 | LOE | LOE |
| 1024 ICBM Command & Control Applications | 0 | 301 | 200 | 200 | 200 | 200 | 200 | 200 | LOE | LOE |
| 4209 Long Range Planning** | 2,504 | 3,205 | 2,618 | 2,442 | 2,744 | 2,679 | 2,625 | 2,776 | LOE | LOE |

A. (U) Mission Description and Budget Item Justification

(U) Efforts identify methods to reduce life cycle costs, improve nuclear safety and surety, support international arms control agreements, and ensure Minuteman III supportability. Program includes demonstration and validation of Minuteman III guidance options, independent assessment of stage IV supportability, feasibility study of future warhead safety options, and enhancements to survivable command and control capabilities. These programs are in Budget Activity/Research Category Demonstration and Validation and these programs integrate existing technologies and reduce life cycle costs.

*FY95 funds reported and executed under PE 65860F, Rocket Systems Launch Program
**FY94 and Prior Year funds were appropriated in PE 11213F, Minuteman Squadrons.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget* | 16,336 | 36,018 | 42,830 | 38,600 | LOE |
| Appropriated Value | | 43,206 | | | |
| Adjustments to Appropriated Value | | | | | |
| Congressional Reductions | | -603 | | | |
| SBIR | | -899 | | | |
| New RSLP PE** | | -23,827 | | | |
| Adjustments to Budget Years Since FY95 PB | | | -22,565 | -7,962 | |
| Current Budget Submit/President's Budget* | 2,504 | 17,877 | 20,265 | 30,638 | LOE |

*FY94 and Prior Year funds were appropriated in PE 11213F, Minuteman Squadrons; FY95 and out years previously budgeted in PE 11213F (Minuteman Squadrons) and PE 0603308 (Strategic Missile Modifications)
**FY95 funds ($23,827) reported under PE 65860F, Rocket Systems Launch Program

Change Summary Explanation:

(U) Funding: Funding changed as a result of realignment to fund new PEs per congressional direction. Funding adjustments still support NPR recommendations and sustain the Reentry Vehicle industrial base.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Military Construction (PE 035119F) (for Minuteman II Storage) | 7,250 | | | | | | | | | 7,250 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1020

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| ICBM Guidance Applications | 0 | 11,870 | 11,544 | 17,216 | 19,604 | 19,604 | 20,099 | 20,094 | LOE | LOE |

A. (U) Mission Description and Budget Item Justification ($ in Thousands) ICBM Guidance Application efforts implement the JROC-validated Mission Need Statement for Future Guidance Systems for Intercontinental Ballistic Missiles. The program is a compilation of government and contractor efforts focused on implementing disengagement strategies as directed by national security planning agencies, significantly reducing guidance system life cycle cost, increasing nuclear surety, and evaluating/demonstrating the guidance instrument options that will keep the Minuteman III viable. This program also implements the Nuclear Posture Review recommendations to preserve guidance instrument technologies. Guidance Applications projects will demonstrate the utility and/or cost reduction potential of technologies applied to the Minuteman guidance system.

(U) FY 1994 - Not applicable

(U) FY 1995
- (U) Support the Advanced Inertial Measurement System (AIMS) through the completion of dem/val of brassboard testing. ($10,000)
- (U) Perform Alternatives and Effectiveness study. ($685)
- (U) Perform Reliability Analysis Study of IMU viability for dormant operations including start-up reliability. ($590)
- (U) Guidance Replacement Program (GRP) contractor support to evaluate integration of alternative advanced IMUs with GRP. ($595)

(U) FY 1996
- (U) Conduct gyros design and develop brassboard prototype. ($1,444)
- (U) Design replacement accelerometer and develop prototype. ($1,100)
- (U) Begin development of prototype IMU and design Gyro Compass Assembly (GCA) ($7,400)
- (U) Perform guidance component aging prediction study. ($300)
- (U) Begin developing IMU replacement components. ($1,300)

(U) FY 1997
- (U) Continue design and development of prototype gyros. ($2,116)
- (U) Continue accelerometer development. ($1,700)
- (U) Continue development of prototype IMU and complete GCA design. ($11,500)
- (U) Complete aging study and begin methodology assessment. ($500)
- (U) Continue development of IMU replacement components and assess repair technology. ($1,400)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #4 Demonstration & Validation | #0603851F ICBM Modernization Dem/Val | 1020 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 12,650 | 22,593 | 21,593 | LOE |
| Appropriated Value | | 12,650 | | | |
| Adjustments to Appropriated Value | | | | | |
| Congressional Reductions | | -380 | | | |
| SBIR | | -400 | | | |
| Adjustments to Budget Years Since FY95 PB | | | -11,049 | -4,377 | |
| Current Budget Submit/President's Budget | 0 | 11,870 | 11,544 | 17,216 | LOE |

Change Summary Explanation:

(U) Funding: Funding in FY96 and beyond reduced but still supports NPR recommendations.

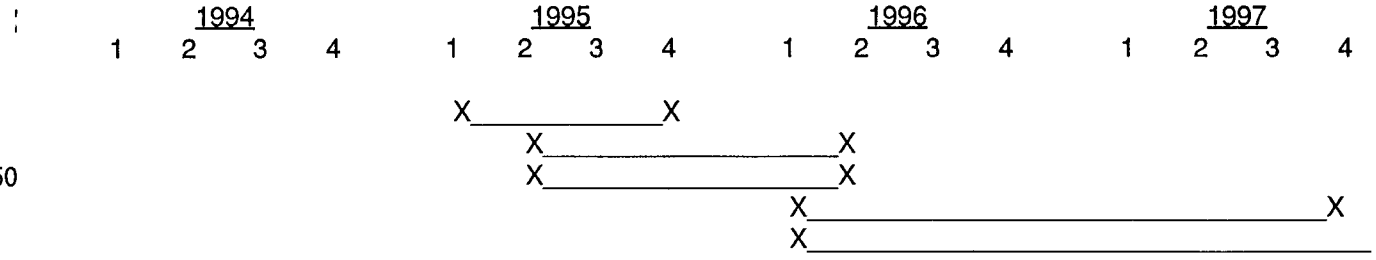
(U) Schedule: AIMS brassboard testing scheduled for 4Qtr FY95.

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands): Not Applicable.

Related RDT&E: PE 0605851F (ICBM Modernization EMD)

D. (U) Schedule Profile



# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1020

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Program Management Support | 0 | 593 | 577 | 861 |
| Contract Systems Engineering | 0 | 11,277 | 10967 | 16,355 |
| Total | 0 | 11,870 | 11,544 | 17,216 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands):

(U) Performing Organizations: N/A

(U) Government Furnished Property: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1021

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| ICBM Propulsion Applications | 0 | 301 | 200 | 200 | 200 | 200 | 200 | 200 | LOE | LOE |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

(U) PSRE: The Minuteman III post boost vehicle, Propulsion System Rocket Engine (PSRE), is out of production and is a major Minuteman III component which is required through the life of the weapon system. In order to ensure that the PSRE will satisfy operational requirements, special testing, research, risk analyses, and engineering analysis are required for the evaluation of the components. Reuse studies and/or development of replacement hardware will be required which will include feasibility evaluations, technology improvements, material processing validation and manufacturing validation.

(U) Minuteman Ordnance: The igniter safe and arm, arm/disarm switch and interstage skirt jettison ordnance must be replaced or overhauled to support the weapon system life objectives. Component reuse, environmental issues and supportability/produceability issues will be addressed to enable new production of these assemblies. The remanufactured assets from this effort are also required to support motor Change Verification Motor, Qual, and Flight Test Motor testing.

(U) FY 1994 - Not applicable

(U) FY 1995
- (U) PSRE: Conduct fired PSRE reuse study. ($197)
- (U) PSRE: Conduct independent assessment of PSRE and study options to meet Minuteman III post boost vehicle requirements. ($104)

(U) FY 1996 -
- (U) PSRE: Conclude independent assessment of PSRE and study of options to meet Minuteman III post boost vehicle requirements. ($98K)
- (U) PSRE: Conduct fired PSRE reuse study. ($52)
- (U) Ordnance: Conduct component reuse studies for life extension. ($50)

(U) FY 1997 -
- (U) PSRE: Conduct component reuse studies for life extension. ($98)
- (U) PSRE: Conduct fired PSRE reuse study. ($52)
- (U) Ordnance: Conduct component reuse studies for life extension. ($50)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1021

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget* | 0 | 301 | 604 | 0 | LOE |
| Appropriated Value | | | | | |
| Adjustments to Appropriated Value | | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -404 | 200 | |
| Current Budget Submit/President's Budget | 0 | 301 | 200 | 200 | LOE |

Change Summary Explanation:

(U) Funding: Funding in FY96 reduced for affordability issue.

(U) Schedule: N/A

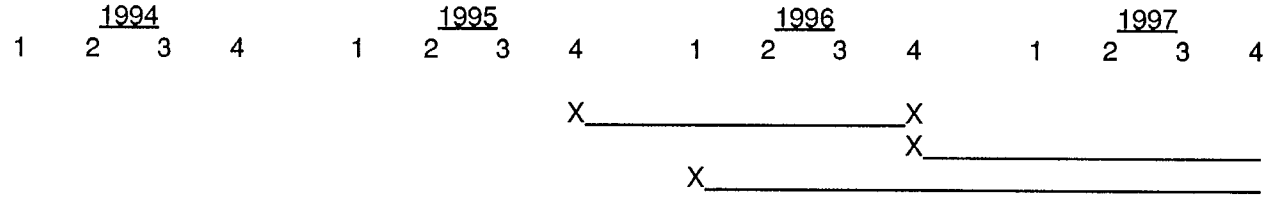
(U) Technical: N/A

*Program funding moved from PE 0603380F to PE 0603851F to comply with FY95 Appropriation language.

C. (U) Other Program Funding Summary ($ in Thousands): Not Applicable.

Related RDT&E: PE 0604851F (ICBM Modernization EMD)

D. (U) Schedule Profile



# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #4 Demonstration & Validation | #0603851F ICBM Modernization Dem/Val | 1021 |

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Contract Engineering Support | 0 | 301 | 200 | 200 |
| Total | 0 | 301 | 200 | 200 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands):

(U) Performing Organizations: N/A

(U) Government Furnished Property: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1022

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| ICBM Reentry Vehicle Applications | 0 | 2,200 | 5,673 | 10,549 | 15,723 | 19,704 | 20,994 | 21,785 | LOE | LOE |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

(U) ICBM Reentry Vehicle (RV) Applications efforts will respond to force structure guidance dictating a Minuteman III force of 500 missiles, arms control treaties/initiatives directing the Minuteman force be downloaded to a single RV configuration, the need to ensure Minuteman force contains the safest, most reliable RV, and Nuclear Posture Review guidance to sustain the RV industrial base. ICBM RV Applications efforts will address problems with operational reentry systems, meet real on-going needs, and ensure the availability of long-lead components/materials. This project will develop methods to better predict aging phenomenon, and identify life cycle cost reduction methods. Additionally, these efforts will maintain a minimum level of technical engineers and capability to respond to aging phenomenon and future requirements. RV work conducted under this program will leverage the Science & Technology community and coordinate with Navy RV efforts to eliminate duplication and realize synergistic cost savings.

(U) FY 1994 - Not applicable

(U) FY 1995
- (U) Identify and assess those critical attributes unique to ICBM requirements. ($1,700)
- (U) Conduct Safety Enhanced Reentry Vehicle (SERV) Phase 0 Study. ($500)

(U) FY 1996
- (U) Evaluate existing RV materials and identify potential material replacements. ($1,886)
- (U) Identify and evaluate options for improved aging prediction testing/measurement techniques. ($1,287)
- (U) Identify and evaluate options for improved sensors/instrumentation to better analyze operational RVs and materials. ($900)
- (U) Identify and evaluate options for improved fuze measurement tools. ($800)
- (U) Conduct Phase 0 work to develop SERV Milestone I documentation. ($300)
- (U) Identify and evaluate supportability for critical RV components. ($300)
- (U) Identify options to better measure/analyze accuracy contributors. ($200)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #4 Demonstration & Validation | #0603851F ICBM Modernization Dem/Val | 1022 |

(U) FY 1997
- (U) Continue to evaluate existing RV materials and potential material replacements; begin planning for ground and flight tests. ($3,275)
- (U) Design, develop, and conduct prototype testing of selected aging prediction techniques and tools. ($2,174)
- (U) Design, develop, and conduct prototype testing of selected fuze measurement tools. ($2,100)
- (U) Design, develop, and conduct prototype testing of selected sensors/instruments. ($1,700)
- (U) Identify potential replacement options for critical RV components. ($800)
- (U) Conduct initial evaluation of improved accuracy measurement/techniques. ($500)

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget* | 0 | 10,939 | 1,423 | 703 | LOE |
| Appropriated Value | | 2,500 | | | |
| Adjustments to Appropriated Value | | | | | |
| SBIR | | -300 | | | |
| Adjustments to Budget Years Since FY95 PB | | | 4,250 | 9,846 | |
| Current Budget Submit/President's Budget | 0 | 2,200 | 5,673 | 10,549 | LOE |

Change Summary Explanation:

(U) Funding: FY95 funding reduced during Congressional Budget cycle with direction to conduct Critical Attributes study. AF/CV and OSD approved and funded ICBM RV Applications Program in FY96-01.

(U) Schedule: N/A

(U) Technical: N/A

*Program funding moved from PE 0603308F to PE 0603851F to comply with FY95 Appropriations language.

C. (U) Other Program Funding Summary ($ in Thousands) Not applicable

Related RDT&E: PE 0604851F (ICBM Modernization EMD)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1022

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Conduct Critical Attributes Study | | | | | X | ——— | ——— | X | | | | | | | | |
| Conduct Phase 0 SERV Study | | | | | X | X | | | | | | | | | | |
| Develop SERV Milestone I Documentation | | | | | | | | | X | ——— | ——— | X | | | | |
| Evaluate Materials, Identify Replacements | | | | | | | | | X | ——— | ——— | ——— | ——— | ——— | ——— | X |
| Begin Planning for Ground/Flight Tests | | | | | | | | | | | | | X | ——— | ——— | X |
| Aging Prediction Methodologies | | | | | | | | | | | | | | | | |
| Identify Improved Prediction Techniques | | | | | | | | | X | ——— | ——— | X | | | | |
| Design/Develop/Test Selected Techniques | | | | | | | | | | | | | X | ——— | ——— | X |
| Sensor/Instrumentation Integration | | | | | | | | | | | | | | | | |
| Identify Options for Improved Sensors/Instrumentation | | | | | | | | | X | ——— | ——— | X | | | | |
| Design/Develop/Test Selected Sensors/Instruments | | | | | | | | | | | | | X | ——— | ——— | X |
| Accuracy Assessment Methodology | | | | | | | | | | | | | | | | |
| Identify Options to Measure Accuracy Contributors | | | | | | | | | X | ——— | ——— | X | | | | |
| Conduct Evaluation of Accuracy Measurement Techniques | | | | | | | | | | | | | X | ——— | ——— | X |
| Fuze Assessment | | | | | | | | | | | | | | | | |
| Identify Options for Improved Measurement Tools | | | | | | | | | X | ——— | ——— | X | | | | |
| Design/Develop/Test Selected Measurement Tools | | | | | | | | | | | | | X | ——— | ——— | X |
| Critical Components | | | | | | | | | | | | | | | | |
| Identify Supportability | | | | | | | | | X | ——— | ——— | X | | | | |
| Identify Potential Replacement Options | | | | | | | | | | | | | X | ——— | ——— | X |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #4 Demonstration & Validation | #0603851F ICBM Modernization Dem/Val | 1022 |

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Contract Engineering Support | 0 | 2,200 | 5,673 | 10,549 |
| Total | 0 | 2,200 | 5,673 | 10,549 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands):

(U) Performing Organizations: N/A

(U) Government Furnished Property: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1023

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Rocket System Launch Program | 0 | 0 | 30 | 31 | 31 | 32 | 34 | 36 | LOE | LOE |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

(U) This task supports studies/analysis for the adoption of the Multiservice Launch System (MSLS) or other alterrnative hardware for use on deactivated Peacekeeper missiles.

(U) FY 1994 - N/A

(U) FY 1995 - N/A

(U) FY 1996

- (U) Conduct studies/analysis for the adoption of Multiservice Launch System (MSLS) or MSLS-like guidance system for use on deactivated Peacekeeper missiles. ($30)

(U) FY 1997

- (U) Continue studies/analysis for the adoption of Multiservice Launch System (MSLS) or MSLS-like guidance system for use on deactivated Peacekeeper missiles. ($31)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Valm

PROJECT NO.: 1023

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 0 | 30 | 31 | LOE |
| Appropriated Value | 0 | 0 | | | |
| Adjustments to Appropriated Value | | | | | |
| Adjustments to Budget Years Since FY95 PB | | | | | |
| Current Budget Submit/President's Budget | 0 | 0 | 30 | 31 | LOE |

Change Summary Explanation:

(U) Funding: FY95 funded in PE 0603851F; FY94 funded in 0305119F

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands) - N/A

Related RDT&E: PE 0605860F, Rocket System Launch Program (RSLP)
BA#6, Management Support

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1023

D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Multiservice Launch System Applications Studies/Analysis | | | | | | | | | X | | | X | X | | | X |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #4 Demonstration & Validation | #0603851F ICBM Modernization Dem/Val | 1023 |

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Studies/Analysis | 0 | 0 | 30 | 31 |
| Total | 0 | 0 | 30 | 31 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands):

(U) Performing Organizations: N/A

(U) Government Furnished Property: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1024

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| ICBM Command and Control Applications | 0 | 301 | 200 | 200 | 200 | 200 | 200 | 200 | LOE | LOE |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

(U) The deMIRVing of ICBMs and overall cutbacks in the number of nuclear weapons reduces the incentive to attack individual ICBM silos. Therefore, the incentive to attack Minuteman launch control centers will increase unless steps are taken to lessen an aggressor's confidence in being able to prevent missile launch by simultaneously destroying all launch control centers. This program funds efforts to identify existing technologies (Ground Launch Cruise Missile, Small ICBM, Airborne Launch Control Centers, etc.) to increase the uncertainty of destroying Minuteman launch control centers. The use of inter-squadron relay of launch commands, ground deplorable UHF repeaters for airborne launch control center commands, and alternative launch command nodes will be examined. The identification and use of existing military hardware, software, and system designs/documentation are principle concerns. Testing existing low-cost technology (fiber optic cable, telescoping antennas, etc.) under a generation scenario will be stressed. Methods to allow further disengagement and cost savings will be pursued.

(U) FY 1994 - Not applicable

(U) FY 1995
- (U) Identify from previous ICBM Long Range Planning, System Program Office, and AFSPC studies candidate command and status methodologies. Refine analysis and downselect to a single study candidate. ($301)

(U) FY 1996
- (U) Identify technical and cost options for providing a Milstar EHF/SHF capability to Minuteman LCCs. ($200)

(U) FY 1997
- (U) Accomplish an in depth analysis for the remaining Enduring Command and Status Monitoring candidate. ($200)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration & Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 1024

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 301 | 811 | 503 | LOE |
| Appropriated Value | | | | | |
| Adjustments to Appropriated Value | | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -611 | -303 | |
| Current Budget Submit/President's Budget | 0 | 301 | 200 | 200 | LOE |

Change Summary Explanation:

(U) Funding: Funding in FY96 and beyond reduced for affordability issue.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|

Not applicable

Related RDT&E: PE 0605851F

D. (U) Schedule Profile

| 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |

Not applicable

Exhibit R-3

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #4 Demonstration & Validation | #0603851F ICBM Modernization Dem/Val | 1024 |

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Contract Engineering Support | 0 | 301 | 200 | 200 |
| Total | 0 | 301 | 200 | 200 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands):

(U) Performing Organizations: N/A

(U) Government Furnished Property: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration and Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 4209

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Long Range Planning | *2,505 | 3,204 | 2,618 | 2,442 | 2,774 | 2,679 | 2,625 | 2,776 | LOE | LOE |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

The Long Range Planning (LRP) task analyzes the Minuteman III system to identify potential subsystem modifications required to meet user objectives relative to long term sustainment, technology insertion, employment, and force structure. The primary focus of the studies centers on system supportability, operability, reliability, and maintainability. Options/concepts generated by these studies are evaluated for feasibility, system impacts, and cost.

(U) FY 1994

- (U) Demonstrated Computer Aided Flaw Detection and Evaluation (CAFDE) Phase I capability at the 9 million electron volt (MeV) computed tomograpy facility for Minuteman stage III. ($130)
- (U) Performed technology insertion studies such as Mk 21 on Minuteman III, Enduring Command and Status Monitoring, and updated the System Options Report. ($1,490)
- (U) Provided inputs in support of the Nuclear Posture Review. Produced an Integrated System Master Plan (ISMP) which identifies efforts to maintain ICBMs to 2020. ($884)

(U) FY 1995

- (U) Performing technology insertion studies such as Minuteman III Gyrocompass Assembly (GCA) Technology Insertion Options, and Future ICBM Applications. ($1,347)
- (U) Performing CSD(M)/Remote Code Change study in response to Nuclear Posture Review (NPR) / Presidetntial Decision Directive (PDD) 30 requirements. ($205)
- (U) Performing life extension and feasibility studies such as Missile Guidance Performance Improvement Options, LF Electronics Life Extension, and Minuteman III Range Cost Reduction. ($1,058)
- (U) Support Long Range Planning tasks, develop the Systems Options Report (SOR), update the Logistics Program Management Plan (LPMP), and update the ICBM Master Plan (IMP). ($595)

*FY94 and Prior Year funds appropriated in a different PE, 11213 Minuteman Squadrons.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #4 Demonstration and Validation | PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val — PROJECT NO.: 4209 |

(U) FY 1996
- (U) Support Long Range Planning tasks, develop the SOR, and update the LPMP and IMP. ($500)
- (U) Plan to perform feasibility and life extension studies such as Weapon System Threat and Mission Assessment, and Post 2020 ICBM Force Structure Options. ($1,597)
- (U) Plan to perform technology insertion studies in support of changing ICBM environments such as Targeting Flexibility. ($521)

(U) FY 1997
- (U) Support Long Range Planning tasks, develop a SOR, and update the LPMP and IMP. ($550)
- (U) Plan to perform technology insertion studies in support of changing ICBM environments and life extension activities. ($329)
- (U) Plan to perform feasibility studies in direct support of Miniteman Life Extension to 2020. ($1,563)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration and Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 4209

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,504* | 3,627 | 4,521 | 4,545 | LOE |
| Appropriated Value | 2,504* | 3,627 | | | |
| Adjustments to Appropriated Value | | | | | |
| Congresional Reductions | | -223 | | | |
| SBIR | | -199 | | | |
| Adjustments to Budget Years Since FY95 PB | | | -1,903 | -2,103 | |
| Current Budget Submit/President's Budget | 2,504* | 3,205 | 2,618 | 2,442 | LOE |

Change Summary Explanation:

(U) Funding: Insignificant changes.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands) Not applicable

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Contract Award | X* | | | | X* | | | | X | | | | X | | | |
| Program Reviews | | X* | X* | | | X | X | | | X | X | | | X | X | |
| Deliverable Reports | | | | X* | | | | X | | | | X | | | | X |

*FY94 funds appropriated in a different PE, 11213 Minuteman Squadrons.

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #4 Demonstration and Validation

PE NUMBER AND TITLE: #0603851F ICBM Modernization Dem/Val

PROJECT NO.: 4209

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Government Engineering Support | 130 | 0 | 0 | 0 |
| Contractor Engineering Support | 1,490 | 2,610 | 2,241 | 2,357 |
| Program Management Support | 884 | 595 | 377 | 387 |
| Total | 2,504 | 3,205 | 2,618 | 2,744 |

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

(U) Performing Organizations: N/A

(U) Government Furnished Property: N/A

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

DATE: February, 1995

BUDGET ACTIVITY: 4 - Demonstration And Validation

PE NUMBER AND TITLE: 0603853F Evolved Expendable Launch Veh (EELV)

PROJECT: 0006

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0006 Evolved Expendable Launch Vehicle* | 10,000 | 29,046 | 39,226 | 57,035 | 0 | 0 | 0 | 0 | 0 | 135,307 |

*** $10M in FY 94 identified in PE 0603226E**

(U) **A. Mission Description and Budget Item Justification**

The Evolved Expendable Launch Vehicle (EELV) program is a space launch vehicle development program. This program concept is based on the DoD's Bottom Up Review (BUR) and the Space Launch Modernization Plan by General Moorman. The purpose of this program is to replace the current fleet of expendable launch vehicles (Titan II, Delta, Atlas, and Titan IV) with a lower cost family of space launch vehicles. Program content includes the development of the design, demonstrations of key technologies, modifications to industrial capability and launch infrastructure, and demonstration flights of first article spacelift vehicles. The EELV family of vehicles must be capable of meeting the DoD's requirements for spacelift, as defined by the National Mission Model (medium and heavy lift). Funding between FY95-FY97 is budgeted in this Budget Activity Research Category because it supports risk reduction and and validation of advanced technologies leading to lower cost expendable launch vehicles.

(U) FY 1994
- (U) FY95 Appropriation Law directed $10 million of FY94 funds be made available for execution of EELV development in FY95.
- (U) Modify AF rocket engine test facilities at Phillips Laboratory (PL) and Arnold Engineering & Development Center (AEDC) ($6,500 FY94 ARPA funding)
- (U) Mission Support ($3,500 FY94 ARPA funding)

(U) FY 1995
- (U) Competitive award of four Risk Reduction (RR) module development contracts ($20,000)
- (U) Compete modifications to AF rocket engine test facilities at PL and AEDC ($7,300)
- (U) Mission Support ($1,746)

(U) FY 1996
- (U) Complete four RR module contracts culminating in a "preliminary design review-like" event and downselect to two contractor concepts to continue into PRE EMD phase ($35,000)
- (U) Mission Support ($4,226)

(U) FY 1997
- (U) Award two PRE EMD phase contracts ($51,000)
- (U) Mission Support ($6,035)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603853F Evolved Expendable Launch Veh (EELV) |
| | PROJECT<br>0006 |

(U) **Acquisition Strategy:**

The EELV concept of a family of launch vehicles emphasizes commonality of hardware and infrastructure to enhance production and operations efficiencies. Cost improvements will be achieved through reduction of supporting infrastructure (launch pads, manufacturing facilities, workforce) and optimization of production and launch operations, processes, and rates. Development contracts will be awarded on the basis of full and open competition. Production contracts will be sole source to a single spacelift provider. The EELV acquisition strategy is outlined in the DoD's Report to Congress.

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 |
| (U) Appropriated Value | | 30,000 | | |
| (U) Adjustments to Appropriated Value | | | | |
| a. Cong Gen Reductions | | -328 | | |
| b. SBIR | | -626 | | |
| c. Cong Directed Addition | +10,000 | | | |
| d. Below Threshold Reprogramming | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | +10,000 | | +39,226 | +57,035 |
| (U) Current Budget Submit/President's Budget | +10,000 | 29,046 | 39,226 | 57,035 |

(U) Change Summary Explanation:

Funding: EELV is a new program. Funding for FY94 and FY95 was initiated by Congress and funding in FY96 and subsequent year funding was requested in the FY96/FY97 Budget Request.

Schedule: New Program.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Atlas Reliability Enhancement Program (AREP) from non-AF budget | | | 76,000 | 15,000 | 7,000 | | | | | |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603853F Evolved Expendable Launch Veh (EELV) |
| | PROJECT<br>0006 |

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | | |
| **Related RDT&E:** | | | | | | | | | | | | | | | | | | |
| (U) EELV EMD (PE 64853F). | | | | | | | | | | | | | | | | | | |
| (U) Medium Launch Vehicles (PE 35119F). | | | | | | | | | | | | | | | | | | |
| (U) Titan Space Launch Vehicles (PE 35144F). | | | | | | | | | | | | | | | | | | |
| **(U) D. Schedule Profile** | | | | | | | | | | | | | | | | | | |
| **Risk Reduction Module** | | | | | | | | | | | | | | | | | | |
| (U) Aquisiton Strategy Panel (ASP) | | | | | | X | | | | | | | | | | | | |
| (U) Defense Acquisition Exec. Review | | | | | | X | X | | | | | | | | | | | |
| (U) Contract Awards | | | | | | | | X | | | | | | | | | | |
| (U) "PDR-like" Event/Downselect | | | | | | | | | | | | X | | | | | | |
| **EMD Part 1 Module** | | | | | | | | | | | | | | | | | | |
| (U) Defense Acquisition Exec. Review | | | | | | | | | | | | X | | | | | | |
| (U) "CDR-like" Event/Downselect | | | | | | | | | | | | | | | | | | X |
| **EMD Part 2 Module** | | | | | | | | | | | | | | | | | | |
| (U) PP/M planned for late-first qtr/early-second qtr FY98 start | | | | | | | | | | | | | | | | | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>4 - Demonstration And Validation | PE NUMBER AND TITLE<br>0603853F Evolved Expendable Launch Veh (EELV) |
| | PROJECT<br>0006 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994* | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Primary Hardware Development | 0 | 20,000 | 35,000 | 51,000 |
| (U) Rocket Engine Test Stand Modifications | 6,500 | 7,300 | 0 | 0 |
| (U) Mission Support | 3,500 | 1,746 | 4,226 | 6,035 |
| (U) Total | 10,000 | 29,046 | 39,226 | 57,035 |

* NOTE: Project costs indicated in FY94 will be incurred in FY95 and funded from ARPAs FY94 Appropriation

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**

Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering & Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 6,224 | 4,680 | 16,892 | 23,529 | 17,985 | 9,875 | 4,928 | 3,268 | Continuing | TBD |
| Proj 2257 - Standard Avionics/Joint Service Review Committee (JSRC) Initiatives | 2,092 | 1,129 | 1,231 | 1,061 | 1,303 | 1,332 | 1,454 | 1,579 | Continuing | TBD |
| Proj 2258 - Inertial Navigation Systems (INS) | 453 | 533 | 533 | 480 | 0 | 0 | 0 | 0 | 0 | 28,753 |
| Proj 3264 - Standard Flight Data Recorder (SFDR) | 823 | 704 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38,599 |
| Proj 4017 - Compass/Attitude & Heading Reference System (C/AHRS) | 2,856 | 2,314 | 3,686 | 2,985 | 465 | 186 | 192 | 197 | Continuing | TBD |
| Proj 2050 - Joint Helmet-Mounted Cueing System (JHMCS) | 0 | 0 | 11,442 | 19,003 | 16,217 | 8,357 | 3,282 | 1,492 | Continuing | TBD |

A. (U) Mission Description and Budget Item Justification

This program element explores and develops standard avionics architecture and equipment which will reduce acquisition and support costs, increase weapon system performance and availability, and foster weapons system interoperability of standard interfaces and components. This program element is devoted to the Engineering and Manufacturing Development (EMD) of standard avionics architecture and equipment. The scope is both domestic and international. Reliability and Maintainability (R&M) play a major role in the identification of specific development efforts within this element as evidenced by the evolution of the Standard Inertial Navigation Unit, the Standard Flight Data Recorder and the Compass/Attitude & Heading Reference System. Joint avionics development efforts are pursued through participation in and support of the Joint Service Review Committee (JSRC). Current initiatives include the Embedded Global Positioning System/Inertial Navigation System, and the Joint Helmet-Mounted Cueing System. Acquisition strategy is incorporated at the project level.

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering & Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 6,570 | 4,824 | 6,237 | 5,298 | TBD |
| Appropriated Value | 6,570 | 4,824 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Undistibuted reductions | | -53 | | | |
| b. Below threshold Reprogramming | -255 | 0 | | | |
| c. Small Business Innovative Research (SBIR) | -91 | -91 | | | |
| Adjustments to Budget Years since FY95 PB | | | 10,655 | 18,231 | |
| Current Budget Submit/President's Budget | 6,224 | 4,680 | 16,892 | 23,529 | TBD |

Change Summary Explanation:

Funding: Below Threshold Reprogramming reduction was part of FY94 Omnibus reprogramming bill. FY95 reduced for FFRDC, Non-FFRDC, University Research, and Travel. FY96 and FY97 increased for the addition of Joint Helmet Mounted Cueing System.

Schedule: No Changes

Technical: No Changes

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

D. (U) Schedule Profile: See individual projects

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2257

PROJECT NO.: 2257

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Proj 2257 - Standard Avionics/Joint Service Review Committee (JSRC) Initiatives | 2,092 | 1,129 | 1,231 | 1,061 | 1,303 | 1,332 | 1,454 | 1,579 | Continuing | TBD |

A. (U) Mission Description and Budget Item Justification

This project identifies/develops candidate architecture standards and systems in the Air Force and through the JSRC. Maintains/updates the common Avionics database to promote aircraft interoperability. Supports international avionics initiatives and standardization activities. Develops an opportunity matrix for tactical and airlift programs to identify opportunities to leverage investments. JSRC is a phase 0 concept studies project that explores candidate avionics systems and designs for potential developmental efforts and aircraft interoperability initiatives.

(U) FY 1994 Program

- (U) Continued front-end work to identify avionics standardization opportunities through Air Force and JSRC. ($213)
- (U) Continued Modular Avionics System Architecture (MASA) demonstration/validation and conducted a Multi-Command Common Radar (MCCR) development (conduct formal System Requirement Review (SRR) on T-38 MASA avionics upgrade). ($983)
- (U) Updated Avionics database and developed opportunity matrix. ($416)
- (U) Program Management Support. ($480)

(U) FY 1995 Program

- (U) Continue T-38 upgrade. ($133)
- (U) MARK XV (Next generation Identification Friend or Foe (IFF)) close-out support. ($88)
- (U) Continue Avionics Roadmap. ($300)
- (U) Continue MASA Electronic Cockpit. ($50)
- (U) Product Group Manager Support. ($170)
- (U) Program Management Support. ($388)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2257 / PROJECT NO. |

A. (U) Mission Description and Budget Item Justification (Cont.)

(U) FY 1996 Planned Program
- (U) Continue tri-service standardization opportunities via the Joint Service Review Committee (JSRC) processes. ($343)
- (U) Product Group Manager Support. ($170)
- (U) Continue Modular Avionics System Architecture (MASA) avionics upgrade. (NSP)
- (U) Continue Avionics Planning Baseline. ($300)
- (U) Program Management Support. ($418)

(U) FY 1997 Planned Program
- (U) Continue tri-service standardization opportunities via the JSRC processes. ($173)
- (U) Product Group Manager Support. ($170)
- (U) Continue Avionics Planning Baseline. ($300)
- (U) Program Management Support. ($418)

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2257

PROJECT NO.: 2257

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Proj 2257 - Standard Avionics/Joint Service Review Committee (JSRC) Initiatives | 2,092 | 1,129 | 1,231 | 1,061 | 1,303 | 1,332 | 1,454 | 1,579 | Continuing | TBD |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,485 | 2,510 | 2,533 | 2,511 | TBD |
| Appropriated Value | 2,485 | 2,510 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | | -53 | | | |
| b. Below Threshold Reprogramming | -302 | -1,237 | | | |
| c. Small business Innovative Research (SBIR) | -91 | -91 | | | |
| Adjustments to Budget Years since FY95 PB | | | -1,302 | -1,450 | |
| Current Budget Submit/President's Budget | 2,092 | 1,129 | 1,231 | 1,061 | TBD |

Change Summary Explanation:

Funding: Below Threshold Reprogramming within PE 64201F in FY94 and FY95 to cover program priority requirements. Reductions in FY95 for FFRDC, Non - FFRDC, University Research, and Travel. FY96 and FY97 RDT&E funds decreased due to reduction in JSRC and Standard Avionics initiatives. FY96 and FY97 also reduced due to realignment of funds within PE 64201F to cover a higher priority requirement in the Inertial Navigation Systems Project (Proj 2258).

Schedule: No Changes

Technical: No Changes

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development

PROJECT NO.: 2257

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Publish Avionics Planning Baseline | ✳ | | | | X | | | | X | | | | X | | | |

✳ - Completed Effort
X - Start of Effort

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE / PROJECT NO.: #0604201F - Aircraft Avionics Equipment Development - 2257

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| - Avionics Database | 416 | 300 | 300 | 300 |
| - Modular Avionics System Architecture (MASA) | 983 | 183 | 0 | 0 |
| - Joint Service Review Committee (JSRC) | 213 | 88 | 343 | 173 |
| - Program Management Support | 480 | 388 | 418 | 418 |
| - Product Group Mgt Spt | 0 | 170 | 170 | 170 |
| Total | 2,092 | 1,129 | 1,231 | 1,061 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands) Not Applicable

Exhibit R-3

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2258

PROJECT NO.

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2258 - Inertial Navigation Systems (INS) | 453 | 533 | 533 | 480 | 0 | 0 | 0 | 0 | 0 | 28,753 |

A. (U) Mission Description and Budget Item Justification

Develop DoD standard Embedded Global Positioning System (GPS)/ Inertial Navigation System (INS) (EGI) Precise Positioning System (PPS), (0.8 nm/h free inertial) Navigation System for Army's OH-58 Kiowa Warrior, Special Operations, Apache AH-64A+ and AH-64 C/D Apache Longbow helicopters, Navy's AH-1W Super Cobra helicopter, F-18 aircraft, EA-6B aircraft, and Air Force F-15 Eagle. Directly tied to the Congressionally mandated Minimum Avionics Requirement (MAR) capability for DoD aircraft and the Joint Chiefs of Staff (JCS) Radio Navigation Master Plan. Develop enhanced accuracy (0.3 nm/hr) Inertial Navigation Unit (INU) for the F-117A aircraft. Continue development of INU depot Support Equipment (SE) for the Standard Ring Laser Gyro (RLG) program. Embedded GPS/INS efforts resulted from a Tri-service acquisition plan. Program currently is in phase III (production). Contracts were awarded on a full and open basis to Honeywell and Litton Industries.

(U) FY 1994 Program (Funded with aircraft Program Element funds)

- (U) Completed system development activities; transfer residual tasks to depot. (Not Separately Priced, NSP)
- (U) Completed Embedded GPS/INU technology risk reduction test program. (NSP)
- (U) Awarded Embedded GPS/INU contract for initial tri-service programs. (NSP)
- (U) Delivered initial integration units to tri-service platforms. (NSP)
- (U) Began Qualification, Testing, and Evaluation (QT&E) program. (NSP)
- (U) Completed Enhanced Accuracy INU (Revision C) testing program for F-117A. (NSP)
- (U) Began Enhanced Accuracy INU (Revision C) integration. (NSP)
- (U) Program Management Support. ($453)

(U) FY 1995 Program (Funded with aircraft Program Element funds.)

- (U) Complete QT&E program. (NSP)
- (U) Complete Enhanced Accuracy INU testing and integration for F-117A. (NSP)
- (U) Program Management Support. ($533)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2258

PROJECT NO.: 2258

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2258 - Inertial Navigation Systems (INS) | 453 | 533 | 533 | 480 | 0 | 0 | 0 | 0 | 0 | 28,753 |

A. (U) Mission Description and Budget Item Justification (Cont.)

(U) FY 1996 Planned Program
- (U) Continue Embedded Global Positioning Satellite (GPS) Inertial Navigation System (INS) (EGI) integration. (NSP)
- (U) Program Management Support. ($533)

(U) FY 1997 Planned Program
- (U) Conduct follow-on EGI procurement source selection. (NSP)
- (U) Program Management Support. ($480)

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 95 | 0 | 0 | 0 | 26,849 |
| Appropriated Value | 95 | | | | |
| Adjustments to Appropriated Value | | | | | |
| Below Threshold Reprogramming | 358 | 533 | | | |
| Adjustments to Budget Years since FY95 PB | | | 533 | 480 | |
| Current Budget Submit/President's Budget | 453 | 533 | 533 | 480 | 28,753 |

Change Summary Explanation:

Funding: FY94 and FY95 Below Threshold Reprogramming and FY96 - FY97 increases to meet Congressionally mandated Minimum Avionics Requirement (MAR) capability for DoD aircraft by the year 2000.

Schedule: FY95/97 tasks added to comply with Congressionally mandated Minimum Avionics Requirement (MAR) capability for DoD aircraft by year 2000. Technical: No Changes

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2258

PROJECT NO.: 2258

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2258 - Inertial Navigation Systems (INS) | 453 | 533 | 533 | 480 | 0 | 0 | 0 | 0 | 0 | 28,753 |

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| - Complete Risk Reduction test program | | | ✷ | | | | | | | | | | | | | |
| - Awarded Tri-service Global Positioning System/ Inertial Navigation Unit (GPS/INU) Contract | | | | ✷ | | | | | | | | | | | | |
| - Complete F-117 Testing | | | | | | X | | | | | | | | | | |
| - Complete Qualification, Testing, and Evaluation (QT&E) | | | | | | | | X | | | | | | | | |

✷ - Completed Effort
X - Planned Effort

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2258

PROJECT NO.: 2258

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Program Management Support | 453 | 533 | 533 | 480 |
| Total | 453 | 533 | 533 | 480 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands) Not Applicable

Exhibit R-3

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 3264

PROJECT NO.

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3264 - Standard Flight Data Recorder (SFDR) | 823 | 704 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38,599 |

A. (U) Mission Description and Budget Item Justification

A Joint Service Review Committee-sponsored initiative to develop a standard crash survivable flight data recorder for various Air Force aircraft. SFDR contract was awarded in Jul 88 to Smith Industries, Firm Fixed Price (FFP). Program is currently in Phase II, (Engineering, Manufacturing, and Development).

(U) FY 1994 Program
- (U) Completed development for Helo (MH-53) application. ($563K)
- (U) Program Mission Support. ($260K)

(U) FY 1995 Planned Program
- (U) Complete Test Program Software Development. ($604K)
- (U) Mission Support. ($100K)

(U) FY 1996 - Not Applicable

(U) FY 1997 - Not Applicable

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 3264

PROJECT NO.

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3264 - Standard Flight Data Recorder (SFDR) | 823 | 704 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38,599 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 856 | 0 | 0 | 0 | 37,928 |
| Appropriated Value | 856 | | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Below Threshold Reprogramming | -33 | 704 | | | |
| Current Budget Submit/President's Budget | 823 | 704 | 0 | 0 | 38,599 |

Change Summary Explanation:

Funding: FY94 Below Threshold Reprogramming within PE 64201F in FY95 to complete Test Program Software (TPS) Development.

Schedule: No Changes

Technical: No Changes

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Integrated Process Team (IPT) Leadership Transfer | | | | ✳ | | | | | | | | | | | | |
| Data Processing Unit Production Deliveries | | | | | | | X | | | | | | | | | |
| TPS Development | | | | | | | X | | | | | | | | | |
| MH-53 SFDR Functional Configuration Audit/ Physical Configuration Audit (FCA/PCA) | | | | | | | | X | | | | | | | | |

✳ - Completed Effort

X - Planned Effort

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: September 1994

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #064201F - Aircraft Avionics Equipment Development - 3264

PROJECT NO.: 3264

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Air Force Helicopter Development | 563 | 0 | 0 | 0 |
| Contractor Residual Tasks | 110 | 0 | 0 | 0 |
| Mission Support | 150 | 100 | 0 | 0 |
| Test Program Sets | 0 | 604 | 0 | 0 |
| Total | 823 | 704 | 0 | 0 |

Exhibit R-3

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 4017

PROJECT NO.: 4017

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4017 - Compass/Attitude & Heading Reference System (C/AHRS) | 2,856 | 2,314 | 3,686 | 2,985 | 465 | 186 | 192 | 197 | Continuing | TBD |

A. (U) Mission Description and Budget Item Justification

Joint Service Review Committee-supported program. Develops functional replacement systems for several existing compass systems and C/AHRS for use in various Air Force and Navy aircraft. Tri-service Memorandum Of Agreement (MOA) includes the Army as a potential user. C/AHRS Is currently in phase II (Engineering, Manufacturing and Development). Contract awarded to Smith Industries, Cost Plus Firm Fixed Fee (CPFF).

(U) FY 1994 Program
- (U) Continued design/development of units for qualification/durability and flight testing. ($2,250)
- (U) Began fabrication of units for flight/qualification/durability testing. ($232)
- (U) Program Management Support. ($374)

(U) FY 1995 Planned Program
- (U) Continue system development. ($805)
- (U) Complete fabrication of units for flight/qualification/durability testing. ($1,000)
- (U) Begin flight/qualification/durability testing. ($233)
- (U) Program Management Support. ($276)

(U) FY 1996 Planned Program
- (U) Complete qualification/durability testing. ($300)
- (U) Continue flight testing. ($604)
- (U) Acquire unique Support Equipment (SE). ($2,482)
- (U) Program Management Support. ($300)

(U) FY 1997 Planned Program
- (U) Mission Support. ($300)
- (U) Acquire unique (SE). ($2,685)

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 4017

PROJECT NO.: 4017

B. (U) Program Change Summary $ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 3,703 | 2,314 | 3,704 | 2,787 | TBD |
| Appropriated Value | 3,703 | | | | |
| Adjustments to Appropriated Value | | | | | |
| Below Threshold Reprogramming | -847 | | | | |
| Adjustments to Budget Years since FY95 PB | | | -18 | 198 | |
| Current Budget Submit/President's Budget | 2,856 | 2,314 | 3,686 | 2,985 | TBD |

Change Summary Explanation:

Funding: FY94 Below Threshold Realignment within PE 64201F to cover program priority requirements. FY96 and FY97 RDT&E reduced for non-pay purchases inflation. FY97 increased to complete qualification/durability testing.

Schedule: No Changes

Technical: No Changes

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development

PROJECT NO.: 4017

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Test Readiness Review | | | | ✳ | | | | | | | | | | | | |
| Qual Test | | | | ✳ | | | | | | | | | | | | |
| Maintainability/Training M/T Demo | | | | ✳ | | | | | | | | | | | | |
| Developmental Test and Evaluation/Initial Operational Test and Evaluation DT&E/IOT&E | | | | | | | X | | | | | | | | | |
| Incremental Functional Configuration Audit/Physical Configuration Audit (FCA/PCA) | | | | | | | X | | | | | | | | | |
| Final FCA | | | | | | | | X | | | | | | | | |
| Option 1 Production decision - Navy | | | | | | | | | | | | X | | | | |
| Exercise Production Option 1 - Navy | | | | | | | | | | | | X | | | | |
| Navy Option 1 deliveries | | | | | | | | | | | | | | | X | |
| PCA | | | | | | | | | | | | | | | | X |
| Option II Production Exercise - AF/Navy | | | | | | | | | | | | | | | | X |
| Option II Production Delivery | | | | | | | | | | | | | | | | |

✳ - Completed Effort
X - Planned Effort

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development

PROJECT NO.: 4017

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Primary Hardware Development | 2,250 | 1,805 | 0 | 0 |
| Developmental Test and Evaluation (DT&E) | 232 | 233 | 904 | 0 |
| Support Equipment Acquisition | 0 | 0 | 2,482 | 2,685 |
| Program Management Support | 374 | 276 | 300 | 300 |
| Total | 2,856 | 2,314 | 3,686 | 2,985 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands) Not Applicable

Exhibit R-3

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2050

PROJECT NO.: 2050

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2050 - Joint Helmet-Mounted Cueing System (JHMCS) | 0 | 0 | 11,442 | 19,003 | 16,217 | 8,357 | 3,282 | 1,492 | Continuing | TBD |

A. (U) Mission Description and Budget Item Justification

This Joint program with the USN will develop a helmet display system, capable of depicting aircraft heading data, pilots viewing perspective, target indication graphics and digital information. Consolidating this information on the pilot's visor allows the pilot to quickly align sensors and weapons on targets and engage threats using High Off-Boresight Angle (HOBA) weapons such as the AIM-9X. The JHMCS includes a helmet with a mounted visor display capability, a helmet-vehicle interface cable, and several other components. JHMCS is currently in phase 0 (Concept Exploration). Demonstration/Validation and Engineering, Manufacturing and Development contracts will be awarded as full and open competition contracts.

(U) FY 1994 - Not Applicable

(U) FY 1995 - Not Applicable

(U) FY 1996 Planned Program

- (U) Initiate Interface Design and interface control documentation. ($3,200)
- (U) Perform integration analysis between the helmet and F-15 and F-18. ($2,300)
- (U) Request For Proposal (RFP) Development. ($1,800)
- (U) Demonstrate prototype concepts for Helmet alternatives. ($2,700)
- (U) Conduct cost benefit studies for Milestone II. ($700)
- (U) Program Management Support. ($742)

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2050

PROJECT NO.: 2050

A. (U) Mission Description and Budget Item Justification (Cont.)

- (U) FY 1997 Planned Program
- (U) Initiate Joint Helmet Mounted Cueing System (JHMCS) Engineering, Manufacturing and Development (EMD) (contract award). ($13,500)
- (U) Conduct Preliminary Design Review (PDR) and Critical Design Review (CDR). ($1,500)
- (U) Determine Maintenance concepts. (NSP)
- (U) Initiate Support Equipment development. ($1,900)
- (U) Program Management Support. ($2,103)

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| Appropriated Value | 0 | | | | |
| Adjustments to Appropriated Value | | | | | |
| General Undistributed Reduction | 0 | | | | |
| Adjustments to Budget Years since FY95PB | | | 11,442 | 19,003 | |
| Current Budget Submit/President's Budget | 0 | 0 | 11,442 | 19,003 | TBD |

Change Summary Explanation:

Funding: FY96 - FY97 funding added to meet requirement for a Helmet Mounted Cueing System as outline in the joint CAF - USN Mission Need Statement 308-93.

Schedule: No Changes

Technical: No Changes

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2050

PROJECT NO.:

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| - Mission Need Statement (MNS) Receipt | | * | | | | | | | | | | | | | | |
| - Joint Operational Requirements Document (JORD) development | | | | | X | | | | | | | | | | | |
| - Milestone 0 Acquisition Decision Memorandum (ADM) | | | | | * | | | | | | | | | | | |
| - Request For Proposal (RFP) release | | | | | | | | | | X | | | | | | |
| - Milestone I/II (EMD Contract Award) | | | | | | | | | | | | | | X | | |

* - Completed Effort
X - Planned Effort

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2050

PROJECT NO.: 2050

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Interface Design and integration | 0 | 0 | 5,500 | 1,500 |
| Initiate EMD Contract Award | 0 | 0 | 0 | 13,500 |
| Request For Proposal | 0 | | | |
| RFP Development | 0 | 0 | 1,800 | 0 |
| Helmet Demonstration | 0 | 0 | 2,700 | 0 |
| Program Management Support | 0 | 0 | 742 | 2,103 |
| Studies/Engineering | 0 | 0 | 700 | 1,900 |
| Total | 0 | 0 | 11,442 | 19,003 |

Exhibit R-3

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604201F - Aircraft Avionics Equipment Development - 2050

PROJECT NO.: 2050

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| TBD | TBD | TBD | TBD | TBD | 0 | 0 | 0 | 8,900 | 14,250 | Continuing | TBD |
| Support and Management Organizations | | | | | | | | | | | |
| Program Management Support | | | | | | | | | | | |
| TBD | TBD | TBD | TBD | TBD | 0 | 0 | 0 | 2,542 | 4,753 | Continuing | TBD |
| Test and Evaluation Organizations | | | | | | | | | | | |
| TBD | TBD | TBD | TBD | TBD | 0 | 0 | 0 | 0 | 0 | Continuing | TBD |
| **TOTAL** | | | | | **0** | **0** | **0** | **11,442** | **19,003** | **Continuing** | **TBD** |

**Government Furnished Property:** TBD

Exhibit R-3

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE |
|---|---|
| #5 - Engineering and Manufacturing Development | #0604218F - Engine Model Derivative Program (EMDP) |

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 841 | 739 | 756 | 739 | 772 | 810 | 834 | 859 | CONT | CONT |

A. (U) Mission Description and Budget Item Justification

(U) EMDP is an engineering development program that provides the latest engine technology advances to current weapon systems and provides a framework for engine development for future systems. EMDP contributes to system life extension, reduced life cycle cost, and enhanced performance. Enhanced performance is required to counter increases in system weight and increased threat capability. EMDP demonstrates derivative engine concepts incorporating advanced technology and components from government and contractor funded programs. EMDP demonstrates advances in performance, durability, operability, supportability, reliability, maintainability, and unique capabilities, such as thrust reversing and vectoring nozzles. These demonstrations are in prototype derivatives of existing engines prior to full scale development. Early demonstration of improved engine characteristics significantly reduces risk and shortens engine development and qualification, allowing quick, cost-effective response to weapon system needs. EMDP also evaluates candidate engines (commercial or military) to provide competitive engine opportunities. EMDP ensures the Air Force has propulsion alternatives to meet near- and far-term needs. EMDP plans for and sustains the engineering development necessary to provide increased performance, reduced life cycle cost and system life extension for air breathing engines for current and future systems. This Program is in Budget Activity/Research Category Engineering and Manufacturing Development because in applies advanced technology to existing engines to demonstrate possible performance improvements.

(Dollars in Thousands)

(U) FY 1994 Accomplishments:

(U) - Completed the F-15/16 Propulsion Roadmap Study . This study was commissioned by Air Combat Command (ACC) to provide propulsion options to first; address deficiencies identified in the Strategic Attack/Interdiction, Close Air Support/ Interdiction and Air Superiority Mission Area Plans (MAPs) and second; reduce the operating and life cycle costs of the weapons systems. This effort began in Feb, 94 and was completed Jan 95. ($616)

(U) - Completed the Maverick Longhorn /Allison model 150 Engine Life Cycle Cost Study . This Study was commissioned by ACC and Aeronautical Systems Center (ASC) to provide options to reduce the development, acquisition and long term support costs of the Model 150 engine which can be applied to various tactical missile systems. The effort began in July 94 and was completed in Jan 95. ($225)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY | PE NUMBER AND TITLE |
| #5 - Engineering and Manufacturing Development | #0604218F - Engine Model Derivative Program (EMDP) |

A. (U) Mission Description and Budget Item Justification (Cont.)
(Dollars in Thousands)

(U) FY 1995 Plans:

(U) - Continue F-15/16 Road mapping efforts. ($30)

(U) - Air Mobility Command (AMC) Noise Suppression/Emission Control Studies - This effort will support AMC by evaluating the available options to meet the impending requirement of Part 36, Stage 3 Noise Compliance Federal Aviation Regulation, as well as European noise and emission standards. This will be done in conjunction with the ongoing Air Mobility Technology Planning Integrated Product Team. These efforts are required to accelerate road mapping of AMC propulsion systems in order to meet the implementation dates required for noise and emission standards. ($269)

(U) - C-130 Propulsion Roadmapping. This effort will support an ACC and SPD (System Program Director) request to provide and evaluate propulsion options for the C-130 aircraft fleet. The goals will be to first address deficiencies identified in the Air Mobility and Special Operations Forces Mission Area Plans, and second to reduce the cost of ownership and life cycle costs of the C-130 weapon systems. ($440)

(U) FY 1996 Plans:

(U) - Road mapping Studies - These efforts are intended to assist the aircraft SPDs, engine System Support Managers (SSMs) and the using commands in developing a long term propulsion plan of enhancements, modifications, and upgrades to meet the unique requirements of each system. The F-111F study done in 1993 and the F-15/16 study just completed are examples of this type of program. The road mapping studies will consume the entire EMDP budget (as currently funded) in future years. Examples of candidate systems for evaluation include A-10, B-1, B-52, C-5, KC-10, C-130, KC-135, C-141, and T-38. ($756)

(U) FY 1997 Plans:

(U) - ($739) Continue Roadmapping Studies - Specifics TBD

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE |
|---|---|
| #5 - Engineering and Manufacturing Development | #0604218F - Engine Model Derivative Program (EMDP) |

B. (U) Program Change Summary ($ in Thousands)

| | FY94 | FY95 | FY96 | FY97 | Total |
|---|---|---|---|---|---|
| Previous President's Budget | 863 | 761 | 760 | 743 | CONT |
| Appropriated Value | 863 | 761 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reduction | -12 | -8 | | | |
| b. SBIR | -10 | -14 | | | |
| Current Budget Submit/President's Budget | 841 | 739 | 756 | 739 | CONT |

Change Summary Explanation:

Funding: Outyear funding reduced for inflation adjustments.
Schedule: None.
Technical: None.

C. (U) Other Program Funding Summary ($ in Thousands): Not applicable.

Related RDT&E:

(U) - PE # 0603202F, Aircraft Propulsion Subsystem Integration, provides fan and low pressure turbine technology.
(U) - PE # 0603216F, Advanced Turbine Engine Gas Generator, provides compressor, combustor, and high pressure turbine technology.
(U) - PE # 0602203F, Aerospace Propulsion, provides additional component and engine test data.
(U) - PE # 0708011F, Industrial Preparedness Program, provides materials processing and component fabrication demonstration.
(U) - Activities conducted by the Army, Navy, National Aeronautics and Space Administration, and propulsion industry Independent Research and Development (IR&D).
(U) - PE # 0604268F, Aircraft Engine Component Improvement Program, complements EMDP by addressing engine safety problems, service-revealed deficiencies, and improved reliability. This PE will change to #0207268F with submission of the FY97 President's Budget.
(U) - The Air Force and Navy have a broad memorandum of understanding for joint cooperative propulsion programs in areas of common interest.
(U) - There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

D. (U) Schedule Profile: Not applicable - On-going level-of-effort program.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE / PROJECT: #0604218F - Engine Model Derivative Program (EMDP)

A. Project Cost Breakdown ($ in Thousands)

TBD - Specific funding levels for FY96 are being developed. The major tasks will be Roadmapping studies by GE, P&W and Allison.

B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations ($ in Thousands) | | | | | | | | | | | |
| P & W | FFP | N/A | N/A | N/A | $923 | $308 | $299 | TBD | TBD | CONT | CONT |
| GE | FFP | N/A | N/A | N/A | $830 | $308 | $0 | TBD | TBD | CONT | CONT |
| Williams Int'l | FFP | N/A | N/A | N/A | $215 | $0 | $0 | TBD | TBD | CONT | CONT |
| Allison | FFP | N/A | N/A | N/A | $369 | $225 | $440 | TBD | TBD | CONT | CONT |
| Teledyne CAE | FFP | N/A | N/A | N/A | $2,882 | $0 | $0 | TBD | TBD | CONT | CONT |
| Allied Signal | FFP | N/A | N/A | N/A | $186 | $0 | $0 | TBD | TBD | CONT | CONT |
| Total | | | | | $5,405 | $841 | $739 | $756 | $739 | CONT | CONT |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 5,365 | 5,609 | 4,822 | 4,855 | 4,834 | 4,813 | 5,008 | 5,074 | Cont | Cont |
| 4236 Engineering Analysis | 1,399 | 1,204 | 710 | 761 | 748 | 746 | 791 | 787 | Cont | Cont |
| 5708 Nuclear Weapons Support | 3,966 | 4,405 | 4,112 | 4,094 | 4,086 | 4,067 | 4,217 | 4,287 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification

(U) Provides funds for maintaining core USAF nuclear weapon system expertise. Includes in-house technical capabilities, contractual efforts, supplies and equipment, travel, and salaries of the San Antonio Air Logistics Center, Product Group Manager for Nuclear Weapons, Nuclear Weapons Integration Division's civilian and military nuclear weapon specialists at Kirtland Air Force Base. Provides technical guidance for continued and improved weapons compatibility, interoperability, safety, surety, security, development, stockpile management and retirement. Customers are: DoD (Air Force, Navy and Defense Nuclear Agency [DNA]), DOE, and NATO. Supports US Strategic Command and Air Combat Command Required Operational Capability 16-71 (Peacekeeper), 12-76 (Air Launched Cruise Missile), 6-76 (B61 Strategic Bomb), 6-69 (B83 Modern Strategic Bomb), and SAC System Operational Requirements Document 13-82-III (Advanced Cruise Missile). Air Force representative for development and implementation of the Joint DoD-DOE Surety Plan. This plan documents nuclear weapon issues which benefit from the application of risk assessment, data collection, and model development. The Nuclear Weapons Integration Division is responsible for all USAF nuclear weapons development, systems engineering, nuclear surety engineering and weapons support procedure changes. These efforts place this project in RDT&E research category/budget activity, Engineering and Manufacturing Development. This work is tied to the DOE nuclear weapons development process independent of the DoD acquisition system. Weapons are always undergoing some form of RDT&E to continually assure safety and reliability as the DoD restructures the nation's nuclear stockpile. Therefore, USAF platforms require continuing engineering development and analysis to ensure compatibility and safety of nuclear systems. Funding this element is essential to maintaining current safety and reliability levels in the US nuclear stockpile.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 5,445 | 5,637 | 5,793 | 5,825 | Cont |
| Appropriated Value | 5,475 | 5,637 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -93 | -28 | | | |
| b. Reprogramming | -17 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -971 | -970 | |
| Current Budget Submit/President's Budget | 5,365 | 5,609 | 4,822 | 4,855 | Cont |

Change Summary Explanation:

Funding: Reduction in FY 96 and beyond due to a decrease in the AF inventory, no new weapon requirements and no new nuclear weapons in production.

Schedule: N/A

Technical: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Support

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

C. (U) Other Program Funding Summary ($ in Thousands)

Not Applicable

Related RDT&E:

- PE 0603851F, ICBM Modernization Dem/Val; PE0604851F, ICBM Modernization EMD.
- PE 0101122F, Air Launched Cruise Missile; PE 0101120F, Advanced Cruise Missile (ACM).
- PE 0101113F, B-52 Squadrons.
- PE 0101118F, Short Range Attack Missile.
- PE 0101126F, B-1B Squadrons; PE 0604240F, B-2 Adv Technology Bomber; PE 0101127F, B-2 Squadrons.
- PE 0207130F/0207134F, F-15 A-D Squadrons/F-15E Squadrons.
- PE 0207590F SEEK EAGLE

D. (U) Schedule Profile

| Technical capabilities maintained for: | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Enduring Stockpile Weapons** | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| - B53 Strategic Bomb | | | | | | | | | | | | | | | | |
| - W80-1 (ALCM, ACM) | | | | | | | | | | | | | | | | |
| - B61-7, B83 Strategic Bombs | (Stockpile Data, i.e., IOC, retirement dates, etc. are classified) | | | | | | | | | | | | | | | |
| - B61-3,4,10 (Tactical Bombs) | | | | | | | | | | | | | | | | |
| - W78, W87 (Minuteman III and Peacekeeper) | | | | | | | | | | | | | | | | |
| **Inactive Stockpile (in Storage)** | | | | | | | | | | | | | | | | |
| - W84 (GLCM) | | | | | | | | | | | | | | | | |
| **Scheduled for Retirement** | | | | | | | | | | | | | | | | |
| - W69 (SRAM A)[1] | | | | | | | | | | | | | | | | |
| - W62 (Minuteman III) | | | | | | | | | | | | | | | | |

*Note 1: Weapons will remain in USAF custody pending DOE scheduling for shipment and dismantlement.*

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Support

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

PROJECT NO.: 4236

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Engineering Analysis | 1,399 | 1,204 | 710 | 761 | 748 | 746 | 791 | 787 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

Funds the engineering analysis performed on contract for all new and fielded nuclear weapon systems. Contractors provide technical expertise unavailable through organic resources in critical areas of nuclear weapons safety and security. Projects and fund allocations have been adjusted to better accommodate reduced funding levels in future years.

(U) FY 1994

- (U) Nuclear Aircraft System Support. Analyzed the Aircraft Monitor and Control (AMAC) software for the B-52 and F-16 software upgrades and provided technical expertise for continued nuclear weapons integration on US and non-US aircraft systems; formatted nuclear weapons loading, delivery, warhead mate and demate technical orders; supported the nuclear hardness data base; and began development of computer aided logistics support (CALS) interconnectivity between the Air Force and DOE for the Joint Nuclear Weapons Publication System (JNWPS). ($350)
- (U) Nuclear Weapons Program Support. Provided technical expertise to support development, fielding and updates of nuclear weapon stockpile-to-target sequences; documented and supported weapon safety analyses; documented and supported all weapon program actions, agreements, and program status; and provided technical support on accident-resistant shipping containers, use control, long-term storage and dismantlement issues to weapon Lead Project Officers. ($745)
- (U) Nuclear Weapons/Systems Assessments. Terminated development of system performance specification for the Nuclear Weapons Data Base (NWDB) to become a functional data base (lack of user interest); supported Phase 1 and 2 of Kirtland Underground Munitions Storage Complex (KUMSC) door seal analysis. ($304)

(U) FY 1995

- (U) Nuclear Aircraft System Support. Revise and verify nuclear weapons loading, delivery, warhead mate and demate technical orders; provide support on the nuclear hardness data base; provide Aircraft Monitor and Control software analysis as required and technical expertise for continued nuclear weapons integration on US and non-US aircraft systems; continue to support development of USAF-DOE interconnectivity to JNWPS. ($295)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 Engineering and Manufacturing Support | PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support — PROJECT NO.: 4236 |

(U) FY 1995 (Cont.)

- (U) Nuclear Weapons Program Support. Provide technical expertise to support development, fielding and updates of nuclear weapon stockpile-to-target sequences; document and support weapon safety analyses; document and support all weapon program actions, agreements, and program status; and provide technical support on accident resistant shipping containers, use control, long-term storage and dismantlement to weapon Lead Project Officers. ($659)
- (U) Nuclear Weapons/Systems Assessments. Provide technical assessments and support on nuclear safety analyses and special studies including support of Phase 2 KUMSC door seal analysis. ($250)

(U) FY 1996

- (U) Nuclear Aircraft System Support. Revise and verify nuclear weapons loading, delivery, warhead mate and demate technical orders; provide support on the nuclear hardness data base; and provide technical expertise for continued nuclear weapons integration on US and non-US aircraft systems; continue to support development of USAF-DOE interconnectivity to JNWPS. ($213)
- (U) Nuclear Weapons Program Support. Provide technical expertise to support development, fielding and updates of nuclear weapon stockpile-to-target sequences; document and support all weapons safety analyses; document and support all weapon program actions, agreements, and program status; provide technical support on accident resistant shipping containers, use control, long-term storage and dismantlement issues to weapon Lead Project Officers. ($297)
- (U) Nuclear Weapons/Systems Assessments. Provide technical assessments and support on nuclear safety analyses and special studies. ($200)

(U) FY 1997

- (U) Nuclear Aircraft System Support. Revise and verify nuclear weapons loading, delivery, warhead mate and demate technical orders; provide support on the nuclear hardness data base; and provide technical expertise for continued nuclear weapons integration on US and non-US aircraft systems; continue to support development of USAF-DOE interconnectivity to JNWPS. ($228)
- (U) Nuclear Weapons Program Support. Provide technical expertise to support development, fielding and updates of nuclear weapon stockpile-to-target sequences; document and support all weapons safety analyses; document and support all weapon program actions, agreements, and program status; provide technical support on accident resistant shipping containers, use control, long term storage and dismantlement issues to weapon Lead Project Officers. ($318)
- (U) Nuclear Weapons/Systems Assessments. Provide technical assessments and support on nuclear safety analyses and special studies. ($215)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Support | #0604222F, Nuclear Weapons Support | 4236 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,145 | 1,204 | 1,264 | 1,315 | Cont |
| Appropriated Value | 1,145 | 1,204 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Realignment between BPAC 5708 and 4236 | +254 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -554 | -554 | |
| Current Budget Submit/President's Budget | 1,399 | 1,204 | 710 | 761 | Cont |

Change Summary Explanation:

Funding: FY 94 BPAC realignment due to increased engineering support requirements. Reduction in FY 96 and beyond due to a decrease in the AF inventory, no new weapon requirements and no new nuclear weapons in production.
Schedule: N/A
Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

Not Applicable

Related RDT&E:

- PE 0603851F, ICBM Modernization Dem/Val; PE0604851F, ICBM Modernization EMD.
- PE 0101122F, Air Launched Cruise Missile; PE 0101120F, Advanced Cruise Missile (ACM).
- PE 0101113F, B-52 Squadrons.
- PE 0101118F, Short Range Attack Missile.
- PE 0101126F, B-1B Squadrons; PE 0604240F, B-2 Adv Technology Bomber; PE 0101127F, B-2 Squadrons.
- PE 0207130F/0207134F, F-15 A-D Squadrons/F-15E Squadrons.
- PE 0207590F SEEK EAGLE.

D. (U) Schedule Profile

Not Applicable

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Support

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

PROJECT NO.: 4236

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Contractor Engineering Support | 1,399 | 1,204 | 710 | 761 |
| Total | 1,399 | 1,204 | 710 | 761 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Miscellaneous | | NA | NA | NA | Cont. | 1,399 | 1,204 | 710 | 761 | Cont | Cont |
| DOE/ALO, Albuquerque, NM | | | | | | | | | | | |
| Picatinney Arsenal, NJ | | | | | | | | | | | |
| TECH REPS, Inc, Albuquerque, NM | | | | | | | | | | | |
| Orion International, Albuquerque, NM | | | | | | | | | | | |
| Naval Air Warfare Center, Indianapolis, IN | | | | | | | | | | | |
| Oklahoma City Air Logistics Center, Tinker AFB, OK | | | | | | | | | | | |
| Silicon Graphics, Albuquerque, NM | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| None | | | | | | | | | | | |
| Test and Evaluation Organizations | | | | | | | | | | | |
| None | | | | | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Support

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

PROJECT: 4236

B. (U) Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:** None

| | Prior to 1994 | Total Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program | |
|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | | | 1,399 | 1,204 | 710 | 761 | LOE | Cont |
| Subtotal Support and Management | | | 0 | | | | | |
| Subtotal Test and Evaluation | | | 0 | | | | | |
| Total Project | | | 1,399 | 1,204 | 710 | 761 | LOE | Cont |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Support

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

PROJECT No.: 5708

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Nuclear Weapons Support | 3,966 | 4,405 | 4,112 | 4,094 | 4,086 | 4,067 | 4,217 | 4,287 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification

Funds San Antonio Air Logistic Center, Nuclear Weapons Integration Division's civilians providing technical support for all new and fielded USAF nuclear weapon systems. Projects and fund allocations have been adjusted to better accommodate reduced funding levels in future years.

(U) FY 1994

- (U) Nuclear Aircraft System Support. Developed H1473/H1545 cargo aircraft and ground handling constraint configurations; supported Nuclear Weapon System Safety Group (NWSSG) action items from the Prime Nuclear Airlift Force (PNAF) Special Safety Study; performed nuclear safety certification assessment of the Air Launched Cruise Missile operational flight software; conducted B-1B block 4.5m3 compatibility test; conducted F-16C/D block 40 tape 4 and block 50 tape 2 nuclear safety analysis; supported nuclear safety certification for F-111 aircraft and weapon systems, and design, development, standardization and procurement of stores management system for nuclear weapons command and control; supported US Strategic Command's nuclear safe escape effort; updated/expanded nuclear hardness data base and indexed nuclear weapons integration technical data; supported nuclear safety certification of C-5B, KC-10 and KC-135 for PNAF missions; provided nuclear surety design criteria, standards, specifications and related requirements documents for all USAF nuclear-capable aircraft weapon systems; continued C-17 nuclear safety certification efforts; revised and validated TO 1F-15E-16, Nuclear Weapons Information and Loading Procedures; completed nuclear safety evaluation of B-52H conventional enhancement modification; and began B-52H nuclear effects vulnerability analyses for sure safe delivery; terminated requirements analysis and system specification development effort for nuclear weapons data base comprised of aircraft compatibility and safety documents and the review of SEEK EAGLE certification package for adaption to nuclear requirements; supported an F-15E NWSSG Operational Safety Review; began to support the B-52H Weapon System Safety Assessment; assumed management of the B-52H Nuclear Project Officers Group; continued B-2A nuclear certification support; and directed a preliminary B-2A Aircraft Monitor and Control Test. ($1,183)
- (U) Nuclear Ground-Launched Missile Support. Supported START I and START II treaties; provided nuclear surety design criteria, standards, specifications and related requirements documents for all USAF ground-launched missile systems; performed safety analyses and independent evaluations for nuclear safety design certification of weapon system modifications; and supported NWSSG safety studies of major Minuteman modifications. ($665)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 Engineering and Manufacturing Support | PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support — PROJECT NO.: 5708 |

(U) FY 1994 (Cont.)

- (U) Nuclear Weapons Program Support. Continued High Power Radio Frequency (HPRF) Phase 2 study; accomplished nuclear weapon safety and compatibility studies, managed USAF nuclear weapon stockpile activities; supported weapon use control; participated in joint DoD/DOE Robust Warhead Assessment and other special studies; supported environmental and intrinsic radiation studies; collected data, analyzed, and characterized hazardous/radioactive waste materials generated during maintenance of special items and developed disposition policy and procedures; developed and fielded alternate storage procedures for reserve and retired systems; and continued support to USAF, DoD and other agencies in all facets of nuclear arsenal. ($1,267)
- (U) Nuclear Weapons/Systems Assessments. Conducted a fault tree analysis of the B61 Inadvertent Nuclear Detonation Assessment; completed fault tree analyses of W80, W78/W87 weapons and B-2 systems; proposed revised Air Force Materiel Command nuclear policy; conducted KUMSC containment calculations of detonation by-products for existing blast door configuration; assisted DNA in PNAF portion of W78/W87 system safety study; developed joint DoD/DOE nuclear surety assessment methodology. ($851)

(U) FY 1995

- (U) Nuclear Aircraft System Support. Continue FY 1994 level of effort: continue support to US Strategic Command's nuclear safe escape effort; update/expand nuclear hardness data base; support NWSSG action items and Operational Safety Reviews as required; perform nuclear safety certification assessments; conduct nuclear safety analyses; support design, development, standardization and procurement of stores management system for nuclear weapons command and control; provide nuclear surety design criteria, standards, specifications and related requirements documents for all USAF nuclear-capable aircraft weapon systems; support the B-52H Weapon System Safety Assessment; manage the B-52H Nuclear Project Officers Group; develop software to institute the nuclear aircraft weapon system surveillance test program; continue C-17 nuclear safety certification efforts; perform an independent analysis of the B-1B block 4.8 Avionics Operational Flight Software for nuclear certification; direct a B-1B block 4.7 software Aircraft Monitor and Control Test. ($1,300)
- (U) Nuclear Ground-Launched Missile Support. Continue FY 1994 level of effort: continue to support START I and START II treaties; provide nuclear surety design criteria, standards, specifications and related requirements documents for all USAF ground-launched missile systems; perform safety analyses and independent evaluations for nuclear safety design certification of weapons system modifications; support NWSSG safety studies. ($750)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 Engineering and Manufacturing Support | PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support — PROJECT NO.: 5708 |

(U) FY 1995 (Cont.)

- (U) Nuclear Weapons Program Support. Continue FY 1994 level of effort: complete and document HPRF Phase 2 study, initiate follow-on studies to HPRF in support of US Strategic Command; accomplish nuclear weapon safety and compatibility studies, support USAF nuclear weapon stockpile activities; conduct follow-on studies to the advanced weapons technology study; support non-proliferation technology studies; support DOE phase 1 and 2 studies and joint DoD/DOE special studies; support environmental and intrinsic radiation studies; continue support to USAF, DoD and other agencies in all facets of nuclear arsenal. ($1,365)
- (U) Nuclear Weapons/Systems Assessments. Continue FY 1994 level of effort: continue to develop joint DoD/DOE nuclear surety assessment methodology; conduct fault tree analyses of W80 Inadvertent Nuclear Detonation study and for other nuclear weapons and weapon systems; provide other special assessments as required; and assist HQ DNA in B-52 Nuclear Weapons Assessment. ($990)

(U) FY 1996

- (U) Nuclear Aircraft System Support. Continue FY 1995 level of effort: continue support to US Strategic Command's nuclear safe escape effort; update/expand nuclear hardness data base; conduct nuclear aircraft weapon system surveillance test program; support NWSSG action items and Operational Safety Reviews as required; perform nuclear safety certification assessments; conduct nuclear safety analyses; support design, development, standardization and procurement of stores management system for nuclear weapons command and control; provide nuclear surety design criteria, standards specifications and related requirements documents for all USAF nuclear-capable aircraft weapon systems; manage the B-52H Nuclear Project Officers Group; complete analysis for C-17 nuclear safety certification; perform an independent analysis of B-2A block 20 software; and direct an Aircraft Monitor and Control Test. ($1210)
- (U) Nuclear Ground-Launched Missile Support. Continue FY 1995 level of effort: continue to support START I and START II treaties; provide nuclear surety design criteria standards specifications and related requirements documents for all USAF ground-launched missile systems; perform safety analyses and independent evaluations for nuclear safety design certification of weapons system modifications; support NWSSG safety studies. ($755)
- (U) Nuclear Weapons Program Support. Reduce FY 1995 level of effort in Advanced Concepts: accomplish nuclear weapon safety and compatibility studies, support USAF nuclear weapon stockpile activities and weapon use control analysis techniques; support non-proliferation technology studies; support environmental and intrinsic radiation studies; continue support to USAF, DoD and other agencies in all facets of nuclear arsenal. ($1160)
- (U) Nuclear Weapons/Systems Assessments. Continue FY 1995 level of effort: continue to develop joint DoD/DOE nuclear surety assessment methodology; conduct fault tree analyses of nuclear weapons and weapon systems; provide other special assessments as required. ($987)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 Engineering and Manufacturing Support | PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support — PROJECT NO.: 5708 |

(U) FY 1997

- (U) Nuclear Aircraft System Support. Continue FY 1996 level of effort: continue support to US Strategic Command's nuclear safe escape effort; update/expand nuclear hardness data base; conduct the nuclear aircraft weapon system surveillance test program; support NWSSG action items and Operational Safety Reviews as required; perform nuclear safety certification assessments; conduct nuclear safety analysis; support design, development, standardization and procurement of stores management system for nuclear weapons command and control; provide nuclear surety design criteria, standards specifications and related requirements documents for all USAF nuclear-capable aircraft weapon systems; perform an independent analysis of B-2A block 30 software and direct an Aircraft Monitor and Control Test. ($1131)
- (U) Nuclear Ground-Launched Missile Support. Continue FY 1996 level of effort: continue to support START I and START II treaties; provide nuclear surety design criteria standards specifications and related requirements documents for all USAF ground-launched missile systems; perform safety analyses and independent evaluations for nuclear safety design certification of weapons system modifications; support NWSSG safety studies. ($782)
- (U) Nuclear Weapons Program Support. Continue FY 1996 level of effort: accomplish nuclear weapon safety and compatibility studies, support USAF nuclear weapon stockpile activities and weapon use control analysis techniques; support nonproliferation technology studies; support environmental and intrinsic radiation studies; continue support to USAF, DoD and other agencies in all facets of nuclear arsenal. ($1189)
- (U) Nuclear Weapons/Systems Assessments. Continue FY 1996 level of effort: continue to develop joint DoD/DOE nuclear surety assessment methodology; conduct fault tree analyses of nuclear weapons and weapon systems; provide other special assessments as required. ($992)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Support | #0604222F, Nuclear Weapons Support | 5708 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,300 | 4,433 | 4,529 | 4,510 | Cont |
| Appropriated Value | 4,330 | 4,433 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -93 | -28 | | | |
| b. Reprogramming | -17 | | | | |
| c. Realignment between BPAC 5708 and 4236 | -254 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -417 | -416 | |
| Current Budget Submit/President's Budget | 3,966 | 4,405 | 4,112 | 4,094 | Cont |

Change Summary Explanation:

Funding: FY 94 BPAC realignment due to increased engineering support requirements. Reduction in FY 96 and beyond due to a decrease in the AF inventory, no new weapon requirements and no new nuclear weapons in production.

Schedule: N/A

Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

Not Applicable

Related RDT&E

- PE 0603851F, ICBM Modernization Dem/Val; PE0604851F, ICBM Modernization EMD.
- PE 0101122F, Air Launched Cruise Missile; PE 0101120F, Advanced Cruise Missile (ACM).
- PE 0101113F, B-52 Squadrons.
- PE 0101118F, Short Range Attack Missile.
- PE 0101126F, B-1B Squadrons; PE 0604240F, B-2 Adv Technology Bomber; PE 0101127F, B-2 Squadrons.
- PE 0207130F/0207134F, F-15 A-D Squadrons/F-15E Squadrons.
- PE 0207590F SEEK EAGLE.

D. (U) Schedule Profile

Not Applicable

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Support

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

PROJECT NO.: 5708

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Program Management Personnel | 235 | 240 | 234 | 234 |
| Research Personnel | 2,712 | 2,712 | 2,720 | 2,870 |
| Travel | 300 | 300 | 400 | 275 |
| Training Development | 130 | 150 | 150 | 150 |
| Research Support Equipment Acquisition | 178 | 400 | 145 | 125 |
| Miscellaneous | 411 | 603 | 463 | 440 |
| Total | 3,966 | 4,405 | 4,112 | 4,094 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations, | | | | | | | | | | | |
| SA-ALC/NWI | Appr | NA | NA | NA | Cont | 3,966 | 4,405 | 4,112 | 4,094 | Cont | Cont |
| Support and Management Organizations, | | | | | | | | | | | |
| None | | | | | | | | | | | |
| Test and Evaluation Organizations | | | | | | | | | | | |
| None | | | | | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Support

PE NUMBER AND TITLE: #0604222F, Nuclear Weapons Support

PROJECT: 5708

B. (U) Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:** None

| | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | Cont | 3,966 | 4,405 | 4,112 | 4,094 | Cont | Cont |
| Subtotal Support and Management | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | |
| Total Project | Cont | 3,966 | 4,405 | 4,112 | 4,094 | Cont | Cont |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5: Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 48,432 | 75,920 | 173,838 | 150,620 | 130,501 | 251,074 | 199,125 | 257,960 | 258,255 | 1,545,725 |
| 4143 Conventional Weapons Upgrade | 48,432 | 73,467 | 155,922 | 106,539 | 81,750 | 160,040 | 139,547 | 162,280 | 195,239 | 1,123,216 |
| 1019 Electronic Countermeasures (ECM) Improvements | 0 | 2,453 | 3,092 | 33,038 | 34,822 | 77,702 | 54,206 | 81,956 | TBD | 287,269 |
| 1020 Avionics/Weapon/Electronic (A/W/E) Module for Air Force Mission Support System (AFMSS) | 0 | 0 | 6,168 | 6,168 | 4,079 | 0 | 0 | 0 | 0 | 16,415 |
| 1021 B-1 Simulator | 0 | 0 | 8,656 | 4,875 | 9,850 | 13,332 | 5,372 | 13,724 | 63,016 | 118,825 |

A. (U) Mission Description and Budget Item Justification

(U) With the drawdown of forward-based US ground, naval, and tactical air forces, current defense strategy calls for long range, conventionally armed strategic bombers to play a major role in the initial stages of a regional contingency. The procurement cap of B-2s and the reduced B-52 fleet make the B-1B Lancer the centerpiece of the bomber force -- B-1s will constitute half of all US strategic bombers. To maximize its contribution in this role, the Air Force must enhance the B-1's capability to perform precision attacks against moderately defended targets deep in enemy airspace. The needed enhancements fall primarily into two categories: improved lethality through integration of advanced conventional weapons and improved survivability through upgrades to the electronic countermeasures (ECM) system. The Air Force established the Conventional Mission Upgrade Program (CMUP) to fulfill these requirements.

(U) This Program Element provides RDT&E funding for CMUP. The program integrates Cluster Bomb Units (CBUs), the Joint Direct Attack Munition (JDAM), and Joint Stand-Off Weapon (JSOW). Parallel and complimentary enhancements include upgrades to the existing ECM suite, an upgrade to the aircraft computer system necessary to handle the advanced weapons and ECM requirements, development of an interface to the Air Force standard mission planning system for more effective employment of the B-1 in a theater scenario, and upgrades to the air crew and maintenance training simulators to keep them consistent with the aircraft's configuration. The program includes work in both Research Category/Budget Activity Concept Demonstration and Validation (ECM, JSOW) and Engineering and Manufacturing Development (CBUs, JDAM, Computer), and is divided into four Projects as follows:

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>**#5: Engineering and Manufacturing Development** | PE NUMBER AND TITLE<br>**0604226F; B-1** |

(U) **Project 4143**: The Conventional Weapons Upgrade Program (CWUP) supports B-1 capability enhancements to improve aircraft effectiveness in conventional operations. These improvements integrate conventional weapons (including advanced precision guided munitions) and upgrade the computer suite to handle the advanced weapons requirements (as well as significantly improving computer reliability and maintainability). Specific B-1 conventional modifications include integration of CBUs and Wind Corrected Munitions Dispenser (WCMD) kits (an ACAT III program), JDAM (ACAT ID), JSOW (ACAT ID), and aircraft enhancements necessary to carry these weapons. Aircraft enhancements included under the JDAM integration effort include: an anti-jam secure-voice radio (communications upgrade) for improved capability to operate within force packages, a Mil-Std-1760 electrical interconnection system which provides a common interface between different aircraft and precision weapons, Global Positioning System (GPS) capability for Congressionally directed navigation enhancements and providing required position updates to precision weapons, and a computer upgrade for improved weapons stores management (plus reliability and maintainability improvements).

(U) **Project 1019**: The Defensive Systems Upgrade Program (DSUP), provides for Electronic Countermeasures (ECM) improvements needed to support B-1 conventional operations at medium to high altitudes in low to medium threat environments. The B-1 needs survivability enhancements in this regime to maximize effectiveness of the weapons capabilities provided under Project 4143. The DSUP is now restructured as an integrated and incremental program -- matching specific ECM improvements to mission requirements based on priority threats at discrete points in time. Priority threats will be those which the user determines are most critical to counter in a typical B-1 mission supporting Defensive Planning Guidance scenarios. These defensive system enhancements will concentrate on three areas: situational awareness, countermeasures effectiveness and reliability and maintainability.

(U) **Project 1020**: This project provides improved B-1 mission planning capabilities by supplementing the ongoing Air Force Mission Support System (AFMSS) program with an aircraft specific software module. Automated mission planning systems traditionally have been developed and deployed by individual Air Force operating commands to support their assigned aircraft and weapons systems. The Air Force is now transitioning to a standard system, the AFMSS. While AFMSS provides common mission planning capabilities for all aircraft, the avionics, weapons and electrical (A/W/E) subsystems on each type aircraft require unique interfaces and functionality not provided by the AFMSS "core" system. This project provides those aircraft unique interfaces; the B-1 A/W/E software module will supplement the AFMSS core capabilities to achieve enhanced route planning, penetration, and weapons delivery capabilities. AFMSS replaces an aging mission planning system which is no longer fully supportable and does not meet current mission requirements. This A/W/E module will be developed concurrently with the AFMSS core software and the B-1 operational flight programs.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: **#5: Engineering and Manufacturing Development** | PE NUMBER AND TITLE: **0604226F; B-1** |

(U) **Project 1021**: This project provides updates to the existing training system necessary to match changes made to the aircraft described in the other projects. The total B-1 Training System (TS) consists of the Simulator System (SS) to train air crew members and Maintenance Training Equipment (MTE) to train maintenance personnel. The SS is actually a suite of systems which provides the necessary visual, motion and aural cues for complete ground training of B-1 air crew members -- there are 5 Weapon System Trainers, 5 Cockpit Procedure Trainers, 2 Mission Trainers, 1 Training System Support Center (TSSC) and 1 Data Base Transformation System (DBTS). The TSSC includes the computational system resources required to support software, hardware and firmware changes. The DBTS consists of transformation programs, commercial computers and printers located at the Defense Mapping Agency Aerospace Center, which provide terrain and feature updates. The MTE provides maintenance training for simulation of fault isolation and remove/replace of all B-1 aircraft systems. The MTE, also a suite of systems, includes 8 Avionics/Armament Maintenance Training Systems, 10 Simulator Maintenance Training Systems, 1 Primary/Secondary Flight Control System Maintenance Trainer and 1 TSSC to support software, hardware and firmware change.

(U) Acquisition Strategy: These major projects will be accomplished during three phases through block upgrades. Phase I, "Enhanced Capability", contains the Block C upgrade consisting of CBU integration. Phase II, "Near Precision Capability," contains both Blocks D and E upgrades. Block D includes GPS, anti-jam secure voice radio, JDAM, and Mil-Std-1760 integration. Block E includes the computer, the first increment of DSUP, and WCMD upgrades. Additional DSUP increments will be incorporated into subsequent upgrade blocks. Phase III, "Standoff Capability," contains the Block F JSOW integration upgrade. AFMSS and Simulator upgrades will be released periodically during Phases I, II, and III. Ongoing sustainment software changes to the aircraft are now also being prioritized and phased into the appropriate "blocks" to maximize mission effectiveness and resource use.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5: Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 49,000 | 74,119 | 162,116 | 160,982 | 1,748,813 |
| Appropriated Value | 49,000 | 74,119 | | | |
| Changes to Appropriated Value | | | | | |
| a. Congressional General Reduction | | - 806 | | | |
| b. SBIR | - 563 | - 1,392 | | | |
| c. Below Threshold Reprogramming | - 5 | + 3,999 | | | |
| Adjustments to Budget Years Since FY95 PB | | | +11,722 | -10,362 | |
| Current Budget Submit/President's Budget | 48,432 | 75,920 | 173,838 | 150,620 | 1,545,725 |

(U) Change Summary Explanation:

(U) Funding: See Project Level R-2 Exhibits.
(U) Schedule: See Project Level R-2 Exhibits.
(U) Technical: See Project Level R-2 Exhibits.

C. (U) Other Program Funding Summary ($ in Thousands)

| | To 1994 | Total 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Compl | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, Air Force | | | | | | | | | | |
| PE 11126F BP 11 B-1 Modifications | | 10,300 | 22,700 | 46,000 | 66,100 | 76,500 | 67,213 | 19,900 | 764,100 | 1,072,813 |
| AFMSS-PE 11126F | | | | | | | | | | |
| Appn 3400 O&M, PE 28006F | | | | 500 | 1,500 | 1,500 | | | | 3,500 |
| Appn 3080 Other Procurement, Budget Activity 83 | | | 983 | | | | | | | 983 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 4143

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4143 Conventional Weapons Upgrade | 48,432 | 73,467 | 155,922 | 106,539 | 81,750 | 160,040 | 139,547 | 162,280 | 195,239 | 1,123,216 |

A. (U) Mission Description and Budget Item Justification

(U) The B-1 will deliver the lion's share of the heavy bomber fleet's conventional weapons in future conflicts. Current B-1 conventional combat capability is optimized for delivery of MK-82 non- precision 500 pound gravity bombs. Project 4143 provides RDT&E funding for increasing B-1 conventional weapons employment capability by upgrading the following systems:

- (U) CBUs: Modify some of the existing B-1 conventional bomb modules (now used only for MK-82 bombs) for integration of cluster bomb units (CBUs)
- (U) GPS: Incorporate Global Positioning System (GPS) capability for more precise long range navigation, TACAN emulation, and weapons delivery
- (U) Secure Communications: Integrate the ARC-210 "have quick" secure/anti-jam communications system for improved capability to operate within force packages
- (U) JDAM: Modify B-1 rotary launcher and develop interfaces for the Joint Direct Attack Munition (JDAM) and other advanced conventional weapons
- (U) Mil-Std-1760: Incorporate Mil-Std-1760 weapons interface required for use with JDAM and other future precision weapons
- (U) Computers: Upgrade the current avionics computer complex, which suffers from memory, throughput, and R&M limitations. A specific architecture will be selected in FY96. The goal is a modern avionics computer suite which provides expanded memory and throughput for enhanced fault isolation/detection, improved maintainability and improved stores management and growth capacity for the future advanced weapons
- (U) Advanced Munitions: Develop necessary modifications to integrate Joint Standoff Weapon (JSOW) and Follow-On Weapons.

(U) Acquisition Strategy: The conventional weapons upgrade program (CWUP) is accomplished in three phases. In each phase cost type contracts are used for EMD and fixed price contracts for production/mod kits:

- (U) Phase I: Enhanced capability (but unguided) weapons (CBU) integration
- (U) Phase II: Near precision weapons (JDAM) integration and Congressionally-directed demonstration of the feasibility of adding a GPS-aided targeting system (designated as the Relative Targeting System (RTS) on B-1). These are divided into three sub-phases:
  - (U) Phase IIA: Pre-EMD (design analyses, trade studies, engineering work leading up to the hardware preliminary design review)
  - (U) Phase IIB: EMD (Continued development effort through flight test, kit proof and physical configuration audit)
  - (U) Phase IIC: Production (modification kits)

- (U) Phase III: Precision weapons with standoff capability (JSOW/Follow-On Weapons)

(U) Rockwell International, El Segundo, CA, and the Boeing Company, Seattle, WA, are associate contractors for Phase I. The Air Force selected Rockwell International to be the integrating contractor to manage Phase II and Phase III upgrade. Rockwell International is the prime contractor for Phase II with the Boeing Company as their major team member. A sole-source contract for Phase IIB EMD is expected to be awarded to Rockwell in Mar 95.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 4143 |

(U) Government organizations responsible for development efforts include: the B-1 System Program Office (SPO) and Simulator Systems SPO at ASC, Wright-Patterson AFB, OH, and at Oklahoma City Air Logistics Center (OC-ALC), Tinker AFB, OK; Rome Laboratories, Griffiss AFB, NY; Warner Robins Air Logistics Center (WR-ALC), Robins AFB, GA; the Air Force Operational Test and Evaluation Center (AFOTEC), Kirtland AFB, NM; Air Force Flight Test Center, Edwards AFB, CA; JDAM/JSOW SPO, Eglin AFB, FL; GPS Joint SPO (JPO), Los Angeles AFB, CA; and AFMSS SPO, ESC, Hanscom AFB, Mass.

(U) This project is categorized as Research Category EMD program because it is an operational weapon system with an ongoing development program which will upgrade conventional weapons capability.

(U) FY 1994
- (U) Conduct Congressionally-directed Relative Targeting System (RTS) demonstration ($8,001)
- (U) Continue Phase I activities for Cluster Bomb Unit (CBU) integration through Critical Design Review (CDR) and flight test planning ($10,003)
- (U) Continue Phase IIA pre-Engineering and Manufacturing Development (EMD) activities for Joint Direct Attack Munition (JDAM), Mil-Std-1760, Global Positioning System (GPS), and Communications ($21,364)
- (U) Simulator upgrades to keep the training system consistent with aircraft modifications prior to block B/C integration ($1,209)
- (U) Release RFP for Phase IIB (EMD) contract for prime contractor for integration of JDAM, Mil-Std-1760, GPS, and Secure Communications ($0)
- (U) Mission Support/Other ($6,811)
- (U) Continue instrumentation upgrade of the flight test aircraft and conduct ground tests ($1,044)

(U) FY 1995
- (U) Complete Phase I contract and flight test activities for CBUs ($13,269)
- (U) Simulator upgrades to keep the training system consistent with aircraft modifications prior to block B/C integration ($4,300)
- (U) Complete Phase IIA contract activities for JDAM, Mil-Std-1760, GPS and Communications Upgrade ($4,851)
- (U) Award Phase IIB (EMD) contract to prime contractor; begin development activities for integration of JDAM, Mil-Std-1760, GPS, and Secure Communications ($45,784)
- (U) Mission Support/Other ($5,263)

(U) FY 1996
- (U) Continue Phase IIB contract activities for JDAM, 1760, GPS and Secure Communications flight test planning ($119,481)
- (U) Engineering Change Proposal to Phase IIB contract for Wind Corrected Munitions Dispenser (WCMD) kit integration ($2,500)
- (U) Government flight test in support of Phase IIB ($15,090)
- (U) Mission Support/Other ($18,851)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 4143 |

(U) FY 1997
- (U) Continue Phase IIB contract activities for JDAM, 1760, GPS and Secure Communications. ($62,815)
- (U) Continue WCMD activities. ($8,500)
- (U) Government flight test in support of Phase IIB. ($13,794)
- (U) Mission Support/Other. ($21,430)

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 49,000 | 71,619 | 130,016 | 98,782 | 1,100,620 |
| Appropriated Value | 49,000 | 71,619 | | | |
| Changes to Appropriated Value | | | | | |
| a. Congressional Reduction | | - 806 | | | |
| b. SBIR | - 563 | - 1,345 | | | |
| c. Below Threshold Reprogramming | - 5 | + 3,999 | | | |
| Adjustments to Budget Years Since FY95 PB | | | +25,906 | +7,757 | |
| Current Budget Submit/President's Budget | 48,432 | 73,467 | 155,922 | 106,539 | 1,123,216 |

(U) Change Summary Explanation:

(U) Funding: FY95 $24.9 million inflation adjustment was applied only to Project 4143. Subsequently, funds were realigned. Rates resulted in increases to FY00+ years not part of FY95 budget program (FY95-FY99).

(U) Schedule: B-1/JDAM Integration efforts were pulled back to meet JDAM weapon DT&E and OT&E to support JDAM weapon LRIP and MSIII decisions.

(U) Technical:The WCMD effort was added during AF POM process to replace the existing tail assembly with a modified fin assembly containing an inertial guidance element electronics package, fin actuator system, movable fins, and an electrical interface to the aircraft.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 4143

C. (U) Other Program Funding Summary ($ in Thousands)

| | To 1994 | Total 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Compl | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, Air Force - B-1 Modifications | 0 | 10,300 | 22,700 | 46,000 | 66,100 | 76,500 | 67,213 | 19,900 | 156,600 | 465,313 |

(U) Related RDT&E
- (U) Program Element #0101126F, B-1 Squadrons
- (U) Program Element #0305164F, Global Positioning System (GPS)
- (U) Program Element #0604618F/N, Joint Direct Attack Munition (JDAM)
- (U) Program Element #0604727F/N, Joint Stand-Off Weapon (JSOW)
- (U) Program Element #0604604F, Wind Corrected Munitions Dispenser (WCMD)
  - - (U) Funding will move into Program Element #0604600F, Wind Corrected Munitions Dispenser (WCMD), in FY96
- (U) Program Element #0208006F, Air Force Mission Support System (AFMSS)
- (U) Program Element #0207130F, F-15 (Contributes to simulator IVACC).
- (U) Program Element #0207133F, F-16 (Contributes to simulator IVACC).

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 4143 |

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) **Acquisition Milestones** | | | | | | | | | | | | | | | | |
| - (U) SSC MSII Decision | | | | | | X* | | | | | | | | | | |
| - (U) Phase I EMD Complete | | | | | | | | X | | | | | | | | |
| - (U) Phase I RAA (CBU) | | | | | | | | | | | X | | | | | |
| - (U) Phase I FOC | | | | | | | | | | | | | | | X | |
| (U) **Engineering Milestones** | | | | | | | | | | | | | | | | |
| - (U) Phase I CDR (CBU) | | X* | | | | | | | | | | | | | | |
| - (U) Phase II PDR (GPS/COMMS, JDAM/1760) | | | | | | X* | | | | | | | | | | |
| - (U) Phase II CDR (GPS/COMMS) | | | | | | | | | | | X | | | | | |
| - (U) Phase II CDR (JDAM/1760) | | | | | | | | | | | X | | | | | |
| (U) **T&E Milestones** | | | | | | | | | | | | | | | | |
| - (U) Start Phase I CBU Flight Test | | | | | X* | | | | | | | | | | | |
| - (U) Start Phase II GPS/COMMS Flight Test | | | | | | | | | | | | | | | | X |
| (U) **Contract Milestones** | | | | | | | | | | | | | | | | |
| - (U) Phase II EMD | | | | | | X | | | | | | | | | | |
| - (U) Phase I Production | | | | | | | X | | | | | | | | | |
| - (U) Phase II Production (GPS/COMM)(Group A) | | | | | | | | | | | | | | | | X |
| - (U) Phase II Production (GPS/COMM) (Group B) | | | | | | | | | | | | | | X | | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 4143 |

(U) Milestones Beyond BY2

| | |
|---|---|
| (U) **Acquisition Milestones** | |
| (U) Limited Operational Capability (GPS/COMMS) | 2QFY99 |
| (U) Full Operational Capability (GPS/COMMS) | 4QFY00 |
| (U) Limited Operational Capability (JDAM/1760) | 1QFY01 |
| (U) Full Operational Capability (JDAM/1760) | 3QFY02 |
| (U) Limited Operational Capability (Computer) | 1QFY03 |
| (U) Limited Operational Capability (WCMD) | 1QFY03 |
| (U) Limited Operational Capability (JSOW/Follow-on Weapons) | 4QFY03 |
| (U) Full Operational Capability (WCMD) | 1QFY05 |
| (U) Full Operational Capability (JSOW/Follow-on Weapons) | 3QFY05 |
| (U) Full Operational Capability (Computer) | 4QFY06 |
| (U) **Engineering Milestones** | |
| (U) Phase II CDR (Computer) | 1QFY01 |
| (U) **T&E Milestones** | |
| (U) Begin Flight Test (GPS/COMM/JDAM/1760) | 4QFY97 |
| (U) Complete Flight Test (GPS/COMM) | 3QFY98 |
| (U) Begin Flight Test (Computer) | 3QFY00 |
| (U) Begin Flight Test (WCMD) | 3QFY00 |
| (U) Complete EMD/Flight Test (WCMD) | 4QFY00 |
| (U) Complete Flight Test (Computer) | 2QFY01 |
| (U) Begin Flight Test (JSOW/Follow-on Weapons) | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 4143 |

(U) **Contract Milestones**

| | |
|---|---|
| (U) Phase II Production (JDAM/1760) | 2QFY99 |
| (U) Phase II Production (GPS/COMM) (Group A) | 4QFY97 |
| (U) Phase II Production (GPS/COMM) (Group B) | 2QFY97 |
| (U) Phase III EMD (JSOW/Follow-on Weapons) | 3QFY99 |
| (U) Phase II Production (WCMD) | 1QFY01 |
| (U) Phase II Production (Computer) | 4QFY01 |
| (U) Phase III Production (JSOW/Follow-on Weapons) | 4QFY02 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 4143 |

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| (U) Major Contract: | | | | |
| (U) Phase I | 9,803 | 4,092 | 0 | 0 |
| (U) Phase IIA | 21,938 | 4,851 | 0 | 0 |
| (U) Phase IIB | 0 | 46,321 | 119,481 | 62,815 |
| (U) RTS Demo | 7,941 | 0 | 0 | 0 |
| (U)Simulator Contract* | 2,191 | 4,300 | 0 | |
| (U) WCMD | 0 | 0 | 2,500 | 8,500 |
| (U) Other Government Costs: | | | | |
| (U) Government Test | 1,232 | 8,640 | 15,090 | 13,794 |
| (U) Mission Support/OGC | 5,327 | 5,263 | 18,851 | 21,430 |
| (U) Total | 48,432 | 73,467 | 155,922 | 106,539 |

* Note: The Simulator contract shown for FY94 and FY95 keeps the training system consistent with aircraft modifications prior to block B/C integration. The money for FY96 and FY97 is allocated under Project 1021.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 4143

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| RI - CBUs | SS/CPFF | 93 | 5,553 | 5,553 | 3,600 | 1,953 | 0 | 0 | 0 | 0 | 5,553 |
| RI - CBUs | SS/CPFF | 1/94 | 7,810 | 7,810 | 0 | 5,850 | 1,960 | 0 | 0 | 0 | 7,810 |
| Boeing CBUs | SS/CPFF | | 5,795 | 5,795 | 1,500 | 2,200 | 2,132 | 0 | 0 | 0 | 5,832 |
| RI-PH IIA | SS/CPAF | 8/93 | 78,186 | 78,186 | 50,571 | 20,774 | 4,851 | 0 | 0 | 0 | 76,196 |
| RI-PH IIB | SS/CPAF | 3/95 | N/A | N/A | 0 | 0 | 42,024 | 116,098 | 71,315 | 163,566 | 393,003 |
| LORAL/QT | C/CPAF | 6/94 | TBD | 6,068 | 0 | 1,209 | 4,300 | 0 | 0 | 0 | 5,509 |
| RI-RTS | SS/CPAF | 8/94 | 7,941 | 8,591 | 0 | 8,591 | 0 | 0 | 0 | 0 | 8,591 |
| RI-PHIII | SS/CPAF | TBD | TBD | TBD | 0 | 0 | 0 | 0 | 0 | 327,040 | 327,040 |
| Support and Management Organizations | | | | | | | | | | | |
| Various | Multiple | Various | N/A | N/A | 0 | 0 | 0 | 9,245 | 8,957 | 63,443 | 81,645 |
| Miscellaneous | Multiple | Various | N/A | N/A | 1,666 | 6,811 | 8,060 | 9,606 | 8,742 | 65,394 | 100,279 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| AFFTC | P.O. | Various* | N/A | N/A | 3,664 | 1,044 | 8,640 | 15,090 | 13,794 | 93,009 | 135,241 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 4143

B. (U) Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | 0 | 0 | 1,500 | 5,883 | 3,731 | 26,404 | 37,518 |
| Support and Management Property | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Test and Evaluation Property | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Subtotal Product Development | | | | 55,671 | 40,577 | 56,767 | 121,981 | 75,046 | 517,010 | 867,052 |
| Subtotal Support and Management | | | | 1,666 | 6,811 | 8,060 | 18,851 | 17,699 | 128,837 | 181,924 |
| Subtotal Test and Evaluation | | | | 3,664 | 1,044 | 8,640 | 15,090 | 13,794 | 93,009 | 135,241 |
| Total Project | | | | 61,001 | 48,432 | 73,467 | 155,922 | 106,539 | 738,856 | 1,184,217 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1019

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1019 Electronic Countermeasures (ECM) Improvements | 0 | 2,453 | 3,092 | 33,038 | 34,822 | 77,702 | 54,206 | 81,956 | 0 | 287,269 |

A. (U) Mission Description and Budget Item Justification

(U) The B-1's expanding conventional mission requires improved ECM capabilities for enhanced survivability at medium to high altitudes in modern air defense threat environments. The Defensive System Upgrade Program (DSUP) is now restructured as an integrated and incremental upgrade program -- matching specific ECM improvements to mission requirements based on priority threats at discrete points in time. Priority threats will be those which the user determines are most critical to counter in a typical B-1 mission supporting Defense Planning Guidance scenarios. Project 1019 provides RDT&E funding for improved B-1 ECM capabilities to address current deficiencies in situational awareness, jamming effectiveness and reliability and maintainability. Specific tasks include:

- (U) EMD planning. Funding requirements are being reviewed to support the restructured acquisition strategy.

- (U) Prioritization and mapping of requirements against specific mission scenarios (based on weapon integration accomplished under project 4143)

- (U) Selection and continued development of incremental solutions based on prioritized requirements

(U) Acquisition strategy: In FY93 the ECM project accomplished the risk reduction planning leading up to development of an RFP by the prime contractor (as system integrator for the subcontractors during evaluation of candidate ECM solutions). Responding to Congressional restrictions in FY94 the Air Force stopped work on the ECM project except for completing studies underway to support the Cost and Operational Effectiveness Analysis (COEA). FY95 efforts focus on finalizing the incremental solutions and corresponding acquisition strategy with a goal of increasing commonality and capitalizing on technology improvements since the original program was developed.

(U) The Air Force selected Rockwell International to be the integrating contractor to manage B-1 upgrade efforts under project 1019. The subcontractor for the ECM upgrade will not be determined until the end of Source Selection in FY96.

(U) Government organizations responsible for various development efforts include: the B-1 System Program Office (SPO) at ASC, Wright-Patterson AFB, OH; Oklahoma City Air Logistics Center (OC-ALC), Tinker AFB, OK; Rome Laboratories, Griffiss AFB, NY; Air Force Electronic Warfare Evaluation Simulator, Dallas, TX; Warner Robins Air Logistics Center (WR-ALC), Robins AFB, GA; the Air Force Operational Test and Evaluation Center (AFOTEC), Kirtland AFB, NM; Air Force Flight Test Center, Edwards AFB, CA; and the Air Force Developmental Test Center (AFDTC), Eglin AFB, FL.

(U) The program is categorized as research category 6.5 (EMD). The B-1 is an operational weapon system; this ongoing development program upgrades its conventional capabilities.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1019 |

(U) FY 1995
- (U) Resume Risk Reduction and planning for EMD for incremental upgrade program ($975)
- (U) Two SETA personnel to support additional EMD workload ($250)
- (U) Risk Reduction testing and demonstration in preparation for start of EMD ($675)
- (U) Mission Support/Other ($553)

(U) FY 1996
- (U) Continue Risk Reduction and planning for incremental upgrade program ($2,000)
- (U) Mission Support/Other ($1,092)

- (U) FY1997
- (U) Procurement of Group B ($3,120)
- (U) Rockwell's Integration and Group A Costs ($12,060)
- (U) Associate Contractor Agreement with AIL ($2,160)
- (U) Contractor System Test and Evaluation ($5,040)
- (U) Government Furnished Equipment (GFE) for Subcontractor Use. ($4,000)
- (U) Mission Support/Other ($6,658)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1019 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 2,500 | 32,100 | 62,200 | 648,193 |
| Appropriated Value | 0 | 2,500 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. SBIR | | - 47 | | | |
| Adjustments to Budget Years Since FY95 PB | | | - 29,008 | - 29,162 | |
| Current Budget Submit/President's Budget | 0 | 2,453 | 3,092 | 33,038 | 287,269 |

(U) Change Summary Explanation:

(U) Funding:

- FY96 (-29,008):New Acquisition Strategy. Under the new strategy the system will be procured in increments. We will no longer do a full Risk Reduction where Rockwell was going to carry 3 subcontractors through risk reduction and later down-select to 1 subcontractor.

- FY97 (-29,162):New Acquisition Strategy. We will start EMD in FY97 at a reduced level.

(U) - Schedule: As a result of the new acquisition strategy we have moved EMD start from FY98 to FY97.

(U) - Technical:Under the new strategy the performance of the first increment will be tailored to the expected threat in the year 2000. Follow-on performance will be tailored to the year 2010 and subsequent years.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1019

C. (U) Other Program Funding Summary ($ in Thousands)

| | To 1994 | Total 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Compl | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, Air Force<br>B-1 Modifications | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 662,000 | 662,000 |

(U) Related RDT&E

- (U) Program Element #0101126F, B-1 Squadrons
- (U) Program Element #0604270F, Electronic Warfare (EW) Development
- (U) Project #3896, Advanced Strategic Tactical Expendable (ASTE)

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) **Acquisition Milestones** | | | | | | | | | | | | | | | | |
| - Milestone II | | | | | | | | | | | X | | | | | |
| (U) **Engineering Milestones** | | | | | | | | | | | | | | | | |
| - (U) SRR | | | | | | | | | | | | | X | | | |
| - (U) SFR | | | | | | | | | | | | | | X | | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1019 |

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) **T&E Milestones** | | | | | | | | | | | | | | | | |
| (U) **Contract Milestones** | | | | | | | | | | | | | | | | |
| - (U) Source Selection (ECP) to Phase IIA | | | | | | | | X | | | | | | | | |
| - (U) Award EMD Contract | | | | | | | | | | | | | X | | | |
| (U) Milestones Beyond BY2 | | | | | | | | | | | | | | | | |
| (U) **Acquisition Milestones** | | | | | | | | | | | | | | | | |
| (U) Milestone III | 4QFY00 | | | | | | | | | | | | | | | |
| (U) Limited Operational Capability | 3QFY01 | | | | | | | | | | | | | | | |
| (U) Full Operational Capability | 4QFY05 | | | | | | | | | | | | | | | |
| (U) **T&E Milestones** | | | | | | | | | | | | | | | | |
| (U) Flight Test Start | 3QFY99 | | | | | | | | | | | | | | | |
| (U) Complete Flight Test | 3QFY00 | | | | | | | | | | | | | | | |
| (U) **Contract Milestones** | | | | | | | | | | | | | | | | |
| (U) Production | 4QFY00 | | | | | | | | | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1019 |

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Part 1 : Requirements | | | | |
| (U) Risk Reduction/Evaluation | 0 | 1,650 | 2,000 | 0 |
| (U) Contractor Group A & B | 0 | 0 | 0 | 17,340 |
| (U) Contractor System Test & Evaluation | 0 | 0 | 0 | 5,040 |
| (U) GFE | 0 | 0 | 0 | 4,000 |
| (U) OGC | 0 | 803 | 1,092 | 6,658 |
| (U) Support Contract | 0 | 0 | 0 | 0 |
| (U) Total | 0 | 2,453 | 3,092 | 33,038 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1019

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| RI | SS/CPAF | Aug 93 | TBD | | 6,000 | 0 | 975 | 2,000 | 0 | 0 | 8,975 |
| RI | SS/CPAF | FY97 | TBD | | | | | | 17,340 | 33,740 | 51,080 |
| Support and Management Organizations | | | | | | | | | | | |
| Miscellaneous | Various | TBD | TBD | | 12,237 | 0 | 1,478 | 1,092 | 6,658 | 141,541 | 163,006 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| AFFTC | P.O. | Various* | TBD | | | | | | 5,040 | 65,405 | 70,445 |

* Note: P.O. provided to AFFTC annually for government flight test activities.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1019

B. (U) Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | | | | | | | |
| Various | TBD | FY96 | TBD | 0 | 0 | 0 | 0 | 4,000 | 8,000 | 12,000 |
| Support and Management Property | | | | | | | | | | |
| Test and Evaluation Property | | | | | | | | | | |
| Subtotal Product Development | | | | 6,000 | 0 | 975 | 2,000 | 21,340 | 41,740 | 72,055 |
| Subtotal Support and Management | | | | 12,237 | 0 | 1,478 | 1,092 | 6,658 | 141,541 | 163,006 |
| Subtotal Test and Evaluation | | | | 0 | 0 | 0 | 0 | 5,040 | 65,405 | 70,445 |
| Total Project | | | | 18,237 | 0 | 2,453 | 3,092 | 33,038 | 248,686 | 305,506 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1020

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1020 Aircraft/Weapon/Electronic (A/W/E) Module for Air Force Mission Support System (AFMSS) | 0 | 0 | 6,168 | 6,168 | 4,079 | 0 | 0 | 0 | 0 | 16,415 |

A. (U) Mission Description and Budget Item Justification

(U) Automated mission planning systems traditionally have been developed and deployed by individual Air Force operating commands to support their assigned aircraft and weapons systems. The Tactical Air Forces (TAF) and the Strategic Air Commands (SAC), for example, began fielding mission support capabilities in various forms in the late 1970s, sometimes as extensions of avionics initialization systems already developed and in other cases as personal computer (PC), minicomputer or mainframe applications.

(U) In the future, the Air Force will fulfill these requirements with the Air Force Mission Support System (AFMSS), a mission planning system that will be used throughout the Air Force to capitalize on commonly developed functionality. While the AFMSS core provides common mission planning capabilities, each aircraft or weapon system or electronic system (A/W/E) that uses AFMSS, requires specific mission planning functionality not provided by the AFMSS core. The B-1 A/W/E will supplement the AFMSS core capabilities and fulfill any B-1 specific mission planning requirements.

(U) The B-1 currently uses the Mission Data Preparation System (MDPS). The MDPS will be replaced with AFMSS, currently under development by ESC, and the B-1 specific A/W/E module. The government will competitively procure the B-1 A/W/E software module and any necessary peripheral hardware to be hosted on or integrated with AFMSS. Full compatibility will require concurrent development with the evolutionary AFMSS core software, now scheduled for annual updates through FY98, and the aircraft OFPs, which are affected by aircraft changes such as those planned under the B-1B Conventional Mission Upgrade Program.

(U) This program fulfills needs outlined in the B-1 Mission Need Statement (21 Aug 92) and Operational Requirements Document (22 Jan 93). As an interface component hosted on AFMSS, this program also responds to the Statement of Operational Need (SON) for a Strategic MDPS, Phase III (16 Feb 88) (SON 19-82). The AFMSS program implements TAF 312-87-1-B, System Operational Requirements Document (SORD) for TAF Mission Support System (with Military Airlift Command, SAC, TAF and United States Special Operations Command Annexes), 28 Sep 90.

(U) The Government has awarded a contract for development of this A/W/E to Logicon.

(U) Although ESC/YV will manage the development effort of the B-1 A/W/E, ASC/YD will retain PMD and funding authority of the program. Together, the organizations will report to AFPEO/ST, the B-1 PEO office.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1020 |

(U) The Government proposes a "two-release" procurement through FY97 with an option for follow-on software development related to OFP changes and any evolving B-1 mission planning requirements through FY99. In accordance with Integrated Weapon Systems Management (IWSM), the government plans to transition the program to an Air Logistics Center (ALC) to be determined later for management of follow-on organic support of the A/W/E software not earlier than FY98 (completion of Release 2) and no later than FY00.

(U) The first release under the basic contract will provide initial minimum planning capability functions for the B-1, covering approximately 50% of the user's requirements within 24 months of contract award. The second release will provide full functionality as currently defined. Both releases will include software development, training, special studies, and contractor technical support. The contract also has options for a third release and software maintenance.

(U) An award fee plan is structured to motivate the contractor to provide timely, high quality outputs that meet or exceed the minimum requirements, primarily in software design, development, and management while making maximum use of the AFMSS core. The award fee plan is further structured to encourage cost-effective design, development, and management of the software. Also included in the plan, but with much less emphasis, are special studies, training and maintenance. The award fee plan shall apply to this contract period and any future contractual periods, unless modified.

(U) ESC/YVP has awarded a cost-plus-award-fee (CPAF) contract to Logicon after a full-and-open competition and streamlined source selection.

(U) FY 1994
- (U) Not Applicable.

(U) FY 1995
- (U) Not Applicable. (FY 1995 funding will be provided from PE #0208006F)

(U) FY 1996
- (U) Continue Logicon contract development activities ($4,200)
- (U) Mission Support/Other ($1,968)

(U) FY 1997
- (U) Continue Logicon contract ($4,200)
- (U) Mission Support/Other ($1,968)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1020

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | N/A | N/A | N/A | N/A | N/A |
| Appropriated Value | N/A | | | | |
| Current Budget Submit/President's Budget | * | * | 6,168 | 6,168 | 16,415 |

(U) Change Summary Explanation:

(U) Funding: New Project.

(U) Schedule: New Project.

(U) Technical:FY96 addition to support B-1 Aircraft/Weapons/Electronic integration with Air Force Mission Support System (AFMSS)

C. (U) Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| PE 28006F AFMSS RDT&E | 1,420 | 5,155 | * | * | * | * | * | * | * | 6,575 |
| AFMSS-PE 11126F | | | | | | | | | | |
| Appn 3400 O&M, PE 28006F | | | | 500 | 1,500 | 1,500 | | | | 3,500 |
| Appn 3080 Other Procurement, Budget Activity 83 | | | | 983 | | | | | | 983 |

(U) Related RDT&E

- (U) Program Element #0208006F, Air Force Mission Support Systems (AFMSS)

*Note: FY94 and FY95 activities were funded under the AFMSS program. FY96 and beyond activities are funded by B-1.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1020 |

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) **Acquisition Milestones** | | | | | | | | | | | | | | | | |
| (U) Strategic Roundtable | | X* | | | | | | | | | | | | | | |
| (U) Tactical Roundtable | | X* | | | | | | | | | | | | | | |
| (U) Acquisition Strategy Panel | | | X* | | | | | | | | | | | | | |
| (U) **Engineering Milestones** | | | | | | | | | | | | | | | | |
| (U) A/W/E Release 1 | | | | | | | | | | | | | | | | |
| - (U) Systems Design Review | | | | | X* | | | | | | | | | | | |
| - (U) Preliminary Design Review/ | | | | | | | X | | | | | | | | | |
| - (U) Critical Design Review/Demo | | | | | | | | X | | | | | | | | |
| (U) A/W/E Release 2 | | | | | | | | | | | | | | | | |
| - (U) SRR | | | | | | | | | | X | | | | | | |
| - (U) PDR | | | | | | | | | | | X | | | | | |
| - (U) Critical Design Review | | | | | | | | | | | | X | | | | |
| (U) **T&E Milestones** | | | | | | | | | | | | | | | | |
| - CMUP/JDAM DT&E/IOT&E | | | | | | | | | | | | | | | | X |
| (U) A/W/E Release 1 | | | | | | | | | | | | | | | | |
| - (U) Test Readiness Review/FQT | | | | | | | | | | | X | | | | | |
| - (U) SVT | | | | | | | | | | | | X | | | | |
| (U) A/W/E Release 2 | | | | | | | | | | | | | | | | |
| - (U) Test Readiness Review/FQT | | | | | | | | | | | | | | | X | |
| - (U) SVT | | | | | | | | | | | | | | | | X |
| (U) **Contract Milestones** | | | | | | | | | | | | | | | | |
| - (U) Source Selection Start | | | X* | | | | | | | | | | | | | |
| - (U) Contract Award | | | | | X* | | | | | | | | | | | |
| - (U) First S/W Release | | | | | | | | | | | | | X | | | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1020 |

(U) Milestones Beyond BY2

(U) **Engineering Milestones**
(U) A/W/E Release 3
- (U) Critical Design Review — 1QFY98

(U) **T&E Milestones**
(U) A/W/E Release 3
- (U) TRR — 4QFY98

(U) **Contract Milestones**
- (U) Second S/W Release — 1QFY98
- (U) Third S/W Release — 3QFY98

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1020

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| (U) Contract Funding | 0 | 0 | 4,200 | 4,200 |
| (U) Other Government Costs | 0 | 0 | 1,968 | 1,968 |
| (U) Total | 0 | 0 | 6,168 | 6,168 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1020

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| LOGICON | CPAF | Aug 94 | * | * | 0 | 0 | 0 | 4,200 | 4,200 | 3,000 | 11,400 |
| Support and Management Organizations | | | | | | | | | | | |
| Miscellaneous | Miscellaneous | Various | | | 0 | 0 | 0 | 1,968 | 1,968 | 1,079 | 5,015 |
| Test and Evaluation Organizations | | | | | | | | | | | |

*NOTE: Funded Under The AFMSS Program, Program Element #0208006F.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1020 |

B. (U) Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property: N/A**

| | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 0 | 0 | 0 | 4,200 | 4,200 | 3,000 | 11,400 |
| Subtotal Support and Management | 0 | 0 | 0 | 1,968 | 1,968 | 1,079 | 5,015 |
| Subtotal Test and Evaluation | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Project | | | | 6,168 | 6,168 | 4,079 | 16,415 |

N/A - Two AFMSS developmental suites will be provided to the contractor. These suites have been purchased with B-1 funds and are in storage at OC-ALC.
- Three Programmable Cartridge Transfer Units (PCTUs) will be provided to the contractor. The PCTUs are currently being manufactured by OC-ALC/LA and will be purchased with the FY94/FY95 funds ESC is applying to the program.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1021

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1021 B-1 Simulator | * | * | 8,656 | 4,875 | 9,850 | 13,332 | 5,372 | 13,724 | 63,016 | 118,825 |

A. (U) Mission Description and Budget Item Justification

(U) This project provides updates to the existing training system necessary to match changes made to the aircraft described in the preceding exhibits. The total B-1 Training System (TS) consists of the Simulator System (SS) to train air crew members and Maintenance Training Equipment (MTE) to train maintenance personnel. The SS is actually a suite of systems which provides the necessary visual, motion and aural cues for complete ground training of B-1 air crew members -- there are 5 Weapon System Trainers, 5 Cockpit Procedure Trainers, 2 Mission Trainers, 1 Training System Support Center (TSSC) and 1 Data Base Transformation System (DBTS). The TSSC includes the computational system resources required to support software, hardware and firmware changes. The DBTS consists of transformation programs, commercial computers and printers located at the Defense Mapping Agency Aerospace Center, which provide terrain and feature updates. The MTE provides maintenance training for simulation of fault isolation and remove/replace of all B-1 aircraft systems. The MTE, also a suite of systems, includes 8 Avionics/Armament Maintenance Training Systems, 10 Simulator Maintenance Training Systems, 1 Primary/Secondary Flight Control System Maintenance Trainer and 1 TSSC to support software, hardware, and firmware change.

(U) Updates to the training system are necessary to maintain concurrency with the aircraft program. These updates are accomplished through block upgrades as dictated by the aircraft schedule.

(U) Acquisition Strategy: The Loral-Quintron contract awarded 21 Jun 94 is a 5-year, 4 month contract. This contract encompasses development, production and CLS through FY99. The development portion is a Cost Plus Award Fee (CPAF) type contract and the production is Firm Fixed Price (FFP). The CLS is Fixed Price Award Fee (FPAF) for the simulator system and FFP for the Maintenance Training Equipment. It is Time and Materials for over and above work on both the Simulator System and MTE.

*Note: Funding for the B-1 Simulator in FY94 and FY95 was $3.8M and $4.8M, respectively, and was funded under project 4143, Conventional Weapons Upgrade

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 Engineering and Manufacturing Development | PE NUMBER AND TITLE: 0604226F; B-1 — PROJECT NO.: 1021 |

(U) FY 1994 (Funded under Project 4143)

(U) FY 1995 (Funded under Project 4143)

(U) FY 1996
- (U) Begin CPT development - Block B/C ($4,471)
- (U) Begin MTE - B/C ($3,346)
- (U) Award Fee Mar/Sep 96 ($270)
- (U) Mission Support/Other Activities ($569)

(U) FY 1997
- (U) Begin Phase II (Block D) development ($3,812)
- (U) Award Fee Mar/Sep 97 ($465)
- (U) Mission Support/Other Activities ($598)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1021 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | * | * | * | * | * |
| Appropriated Value | | | | | |
| Adjustments to Appropriated Value | | | | | |
| Current Budget Submit/President's Budget | * | * | 8,656 | 4,875 | 118,825 |

(U) Change Summary Explanation:

(U) Funding: The budget has been adjusted to reflect B-1 Training System/Trainers a separate project. Funding was moved from Projects 4143 and 1019.

(U) Schedule: None.

(U) Technical: None.

C. (U) Other Program Funding Summary ($ in Thousands)

| | To 1994 | Total 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Compl | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| None | | | | | | | | | | |

Related RDT&E
- (U) Program Element #0101126F, B-1 Squadrons
- (U) Program Element #0305164F, Global Positioning System (GPS)
- (U) Program Element #0604618F/N, Joint Direct Attack Munition (JDAM)
- (U) Program Element #0604727F/N, Joint Stand-Off Weapon (JSOW)

* Funded in Projects 4143 and 1019

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1021 |

- (U) Program Element #0604604F, Wind Corrected Munitions Dispenser (WCMD)
  - - Funding will move into Program Element #0604600F, Wind Corrected Munitions Dispenser (WCMD), in FY96
- (U) Program Element #0208006F, Air Force Mission Support System (AFMSS)
- (U) Program Element #0207130F, F-15 (Contributes to simulator IVACC).
- (U) Program Element #0207133F, F-16 (Contributes to simulator IVACC).

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) **Acquisition Milestones** | | | | | | | | | | | | | | | | |
| - (U) Start EMD - Block B/C - WST | | | X* | | | | | | | | | | | | | |
| - (U) Start Production Block - B/C - WST | | | | | | | | | X | | | | | | | |
| - (U) First Delivery - WST | | | | | | | | | X | | | | | | | |
| - (U) Delivery MT | | | | | | | | | | | X | | | | | |
| - (U) Start EMD - Block B/C - CPT | | | | | | | | | X | | | | | | | |
| - (U) Start Production - B/C - CPT | | | | | | | | | | | | | | X | | |
| - (U) First Delivery - CPT | | | | | | | | | | | | | | | X | |
| - (U) Start EMD - B/C - MTE | | | | | | | | | X | | | | | | | |
| - (U) Start Production - B/C - MTE | | | | | | | | | | | | | | X | | |
| - (U) First Delivery - MTE | | | | | | | | | | | | | | | X | |
| - (U) Start EMD - Block D | | | | | | | | | | | | | | | | X |
| (U) **Engineering Milestones** | | | | | | | | | | | | | | | | |
| - (U) SR Block B/C - WST (SRR) | | | | X* | | | | | | | | | | | | |
| - (U) PDR Block B/C - WST | | | | | X* | | | | | | | | | | | |
| - (U) CDR Block B/C - WST | | | | | | | X | | | | | | | | | |
| (U) **T&E Milestones** | | | | | | | | | | | | | | | | |
| - (U) System T&E - Block B/C WST | | | | | | | | X | | | | | | | | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1021

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) **Contract Milestones** | | | | | | | | | | | | | | | | |
| - (U) Block B/C WST Award | | | X* | | | | | | | | | | | | | |
| - (U) Block B/C WST Delivery | | | | | | | | | X | | | | | | | |
| - (U) Block B/C CPT Award | | | | | | | | | X | | | | | | | |
| - (U) Block B/C CPT Delivery | | | | | | | | | | | | | | X | | |
| - (U) Block B/C MTE Award | | | | | | | | | X | | | | | | | |
| - (U) Block B/C Delivery | | | | | | | | | | | | | | X | | |
| - (U) Block D Award | | | | | | | | | | | | | | X | | |

| | |
|---|---|
| (U) Milestones Beyond BY2 | |
| (U) Block D | |
| - (U) SRR | 3QFY97 |
| - (U) PDR | 4QFY97 |
| - (U) CDR | 1QFY98 |
| (U) End H/W Development | 1QFY98 |
| (U) End S/W Development | 2QFY98 |
| (U) End H/W & S/W Integration | 4QFY98 |
| (U) End T&E | 1QFY99 |
| (U) Site Activation | 2QFY99 |
| (U) Production Units Installed | 3QFY99 |
| (U) Block E | |
| - (U) SRR | 1QFY00 |
| - (U) PDR | 2QFY00 |
| - (U) CDR | 3QFY00 |
| (U) End S/W Development | 1QFY01 |
| (U) End H/W & S/W Integration | 2QFY01 |
| (U) End H/W Development | 4QFY01 |
| (U) End T&E | 4QFY01 |
| (U) Site Activation | 1QFY02 |
| (U) Production Units Installed | 3QFY02 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1021 |

A. (U) Project Cost Breakdown ($ in Thousands)

| Major Contract | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| (U) Block B/C | | | | |
| - (U) WST | | | | |
| - (U) CPT | 0 | 0 | 4,617 | |
| (U) Block D | | | | |
| - (U) WST | 0 | 0 | 0 | 4,277 |
| - (U) CPT | | | | |
| (U) Maintenance Training Equipment | 0 | 0 | 3,470 | |
| (U) OGC | | | 569 | 598 |
| (U) Total | 0 | 0 | 8,656 | 4,875 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604226F; B-1

PROJECT NO.: 1021

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Loral-Quintron | C/CPAF | Jun 94 | * | N/A | | * | * | 8,087 | 4,277 | 99,410** | 111,774 |
| Support and Management Organizations | | | | | | | | | | | |
| Various | | | | | | * | * | 569 | 598 | 5,884** | 7,051 |
| Test and Evaluation Organizations | | | | | | | | | | | |

* Funded in Conventional Weapon Upgrade Project 4143 in FY94-95.
** New contract begins FY00.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604226F; B-1 | 1021 |

B. (U) Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property: NONE REQUIRED**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | | | | | | | |
| GFP not applicable to this program. | | | | | | | | | | |
| Support and Management Property | | | | | | | | | | |
| Test and Evaluation Property | | | | | | | | | | |
| Subtotal Product Development | | | | | | | 8,087 | 4,277 | 99,410 | 111,774 |
| Subtotal Support and Management | | | | | | | 569 | 598 | 5,884 | 7,051 |
| Subtotal Test and Evaluation | | | | | | | | | | |
| Total Project | | | | | | | 8,656 | 4,875 | 105,294 | 118,825 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 19,485 | 13,690 | 8,786 | 4,650 | 4,848 | 6,177 | 6,365 | 6,562 | Cont | TBD |
| 2325 Simulator Development Activities | 3,000 | 1,778 | 1,677 | 1,531 | 1,577 | 2,741 | 2,818 | 2,900 | Cont | TBD |
| 2769 Simulator Update Development | 3,406 | 3,574 | 3,187 | 3,119 | 3,271 | 3,436 | 3,547 | 3,662 | Cont | TBD |
| 3000 KC-135 Aircrew Training System | 50 | 100 | 1,434 | 0 | 0 | 0 | 0 | 0 | 0 | 5,066 |
| 3135 Advanced Training System | 1,898 | 1,438 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34,266 |
| 4022 Simulator for Electronic Combat Training | 6,820 | 6,800 | 2,488 | 0 | 0 | 0 | 0 | 0 | 0 | 25,820 |
| 4156 AFSPC Training Development | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 208 |
| 2851 STD DOD Sim Data Base | 1,900 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Program Complete | 28,366 |
| 3282 C-17 Aircrew Training System | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Program Complete | 73,793 |
| 3772 C-141 Aircrew Training System | 2,370 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Program Complete | 33,330 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

(U) A. Mission Description and Budget Item Justification

This is a continuing program element for development of aircrew and maintenance training techniques and devices. This program element is devoted to the Engineering and Manufacturing Development (EMD) of aircrew and maintenance training systems and is therefore included in research category (EMD). Objectives are to adapt simulation technology and standards developed in the laboratories and industry to satisfy MAJCOM training requirements, and to develop prototype training devices. Project 3135 - Advanced Training System (ATS) will be transferred to PE 0604243 (Manpower, Personnel, & Training) as of FY96. FY96 to FY98 funds will transfer with the program and become Project 4369 - Air Education and Training Management System. Funds for FY99 and outyears will remain in program element 64227, Project 2325 - Simulator Development Activities.

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 19,815 | 14,261 | 10,069 | 8,005 | TBD |
| Appropriated Value | 20,015 | 14,261 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Undistributed Reduction | -429 | -306 | | | |
| b. Below Threshold Reprogrammings (BTR) | -101 | | | | |
| c. SBIR | | -265 | | | |
| Adjustments to Budget years since FY95 PB | | | -1,283 | -3,355 | |
| Current Budget Submit/President's Budget | 19,485 | 13,690 | 8,786 | 4,650 | TBD |

Change Summary Explanation:

Funding: Project 4033 - JPATS Ground Based Training System (GBTS) funds for FY95-99 transferred to PE 64233F, Specialized Undergraduate Pilot Training (SUPT).FY95 Undistributed reduction: FFRDC, NON FFRDC, university research, travel. Outyears reflect non-pay purchases inflation

Schedule: Not Applicable

Technical: Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2325

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2325, Simulator Development Activities | 3,000 | 1,778 | 1,677 | 1,531 | 1,577 | 2,741 | 2,818 | 2,900 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

Provides the funds to conduct engineering development of new aircrew/maintenance training technologies and standards. Funds the pre-production of first article training devices to satisfy the customer's training requirements. Efforts currently planned or underway include using artificial intelligence techniques in the development of a generic Intelligent Training Management System (TMS). Structural Modeling, a set of software templates and specification forms for developing training device software, will also be developed.

(U) FY 1994 ($ in Thousands)

- (U) - Structural Modeling (SM) continued support of Special Operations Forces Aircrew Training System, Simulator for Electronic Combat Training, and F-22 programs. Developed a SM test bed and core architecture . ($1,900)
- (U) - The Intelligent TMS expanded the scheduling engine into a complete scheduling module. It was integrated into and tested with an existing TMS. ($700)
- (U) - Began testing to determine the acuity of peripheral vision under dynamic conditions of Espirit Visual System. ($200)
- (U) - Determined tradeoffs between Area of Interest (AOI) size and resolutions, blend region, and latency requirements of visual systems using the Espirit Visual System. ($200)

(U) FY 1995 ($ in Thousands)

- (U) - Complete development of the Structural Modeling (SM) core architecture. Continue support of programs using SM. ($1,036)
- (U) - Continue development of objective measures for the transfer of training from the simulator to the aircraft. ($237)
- (U) - Start evaluation, integration, and documentation of latest training technologies (SMART 2000). ($138)
- (U) - Complete Peripheral Vision testing ($200)
- (U) - Technical support ($167)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2325

(U) FY 1996 ($ in Thousands)

(U) - Continue development of objective measures for the transfer of training from the simulator to the aircraft. ($600)

(U) - Continue evaluation, integration, and documentation of the latest training technologies (SMART 2000). ($700)

(U) - Begin development of a prototype training system for demonstrating latest training system technology (SMART 2000). ($377)

(U) FY 1997 ($ in Thousands)

(U) - Assume responsibility for Universal Threat Simulator System (UTSS) from the Navy. Work to populate the data base and standards development will continue. ($200)

(U) - Complete evaluation integration and documentation of the latest training technologies (SMART 2000). ($600)

(U) - Continue development of a prototype training system for demonstrating latest training technologies (SMART 2000). ($731)

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,643 | 3,920 | 3,795 | 3,559 | TBD |
| Appropriated Value | 3,000 | 3,935 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Undistributed Reduction (GUR) | | -306 | | | |
| b. Below Threshold Reprogramming (BTR) | | -1,586 | | | |
| c. SBIR | | -265 | | | |
| Adjustment to Budget years since FY95 PB | | | -2,118 | -2,028 | |
| Current Budget Submit/President's Budget | 3,000 | 1,778 | 1,677 | 1,531 | TBD |

Change Summary Explanation:

Funding: FY94 budget limit, FY95/96/97 program scaled down Outyears reflect non-pay purchases inflation, FY95 $1,586 BTR from 2325 into SECT due to underestimation of software development costs; FY95 GUR - FFRDC, NON FFRDC, travel, university research

Schedule: FY94 events slipped to FY95, FY96/97 program scaled down

Technical: Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2325

(U) C. Other Program Funding Summary ($ in Thousands) Not Applicable

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Espirit Visual System Testing Cycle | | | | X** | | | | | | | | | | | | |
| Peripheral Vision Testing Complete | | | | | | | | X** | | | | | | | | |
| Structural Modeling Complete | | | | | | | | X** | | | | | | | | |
| Intelligent Training Management System Complete | | | | | | | | | X** | | | | | | | |
| Simulator Training Transfer Complete | | | | | | | | | | | | X** | | | | |
| SMART 2000 integration & documentation | | | | | | | X* | | | | | | | | | X** |
| Prototype Training System SMART 2000 | | | | | | | | | | | | | | | | X |
| Universal Threat Simulator System Architecture Development | | | | | | | | | | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2325

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Structural Modeling | 1,900 | 1,036 | 0 | 0 |
| Intelligent Training Management System | 700 | 0 | 0 | 0 |
| Peripheral Vision Testing | 200 | 0 | 0 | 0 |
| Espirit Visual System Testing | 200 | 200 | 0 | 0 |
| Simulator Training Transfer | 0 | 237 | 600 | 0 |
| SMART 2000 | 0 | 138 | 700 | 600 |
| Prototype Training Systems | 0 | 0 | 377 | 731 |
| Universal Threat Simulator System Standards Deviation | | 0 | 0 | 200 |
| Technical support | | 167 | | |
| Total | 3,000 | 1,778 | 1,677 | 1,531 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2325

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Numerous | Various | Various | None | None | 35,394 | 2,883 | 1,592 | 1,565 | 1,411 | TBD | TBD |
| Support and Management Organizations | | | | | | | | | | | |
| The Training System Program Office, Aeronautical Systems Center, Wright-Patterson AFB OH | Various | Various | 0 | 0 | 0 | 117 | 186 | 112 | 120 | TBD | TBD |
| Test and Evaluation Organizations | Not Applicable | | | | | | | | | | |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:** Not Applicable

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Product Development Subtotal | None | None | 35,394 | 2,883 | 1,592 | 1,565 | 1,411 | TBD | TBD |
| Support and Management Subtotal | 0 | 0 | 0 | 117 | 186 | 112 | 120 | TBD | TBD |
| Total Project | None | None | 35,394 | 3,000 | 1,778 | 1,677 | 1,531 | TBD | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2769

| COST ($ In Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2769 Simulator Update Developments | 3,406 | 3,574 | 3,187 | 3,119 | 3,271 | 3,436 | 3,547 | 3,662 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

Provides critical Training System Product Group (TSPG) support funding for multiple user commands products to include F-16 Weapon System Trainer, B-1B conventional upgrade, Simulator for Electronic Combat Training SECT, C-17 training suite, Universal Training Device, and C-141 Aircrew Training System. These support systems include a computer center, communications, Systems Engineering and Technical Assistance (SETA) contracting, travel, supplies, specialized training, and equipment.

(U) FY 1994 ($ in Thousands)
- (U) Travel($600)
- (U) Communications($50)
- (U) Training($120)
- (U) SETA($750)
- (U) Management($825)
- (U) Computer center($500)
- (U) Supplies($200)
- (U) Equipment($157)
- (U) Miscellaneous($204)

(U) FY 1995 ($ in Thousands)
- (U) Travel($623)
- (U) Communications($50)
- (U) Training($100)
- (U) SETA($815)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD) | PE NUMBER AND TITLE: #0604227F Training Systems Development | PROJECT NO.: 2769 |

(U) FY 1995 Continued ($ in Thousands)
- (U) Management($947)
- (U) Computer center($470)
- (U) Supplies($199)
- (U) Equipment($128)
- (U) Miscellaneous($242)

(U) FY 1996 ($ in Thousands)
- (U) Travel($506)
- (U) Communications($50)
- (U) Training($099)
- (U) Systems Engineering and Technical Assistance (SETA)($712)
- (U) Management($827)
- (U) Computer center($426)
- (U) Supplies($198)
- (U) Equipment($128)
- (U) Miscellaneous($241)

(U) FY 1997 ($ in Thousands)
- (U) Travel($536)
- (U) Communications($44)
- (U) Training($88)
- (U) SETA($702)
- (U) Management($833)
- (U) Computer center($414)
- (U) Supplies($176)
- (U) Equipment($113)
- (U) Miscellaneous($213)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2769

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,501 | 3,635 | 3,223 | 3,152 | TBD |
| Appropriated Value | 3,406 | 3,635 | | | |
| Adjustments to Appropriated Value | None | | | | |
| a. Congressional reductions | | | | | |
| b. Below Threshold Reprogramming (BTR) | | -61 | | | |
| Current Budget Submit/President's Budget | 3,406 | 3,574 | 3,187 | 3,119 | TBD |

Change Summary Explanation:

Funding: Outyears Reflect non-pay purchases inflation; FY95 $61K BTR into 4022 SECT due to underestimation of software development costs.

Schedule: Not Applicable

Technical: Not Applicable

(U) C. Other Program Funding Summary ($ in Thousands) Not Applicable

(U) D. Schedule Profile

| | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) | Travel | | | | | | | | | | | | | | | | |
| (U) | Communications | | | | X** | | | | X** | | | | X** | | | | X** |
| (U) | Training | | | | X** | | | | X** | | | | X** | | | | X** |
| (U) | SETA | | | | X** | | | | X** | | | | X** | | | | X** |
| (U) | Management | | | | X** | | | | X** | | | | X** | | | | X** |
| (U) | Computer center | | | | X** | | | | X** | | | | X** | | | | X** |
| (U) | Supplies | | | | X** | | | | X** | | | | X** | | | | X** |
| (U) | Equipment | | | | X** | | | | X** | | | | X** | | | | X** |
| (U) | Miscellaneous | | | | X** | | | | X** | | | | X** | | | | X** |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2769

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Travel | 600 | 623 | 506 | 536 |
| Communications | 50 | 50 | 50 | 44 |
| Training | 120 | 100 | 99 | 88 |
| SETA | 750 | 815 | 712 | 702 |
| Management | 825 | 947 | 827 | 833 |
| Computer Center | 500 | 470 | 426 | 414 |
| Supplies | 200 | 199 | 198 | 176 |
| Equipment | 157 | 128 | 128 | 113 |
| Miscellaneous | 204 | 242 | 241 | 213 |
| Total | 3,406 | 3,574 | 3,187 | 3,119 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 2769

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations: Not Applicable | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| The Training System Program Office (SPO), Aeronautical Systems Center, Wright-Patterson AFB OH; | | | | | | | | | | | |
| | Various | Various | None | None | 32,110 | 3,406 | 3,574 | 3,187 | 3,119 | Cont | TBD |
| Test and Evaluation Organizations Not Applicable | | | | | | | | | | | |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands) Not Applicable

**Government Furnished Property:** Not Applicable

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | | None | None | | | | | | | |
| Subtotal Support and Management | | None | None | 32,110 | 3,406 | 3,574 | 3,187 | 3,119 | Cont | TBD |
| Total Project | | None | None | 32,110 | 3,406 | 3,574 | 3,187 | 3,119 | Cont | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 3000

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3000, KC-135 Aircrew Training System | 50 | 100 | 1,434 | 0 | 0 | 0 | 0 | 0 | 0 | 5,066 |

(U) A. Mission Description and Budget Item Justification

Develops aircrew training devices and courseware for KC-135E, KC-135R, and C-135B aircrew members including Air National Guard (ANG) and Air Force Reserve (AFRES) components to satisfy continuation training requirements. Replaces current "blue-suit" instructors with contractor instructors.

(U) FY 1994 ($ in Thousands)
(U) - Mission Support. ($50)

(U) FY 1995 ($ in Thousands)
(U) - Mission Support. ($100)

(U) FY 1996 ($ in Thousands)
(U) - Develop replacement for KC-135 Weapon System Trainer (WST) navigation prototype station due to KC-135 WST elimination. ($1,334)
(U) - Mission Support. ($100)

(U) FY 1997 Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 3000

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,907 | 1,438 | 1,441 | 0 | 6,923 |
| Appropriated Value | 50 | 1,438 | | | |
| Adjustments to Appropriated Value | None | | | | |
| a. General Congressional reduction | | | | | |
| b. Below Threshold Reprogramming | | -1,338 | | | |
| Current Budget Submit/President's Budget | 50 | 100 | 1,434 | 0 | 5,066 |

Change Summary Explanation:

Funding: FY95 $1,338 BTR into Simulator for Electronic Combat Training due to underestimation of software development costs, Outyears reflect non-pay purchase inflation. Program is complete in FY96.

Schedule: Not Applicable

Technical: Not Applicable

(U) C. Other Program Funding Summary ($ in Thousands)

Aircraft Procurement, AF, Budget Activity 07,

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Common Support Equipment | 7,000 | 10,600 | 16,600 | 1,800 | 0 | 0 | 0 | 0 | 0 | 36,000 |

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Navigator Weapon System Trainer development | | | | | | | | | X* | | | X** | | | | |
| Mission support | | | | | X | X | X | X | X | X | X | X | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 3000

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Navigator WST development | | | 1,334 | |
| Mission support | 50 | 100 | 100 | complete |
| Total | 50 | 100 | 1,434 | complete |

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Flight Safety Inc. | C/FP | Jul 92 | 4,837 | 4,837 | 2,137 | 0 | 0 | 1,334 | 0 | 0 | 3,471 |
| Product Development Organizations Not Applicable | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| OG-LIRB & ASC/YWM | | | 250 | 250 | 0 | 50 | 100 | 100 | 0 | 0 | 250 |
| Test and Evaluation Organizations Not Applicable | | | | | | | | | | | |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands) Not Applicable

**Government Furnished Property:** Not Applicable

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subtotal product development | 4,837 | 4,837 | 2,137 | 0 | 0 | 1,334 | 0 | 0 | 3,471 |
| Subtotal Support and Management | 250 | 250 | 0 | 50 | 100 | 100 | 0 | 0 | 250 |
| Total Project | 5,087 | 5,087 | 2,137 | 50 | 100 | 1,434 | 0 | 0 | 3,721 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 4022

| COST ($ In Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4022, Simulator for Electronic Combat Training (SECT) | 6,820 | 6,800 | 2,488 | 0 | 0 | 0 | 0 | 0 | 0 | 25,820 |

(U) A. Mission Description and Budget Item Justification

The SECT will replace outdated simulation devices that support Electronic Warfare Officer Training. The simulator will train students in basic threat recognition and associated electronic combat procedures in a simulated airborne environment. This training is possible only with simulation due to environment, security and range restrictions. This is a one-of-a-kind system with no scheduled production effort.

(U) FY 1994 ($ in Thousands)
- (U) - Completed Critical Design Review (CDR) Readiness Assessment. ($820)
- (U) - Completed CDR. ($4,000)
- (U) - began system design and hardware/software development/integration. ($2,000)

(U) FY 1995 ($ in Thousands)
- (U) - Begin in-plant test of system. ($1,200)
- (U) - Begin complete system code/unit test ($2,423)
- (U) - Complete system design and hardware/software integration ($3,177)

(U) FY 1996 ($ in Thousands)
- (U) - Deploy and complete on-site test of system at Corey Station NTC FL ($1,200)
- (U) - Complete hardware/software integration. ($1,288)

(U) FY 1997 Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 - Engineering and Manufacturing Development (EMD) | #0604227F Training Systems Development | 4022 |

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 451 | 3,638 | 95 | 0 | TBD |
| Appropriated Value | 7,150 | 3,638 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional reductions | -330 | | | | |
| b. Below Threshold Reprogramming (BTR) | | +3,162 | | | |
| Adjustments to Budget years since FY95 PB | | | +2,393 | | |
| Current Budget Submit/President's Budget | 6,820 | 6,800 | 2,488 | 0 | 25,820 |

Change Summary Explanation:

Funding: FY94 funding increase caused by requirements growth; FY95 $3,162 BTR from 2325, 2769, 3000, and 4156; Outyears reflect non-pay purchases inflation

Schedule: Required Assets Available (RAA) date has moved to Aug 96 due to under estimation of software development time lines.

Technical: Technical Requirements have not changed

(U) C. Other Program Funding Summary ($ in Thousands) Not Applicable

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Critical Design Review (CDR) | X** | | | | | | | | | | | | | | | |
| Contractor Engineer Verification Review (CEVT) | | | | | | | | X** | | | | | | | | |
| Development Test & Eval (DT&E) / Sys Performance & Development Eval (SPADE) | | | | | | | | | | X** | | | | | | |
| Operational Test and Eval (OT & E)/ Gov't Functional Mission Test | | | | | | | | | | X** | | | | | | |
| In-Plant test | | | | | | | | | | X** | | | | | | |
| Facilities Ready | | | | X** | | | | | | | | | | | | |
| System Delivery (Required Assets Available) | | | | | | | | | | | | X** | | | | |

** = Completion

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 4022

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Complete Critical Design Review Readiness Assess | 820 | | | |
| Complete CDR | 4,000 | | | |
| Begin System Code & Unit Test | 2,000 | | | |
| Government In-Plant Test of System | | 1,200 | | |
| Complete System Code and Unit Test | | 2,423 | | |
| Complete Hardware Software Integration | | 3,177 | | |
| Deploy and Complete On-site Test of System | | | 1,200 | |
| Begin/Complete Hardware System integration | | | 1,288 | |
| Total | 6,820 | 6,800 | 2,488 | 0 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 4022

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| AAI Corporation Huntvalley MD | C/CPAF | Apr 92 | 18,423 | 25,852 | 10,210 | 6,655 | 6,610 | 2,377 | 0 | 0 | 25,852 |
| Support and Management Organizations | | | | | | | | | | | |
| ASC/YWMT Wright Patterson AFB OH | | | | 1,121 | 655 | 165 | 190 | 111 | 0 | 0 | 1,121 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| AFOTEC | | | | 1,682 | 1,682 | 0 | 0 | 0 | 0 | 0 | 1,682 |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:** Not Applicable

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 18,423 | 25,852 | 10,210 | 6,655 | 6,610 | 2,377 | 0 | 0 | 25,852 |
| Subtotal Support and Management | | | 655 | 165 | 190 | 111 | 0 | 0 | 1,121 |
| Subtotal Test and Evaluation AFOTEC | | | 1,682 | 0 | 0 | 0 | 0 | 0 | 1,682 |
| Total Project | | | 12,547 | 6,820 | 6,800 | 2,488 | 0 | 0 | 28,655 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604227F Training Systems Development

PROJECT NO.: 4156

| COST ($ In Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4156, AFSPC Training Development | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 208 |

(U) A. Mission Description and Budget Item Justification

This project consists of studies, up to and including Training System Requirements Analyses (TSRA), to determine Air Force Space Command (AFSPC) requirements for training systems and/or devices. The training systems and devices span all areas of AFSPC missions, including launch base operations, satellite command and control, surveillance, and early warning.

(U) FY 1994 ($ in Thousands)

(U) - Provide training to AFSPC users of Launch Based Operations database. ($16)

(U) FY 1995 Program complete, scope scaled down due to funding

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 234 | 192 | 480 | 283 | TBD |
| Appropriated Value | 16 | 192 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional reductions | | | | | |
| b. Below Threshold Reprogramming (BTR) | | -192 | | | |
| Current Budget Submit/President's Budget | 16 | 0 | 0 | 0 | 208 |

Change Summary Explanation:

Funding: Program completed, scope scaled down due to funding; FY95 BTR into 4022 SECT due to underestimation of software development costs.

Schedule: Not Applicable

(U) C. Other Program Funding Summary ($ in Thousands) Not Applicable

(U) D. Schedule Profile Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604231F, C-17 Program

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 230,416 | 184,505 | 85,753 | 15,695 | 13,562 | 8,541 | 14,544 | 14,975 | 0 | 5,825,591 |

A. (U) Mission Description and Budget Item Justification

(U) Airlift provides the flexibility essential when responding to contingencies on short notice anywhere in the world. It is a major element of America's national security strategy and constitutes the most responsive means of meeting U.S. mobility requirements. Additional airlift capability is needed for rapid deployment of combat forces in support of national objectives. The congressionally mandated Mobility Requirements Study (MRS) forwarded to Congress on 23 Jan 92, once again validated the need for the C-17 aircraft. Specific tasks associated with the airlift mission area include deployment, employment (airland, airdrop, and extraction), sustaining support, retrograde, and combat redeployment. The C-17 is capable of performing the entire spectrum of airlift missions and is specifically designed to operate effectively and efficiently in both the strategic and theater environments. The vast increase in overall airlift capability provided by the C-17 is needed to replace the capabilities being lost as the C-141 retires from the Air Force inventory. The C-17 is capable of performing the airlift mission well into the 21st century. This program element is budgeted in Budget Activity/research category EMD because the program has completed Milestone II, is currently engaged in final stages of engineering development, and is in low rate production.

(U) FY 1994
- (U) Continue flight test program. ($81,438)
- (U) Continue Live Fire Test (LFT) program. ($3,700)
- (U) Continue developmental effort. ($50,478)
- (U) Implement USD(A&T) and MDA settlement. ($94,800)

(U) FY 1995
- (U) Complete LFT program; estimated completion date (ECD): 30 Sep 95. ($2,300)
- (U) Complete reliability, maintainability & availability (RM&A) evaluation; ECD: 4Q FY95. ($12,000)
- (U) Continue development effort. ($108,805)
- (U) Funding provided by OSD per USD(A&T) and MDA settlement agreement. ($54,300)
- (U) Begin 3rd life durability testing ($7,100)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5, Engineering and Manufacturing Development | PE NUMBER AND TITLE: 0604231F, C-17 Program |

(U) FY 1996
- (U) 3rd life durability test completion ($11,000)
- (U) Continue follow-on developmental effort ($63,053)
- (U) T-1 refurbishment ($11,700)

(U) FY 1997
- (U) Continue follow-on product enhancements ($15,695)

(U) Acquisition Strategy

The Department of Defense has thoroughly studied the airlift issue, and has devised an integrated approach to meet airlift needs. The first element is to continue the C-17 program on a probationary basis to obtain 40 C-17s. If McDonnell Douglas Aerospace (MDA) proves during the probationary period that it can deliver quality aircraft, on time, at an affordable price, DoD will have successfully positioned itself to acquire additional C-17 aircraft. The second element of the airlift acquisition strategy is to expeditiously assess the capabilities of alternative aircraft and their likely cost. If MDA does not demonstrate its capabilities, or if the C-17 does not perform as required, DoD will decide by November 1995 on the number and type of alternative aircraft that it needs to meet overall airlift requirements. The key to the integrated strategy is procurement of eight C-17 aircraft in FY96 and implementation of the settlement agreement.

A weapon system acquisition strategy is being developed to address the buy-out of the C-17 program. This strategy is based upon a 120-aircarft program and accommodates variations in quantity. Special provisions will adjust the prices in the event the total buy is other than 120 aircraft. Multiple contract vehicles are planned with prices for these contracts to be negotiated this summer to support the November 1995 Defense Acquisition Board (DAB) decision (contract award will not occur until after the DAB decision). The strategy will contain provisions for a multiyear procurement (per USD(A&T) direction, 2 Nov 94) in two phases and indemnification (because prices will be obtained for ten years into the future).

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604231F, C-17 Program

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget (FY95) | 232,497 | 221,454 | 37,125 | 21,934 | 5,910,200 |
| Appropriated Value | 179,799 | 190,154 | | | |
| a. FY94 Omnibus | 53,700 | | | | |
| b. PAP 56 Initiative | | | -5,863 | -5,737 | |
| c. Follow-on Flight Test | | | 51,200 | | |
| d. Congressional Reductions | -1,027 | -2,077 | | | |
| e. Inflation Change | | | -809 | -502 | |
| f. Small Business Innovative Research | -2,056 | -3,572 | | | |
| g. Automatic Communications Processor | | | 4,100 | | |
| Current Budget Submit/President's Budget (FY96) | 230,416 | 184,505 | 85,753 | 15,695 | 5,825,591 |

(U) Change Summary Explanation:

Funding:
a. Excess advance procurement and spares funds were reprogrammed to RDT&E in FY94 in support of the settlement agreement.
b. Program Office mission support funds have been shifted from RDT&E to procurement (APAF) in FY96 and out. This is a budget policy change.
c. Air Force provided additional RDT&E funds in FY96 for flight test follow-on.

Schedule: The Milestone III decision has been rescheduled from Jul 95 to Nov 95. Initial Operational Capability (IOC) was declared on 17 Jan 95.

Technical: The current USD(A&T)/MDA settlement agreement specifies further changes in the C-17 System Specification and the Prime Item Development Specification. The most significant changes, which are also Key Performance Parameters in the ORD are:

| Capability | Current Specification | Proposed Specification | ORD Threshold |
|---|---|---|---|
| Heavy logistics | 130,000 lbs/3,200 nm | 120,000 lbs/3,200 nm | 110,000 lbs/3,200 nm |
| Max payload landing | 2,700 ft/167,027 lbs | 3,000 ft/157,000 lbs | 3,000 ft/140,000 lbs |
| Backing up | 2% grade/167,027 lbs | 2% grade/157,000 lbs | 1.5% grade/160,000 lbs |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604231F, C-17 Program

C. (U) Other Program Funding Summary ($ in Thousands)

Information below is based on the purchase of 40 aircraft through FY96, the number to which DoD is currently committed. Approval of additional C-17s is dependent on the Defense Acquisition Board review of the program in November 1995.

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| APAE Budget Activity 02 | 2,086,231 | 2,341,988 | 2,402,490 | 72,041 | 74,836 | 76,785 | 75,189 | 74,500 | 0 | 14,311,311 |
| (Aircraft Quantity) | (6) | (6) | (8) | (0) | (0) | (0) | (0) | (0) | (0) | (40) |
| APAE Budget Activity 06 (Spares) | 29,569 | 102,800 | 117,500 | 83,900 | 78,064 | 33,915 | 16,511 | 0 | 0 | 951,089 |
| APAE Budget Activity 05 (Mods) | 3,472 | 6,065 | 12,687 | 24,411 | 22,226 | 5,033 | 855 | 318 | 0 | 75,067 |
| MilCon Budget Activity N/A | 15,161 | 0 | 6,900 | 29,300 | 40,787 | 1,000 | 0 | 0 | 0 | 240,531 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604231F, C-17 Program

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Milestones: | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| IOC | | | | | | X* | | | | | | | | | | |
| RM&A | | | | | | | | X | | | | | | | | |
| Milestone III | | | | | | | | | X | | | | | | | |
| Engineering Milestones: | | | | | | | | | | | | | | | | |
| T&E Milestones: | | | | | | | | | | | | | | | | |
| Static Article Test Complete | | | X* | | | | | | | | | | | | | |
| Durability Article Test Complete (1st Lifetime) | | | X* | | | | | | | | | | | | | |
| Durability Article Test Complete (2nd Lifetime) | | | | | | | | | X | | | | | | | |
| Durability Article Test Complete (3rd Lifetime) | | | | | | | | | | | | X | | | | |
| DT&E | | | | | X* | | | | | | | | | | | |
| DIOT&E | | | | | | | X | | | | | | | | | |
| Live Fire Test Complete | | | | | | | | X | | | | | | | | |
| Contract Milestones: | | | | | | | | | | | | | | | | |
| Lot VII Adv Proc (6 a/c) | | | X* | | | | | | | | | | | | | |
| Lot VI (6 a/c) | | | X* | | | | | | | | | | | | | |
| Lot VII (6 a/c) | | | | | | X | | | | | | | | | | |
| Lot VIII (8 a/c) | | | | | | | | | X | | | | | | | |
| Lot VIII Adv Proc (8 a/c) | | | | | | X | | | | | | | | | | |

Other Program Milestones: N/A

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604231F, C-17 Program

PROJECT NO.:

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Contractor Furnished Equipment | 176,480 | 129,536 | 63,662 | 5,200 |
| Training OGC | 300 | 3,300 | 1,500 | 0 |
| Test OGC | 34,000 | 25,000 | 8,400 | 0 |
| Mission Support OGC | 15,620 | 20,149 | 10,400 | 9,197 |
| Data OGC | 1,900 | 3,000 | 0 | 0 |
| Site Activation OGC | 1,000 | 900 | 800 | 300 |
| Miscellaneous | 1,116 | 2,620 | 991 | 998 |
| Total | 230,416 | 184,505 | 85,753 | 15,695 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604231F, C-17 Program

PROJECT NO.:

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Douglas Aircraft F33657-81-C-2108 | C,FPI/FP | 8/31/81 | 5,339,098 | 5,339,098 | 4,958,800 | 176,480 | 129,536 | 63,662 | 5,200 | 5,395 | 5,339,073 |
| Pratt & Whitney F33657-89-C-0032 | C,FP | 5/24/91 | 12,900 | 12,900 | 8,000 | 1,900 | 3,000 | 0 | 0 | 0 | 12,900 |
| Douglas Aircraft F33657-89-C-0018 | C,FPI | 4/14/89 | 93,000 | 93,000 | 87,900 | 300 | 3,300 | 1,500 | 0 | 0 | 93,000 |
| Support and Management Organizations | | | | | | | | | | | |
| Mission Support OGC | PO | | 0 | 0 | 64,600 | 15,620 | 20,149 | 10,400 | 9,197 | 45,427 | 165,666 |
| Site Activation OGC | PO | | 0 | 0 | 1,300 | 1,000 | 900 | 800 | 300 | 800 | 5,100 |
| Miscellaneous | PO | | 0 | 0 | 0 | 1,116 | 2,620 | 991 | 998 | 0 | 5,725 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| Combined Test Force (CTF) | PO | | 0 | 0 | 119,300 | 30,200 | 22,400 | 8,400 | 0 | 0 | 180,300 |
| Live Fire Test | PO | | 0 | 0 | 5,500 | 3,700 | 2,300 | 0 | 0 | 0 | 11,500 |
| Other | PO | | 0 | 0 | 12,200 | 100 | 300 | 0 | 0 | 0 | 12,600 |
| Total | | | | | 5,257,600 | 230,416 | 184,505 | 85,753 | 15,695 | 51,622 | 5,825,591 |

**Government Furnished Property:** N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training (SUPT)

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 5,184 | 36,322 | 63,042 | 100,417 | 66,349 | 47,332 | 23,607 | 12,832 | 13,200 | 384,329 |
| T-1A Tanker-Transport Training System, 3853 | 2,205 | 188 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,233 |
| T-3A Enhanced Flight Screener, 4228 | 191 | 188 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 583 |
| Joint Primary Aircraft Training System, 4102 | 2,788 | 35,946 | 47,024 | 76,639 | 55,404 | 47,332 | 23,607 | 12,832 | 13,200 | 317,772 |
| T-38 Avionics Upgrade, 4376 | 0 | 0 | 16,018 | 23,778 | 10,945 | 0 | 0 | 0 | 0 | 50,741 |

(U) A. Mission Description and Budget Item Justification

Supports Air Education and Training Command's (AETC) implementation of Specialized Undergraduate Pilot Training (SUPT) and the Department of Defense initiative for joint pilot training. The T-1A is a derivative of the commercially available Beech 400A "Beechjet," missionized for the training role. The aircraft will accommodate an instructor and two students. The T-1A Ground Based Training System (GBTS) includes compatible simulators, mock-ups, courseware, syllabus, and student management and scheduling. The Tanker-Transport syllabus includes training in high and low altitude instrument approaches, crew coordination, asymmetric thrust situations, airdrop fundamentals, low-level navigation, airborne rendezvous, and cell formation. The T-3A Enhanced Flight Screener (EFS) will be used at the United States Air Force Academy and Hondo Field, Texas to standardize flight screening prior to SUPT. The aircraft is aerobatic certified and has side-by-side seating, dual stick controls, dual throttles, and tricycle gear. The Joint Primary Aircraft Training System (JPATS) is a joint USAF/USN venture to replace the Services' fleets of primary trainer aircraft (T-37 and T-34 respectively) and associated GBTS. The Air Force is the lead or Executive Service. The T-38 Avionics Upgrade is planned as an integrated modernization of the T-38 and AT-38 cockpits to support mission ready bomber/fighter training. Since much of the work in this program element involves the missionizing of commercial aircraft and components, the category of research being performed is 6.5, Engineering and Manufacturing Development

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training (SUPT)

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 5,604 | 41,633 | 85,395 | 80,962 | 302,582 |
| Appropriated Value | 5,604 | 37,433 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | -31 | -408 | | | |
| b. SBIR | -64 | -703 | | | |
| c. Omnibus or Other Above Threshold Reprogramming | -300 | | | | |
| d. Below Threshold Reprogramming | -25 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -22,353 | 19,455 | |
| Current Budget Submit/President's Budget | 5,184 | 36,322 | 63,042 | 100,417 | 384,339 |

(U) Change Summary Explanation:

(U) Funding: Establishment of a new project, T-38 Avionics Upgrade. FY95 reductions include undistributed congressional reductions and Small Business Innovation Research

(U) Schedule: Delay JPATS manufacturing development contract award to Aug 95; accommodate restructured JPATS production program with slower ramp to a maximum quantity of 36 (vice 48) Air Force aircraft per year

(U) Technical: Update JPATS Ground Based Training System (GBTS) to ORD II requirements

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training (SUPT)

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, Air Force | | | | | | | | | | |
| T-1A TTTS | 152,958 | 185,223 | 46,792 | 4945 | 0 | 0 | 0 | 0 | 0 | 1,039,872 |
| T-3A Enhanced Flight Screener | 11,511 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41,113 |
| JPATS | 0 | 92,654 | 54,968 | 109,119 | 132,392 | 136,881 | 169,208 | 222,903 | 2,651,500 | 3,569,581 |
| (Quantity) | | (3) | (3) | (12) | (18) | (18) | (24) | (30) | (264) | (372) |
| T-38 Avionics Upgrade | 0 | 0 | 0 | 0 | 31,321 | 128,913 | 118,244 | 124,063 | 249,059 | 651,600 |
| Aircraft Procurement, Navy, 0804745N, Undergraduate Pilot Training, 033900 | | | | | | | | | | |
| JPATS | 0 | 0 | 0 | 0 | 0 | 0 | 108,356 | 209,920 | 2,799,013 | 3,117,289 |
| (Quantity) | | | | | | | (8) | (24) | (307) | (339) |
| Military Construction, Air Force | | | | | | | | | | |
| JPATS | 0 | 0 | 0 | 2,470 | 3,300 | 0 | 3,200 | 0 | 10,600 | 19,570 |
| Related RDT&E: | | | | | | | | | | |
| RDT&E, Navy, 0603208N, Training System Aircraft, H1150 | | | | | | | | | | |
| JPATS | 3,580 | 3,752 | 2,553 | 3,494 | 3,674 | 0 | 0 | 0 | 0 | 17,053 |

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Reference individual project data | | | | | | | | | | | | | | | | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 3853

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| T-1A Tanker-Transport Training System | 2,205 | 188 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,233 |

(U) A. Mission Description and Budget Item Justification

The T-1A is a program to missionize a small business jet aircraft (Beech 400A) to implement the tanker-transport track of Specialized Undergraduate Pilot Training (SUPT).

(U) FY 1994
- (U) Provide mission support for operation of the T-1A System Program Office ($2,205K)

(U) FY 1995
- (U) Provide mission support for operation of the T-1A System Program Office (188K)

(U) FY 1996
- (U) None

(U) FY 1997
- (U) None

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 3853

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,205 | 2,188 | 0 | 0 | 17,233 |
| Appropriated Value | 2,205 | 188 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | | | | |
| b. SBIR | | | | | |
| c. Omnibus or Other Above Threshold Reprogramming | | | | | |
| d. Below Threshold Reprogramming | | | | | |
| Adjustments to Budget Years Since FY95 PB | | | | | |
| Current Budget Submit/President's Budget | 2,205 | 188 | 0 | 0 | 15,233 |

(U) Change Summary Explanation:

(U) Funding: N/A

(U) Schedule: N/A

(U) Technical: N/A

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, Air Force | | | | | | | | | | |
| T-1A TTTS | 152,958 | 185,223 | 46,792 | 4,845 | 0 | 0 | 0 | 0 | 0 | 1,039,872 |
| (Quantity) | (35) | (32) | (0) | (0) | | | | | | (180) |

Related RDT&E: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 3853

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Acquisition Milestones | | | | | | | | | | | | | | | | |
| Engineering Milestones | | | | | | | | | | | | | | | | |
| T&E Milestones | | | | | | | | | | | | | | | | |
| Contract Milestones | | | | | | | | | | | | | | | | |
| Other Program Events | | | | | | | | | | | | | | | | |
| Begin Aircraft Deliveries Laughlin AFB | x* | | | | | | | | | | | | | | | |
| Complete Aircraft Deliveries Randolph AFB | x* | | | | | | | | | | | | | | | |
| Simulator Deliveries Laughlin AFB | | x* | | | | | | | | | | | | | | |
| Begin Aircraft Deliveries Vance AFB | | | | | x* | | | | | | | | | | | |
| Complete Aircraft Deliveries Laughlin AFB | | | | | | x | | | | | | | | | | |
| Simulator Deliveries Vance AFB | | | | | | | | x | | | | | | | | |
| Complete Aircraft Deliveries Vance AFB | | | | | | | | | | x | | | | | | |
| Begin Aircraft Deliveries Columbus AFB | | | | | | | | | | | x | | | | | |
| Simulator Deliveries Columbus AFB | | | | | | | | | | | | x | | | | |
| Complete Aircraft Deliveries Columbus AFB | | | | | | | | | | | | | | | x | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 3853

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Mission Support | 2,205 | 188 | 0 | 0 |
| Total | 2,205 | 188 | 0 | 0 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 3853

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| N/A | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| Misc | Misc | Misc | N/A | N/A | 12,840 | 2,205 | 188 | 0 | 0 | 0 | 15,233 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

Note: No RDT&E contract exceeds $1 million.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5, Engineering and Manufacturing Development | 0604233F, Specialized Undergraduate Pilot Training | 3853 |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:** N/A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development<br>Subtotal Support and Management<br>Subtotal Test and Evaluation | 12,840 | 2,205 | 188 | 0 | 0 | 0 | 15,233 |
| Total Project | 12,840 | 2,205 | 188 | 0 | 0 | 0 | 15,233 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4228

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| T-3A Enhanced Flight Screener | 191 | 188 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 583 |

(U) A. Mission Description and Budget Item Justification

The T-3A Enhanced Flight Screener, a missionized Slingsby Firefly, is a more capable and maneuverable replacement for the aging T-41. The T-3A will provide a more thorough assessment of candidates' capabilities, lowering the washout rate in pilot training.

(U) FY 1994
- (U) Provide mission suport for the operation of the T-3A System Program Office ($191K)

(U) FY 1995
- (U) Provide mission suport for the operation of the T-3A System Program Office ($188K)

(U) FY 1996
- (U) None

(U) FY 1997
- (U) None

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4228

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 191 | 188 | 0 | 0 | 583 |
| Appropriated Value | 191 | 188 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | | | | |
| b. SBIR | | | | | |
| c. Omnibus or Other Above Threshold Reprogramming | | | | | |
| d. Below Threshold Reprogramming | | | | | |
| Adjustments to Budget Years Since FY95 PB | | | | | |
| Current Budget Submit/President's Budget | 191 | 188 | 0 | 0 | 583 |

(U) Change Summary Explanation:

(U) Funding: N/A

(U) Schedule: N/A

(U) Technical: N/A

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, Air Force | | | | | | | | | | |
| T-3A Enhanced Flight Screener | 11,511 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42,043 |
| (Quantity) | (33) | | | | | | | | | (113) |

Related RDT&E: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4228

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Acquisition Milestones | | | | | | | | | | | | | | | | |
| Engineering Milestones | | | | | | | | | | | | | | | | |
| Functional/Physical Configuration Audits | | | | x* | | | | | | | | | | | | |
| T&E Milestones | | | | | | | | | | | | | | | | |
| Complete QOT&E | | | | x* | | | | | | | | | | | | |
| Contract Milestones | | | | | | | | | | | | | | | | |
| Production Certification (Plant) | | | | x* | | | | | | | | | | | | |
| Other Program Events | | | | | | | | | | | | | | | | |
| Required Assets Available (RAA) 28 Aircraft at Hondo | | | x | | | | | | | | | | | | | |
| RAA 29 Aircraft at USAF Academy | | | | | x | | | | | | | | | | | |
| FOC 56 Aircraft at USAF Academy | | | | | | | x | | | | | | | | | |
| FOC 57 Aircraft at Hondo | | | | | | | | | x | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4228

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Mission Support | 191 | 188 | 0 | 0 |
| Total | 191 | 188 | 0 | 0 |

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| N/A | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| Misc | MIsc | Misc | N/A | N/A | 204 | 191 | 188 | 0 | 0 | 0 | 583 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| N/A | | | | | | | | | | | |

Note: No RDT&E contract exceeds $1 million.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4228

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:** N/A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development<br>Subtotal Support and Management<br>Subtotal Test and Evaluation | 204 | 191 | 188 | 0 | 0 | 0 | 583 |
| Total Project | 204 | 191 | 188 | 0 | 0 | 0 | 583 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4102

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Joint Primary Aircraft Training System (JPATS) | 2,788 | 35,946 | 47,024 | 76,639 | 55,404 | 47332 | 23,607 | 12,832 | 13,200 | 317,772 |

(U) A. Mission Description and Budget Item Justification

The Joint Primary Aircraft Training System (JPATS) is a joint USAF/USN venture to replace the Services' fleets of primary trainer aircraft (T-37 and T-34 respectively) and associated Ground Based Training Systems (GBTS). The aircraft and GBTS will be used to train entry level student aviators in the fundamentals of flying so they can transition into advanced tracks leading to qualification as military pilots, navigators, and Naval Flight officers. The program includes the purchase of aircraft, simulators, and other associated ground-based training devices, training management systems, instructional courseware, and logistics support. Funding reflects the requirements of the Sep 93 Operational Requirements Document.

(U) FY 1994
- (U) Released JPATS acquisition Request for Proposal May 94; began aircraft Source Selection including candidate flight evaluations Jul 94; completed Acquisition Decision Memorandum (ADM)-directed Streamlining Working Group review; acquired/modified test dummies to support DOD-directed, expanded anthropometric requirements; completed Ground Based Training System (GBTS) baseline package ($2,788K)

(U) FY 1995
- (U) Award acquisition contract for manufacturing development phase ($33,446K)
- (U) Begin GBTS Contract Change Proposal, and mission support ($2,500K)

(U) FY 1996
- (U) Modify contract to support GBTS development ($1,600K)
- (U) Begin escape system and birdstrike testing; continue Airframe Structural Integrity Program (ASIP) and Engine Structural Integrity Program (ENSIP); and continue missionization ($43,624K)
- (U) Mission support ($1,800K)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4102

(U) FY 1997
- (U) Complete first aircraft and begin flight test, continue GBTS development ($74,839K)
- (U) Mission support ($1,800K)

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 3,208 | 39,257 | 85,395 | 80,962 | 285,000 |
| Appropriated Value | 3,208 | 37,057 | | | |
| Adjustments to Appropriated Value | -420 | -1,111 | | | |
| a. Cong Gen Reductions | -31 | -408 | | | |
| b. SBIR | -64 | -703 | | | |
| c. Omnibus or Other Above Threshold Reprogramming | -300 | | | | |
| d. Below Threshold Reprogramming | -25 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -22,353 | 19,455 | |
| Current Budget Submit/President's Budget | 2,788 | 35,946 | 47,024 | 76,639 | 317,772 |

(U) Change Summary Explanation:

(U) Funding: FY95 reflects undistributed congressional reductions and Small Business Innovation Research (SBIR). Other changes are reflected in schedule and technical changes along with inflation adjustments

(U) Schedule: Delay manufacturing development contract award to Aug 95; accommodate program with slower ramp up to a maximum production rate of 36 (vice 48) Air Force aircraft per year

(U) Technical: Update of GBTS to ORD II requirements

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4102

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, Air Force | | | | | | | | | | |
| JPATS | 0 | 92,610 | 54,968 | 109,119 | 132,392 | 136,881 | 169,208 | 222,903 | 2,651,500 | 3,569,581 |
| (Quantity) | | (3) | (3) | (12) | (18) | (18) | (24) | (30) | (264) | (372) |
| Aircraft Procurement, Navy, 0804745N, Undergraduate Pilot Training, 033900 | | | | | | | | | | |
| JPATS | 0 | 0 | 0 | 0 | 0 | 0 | 108,356 | 209,920 | 2,799,013 | 3,117,289 |
| (Quantity) | | | | | | | (8) | (24) | (307) | (339) |
| Military Construction, Air Force | | | | | | | | | | |
| JPATS | 0 | 0 | 0 | 2,470 | 3,300 | 0 | 3,200 | 0 | 10,600 | 19,570 |
| Related RDT&E: | | | | | | | | | | |
| RDT&E, Navy, 0603208N, Training System Aircraft, H1150 | | | | | | | | | | |
| JPATS | 3,580 | 3,752 | 2,553 | 3,494 | 3,674 | 0 | 0 | 0 | 0 | 17,053 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4102

(U) D. Schedule Profile

| | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Acquisition Milestones | | | | | | | | | | | | | | | | | |
| Milestone II | | | | | | | | | x | | | | | | | | |
| Engineering Milestones | | | | | | | | | | | | | | | | | |
| Aircraft PDR | | | | | | | | | | | x | | | | | | |
| Aircraft CDR | | | | | | | | | | | | | x | | | | |
| T&E Milestones | | | | | | | | | | | | | | | | | |
| Start Source Selection Flight Evaluation | | | | | x* | | | | | | | | | | | | |
| Early Operational Assessment | | | | | x* | | | | | | | | | | | | |
| Contract Milestones | | | | | | | | | | | | | | | | | |
| Release Aircraft RFP | | | | x* | | | | | | | | | | | | | |
| Begin Source Selection | | | | | x* | | | | | | | | | | | | |
| Aircraft Contract Award | | | | | | | | | x | | | | | | | | |
| GBTS Contract Change Proposal | | | | | | | | | | | | | x | | | | |
| Other Program Events | | | | | | | | | | | | | | | | | |
| Start Aircraft QT&E | 1Q98 | | | | | | | | | | | | | | | | |
| Finish Aircraft QT&E | 3Q98 | | | | | | | | | | | | | | | | |
| First Aircraft Delivery | 3Q98 | | | | | | | | | | | | | | | | |
| Start Aircraft Multi-Service OT&E | 1Q99 | | | | | | | | | | | | | | | | |
| Complete Aircraft Multi-Service OT&E | 2Q99 | | | | | | | | | | | | | | | | |
| GBTS-level CDR | 2Q99 | | | | | | | | | | | | | | | | |
| Milestone III | 3Q99 | | | | | | | | | | | | | | | | |
| Start GBTS DT/OT&E | 2Q00 | | | | | | | | | | | | | | | | |
| Full Rate Production Contract Award | 3Q00 | | | | | | | | | | | | | | | | |
| IOC Air Force | 4Q01 | | | | | | | | | | | | | | | | |
| IOC Navy | 1Q03 | | | | | | | | | | | | | | | | |
| FOC Air Force | 4Q11 | | | | | | | | | | | | | | | | |
| FOC Navy | 2Q17 | | | | | | | | | | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4102

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Airframe/Engine | 0 | 3,200 | 6,700 | 6,800 |
| Avionics | 0 | 200 | 500 | 500 |
| System Engineering/Program Management | 0 | 700 | 1,100 | 700 |
| Test | 0 | 12,300 | 18,700 | 12,100 |
| Support Equipment | 0 | 300 | 1,300 | 800 |
| Nonrecurring Missionization | 0 | 8,800 | 10,200 | 4,900 |
| Data | 0 | 500 | 700 | 500 |
| Type I Training | 0 | 2,449 | 400 | 0 |
| Mission Support | 2,788 | 2,500 | 1,800 | 1,800 |
| ECO | 0 | 1,497 | 3,324 | 1,339 |
| Award Fee | 0 | 3,500 | 700 | 1,200 |
| Curriculum Development | 0 | 0 | 0 | 2,400 |
| Operational Flight Trainer | 0 | 0 | 0 | 13,500 |
| Training Management System | 0 | 0 | 1,500 | 20,600 |
| Other Training Devices | 0 | 0 | 100 | 3,500 |
| Total | 2,788 | 35,946 | 47,024 | 76,639 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4102

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| TBD | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| Misc | Misc | Misc | N/A | N/A | 3,000 | 2,788 | 2,500 | 1,800 | 1,800 | 18,400 | 30,288 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| TBD | | | | | | | | | | | |

Note: Breakout of FY95 and beyond funding will be determined based on contractor selected.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5, Engineering and Manufacturing Development | 0604233F, Specialized Undergraduate Pilot Training | 4102 |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:** N/A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development<br>Subtotal Support and Management<br>Subtotal Test and Evaluation | 3,000 | 2,788 | 2,500 | 1,800 | 1,800 | 18,400 | 30,288 |
| Total Project | 3,000 | 2,788 | 35,946 | 47,024 | 76,639 | 152,375 | 329,475 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4376

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| T-38 Avionics Upgrade | 0 | 0 | 16,018 | 23,778 | 10,945 | 0 | 0 | 0 | 0 | 50,741 |

(U) A. Mission Description and Budget Item Justification

The T-38 Avionics Upgrade is planned as an integrated modernization of the T-38 and AT-38 cockpits to support mission-ready bomber/fighter training. The modern, digital cockpit will include Global Positioning System (GPS), Heads-Up Displays (HUDs), Inertial Navigation System (INS), Multi-function Displays (MFDs), and hands-On Throttle and Stick (HOTAS) switchology. HUD symbology will be the new USAF standard recently certified as a primary flight reference. The program includes the design, integration, test, and kit-proofing of the cockpit prototype aircraft, simulators, and other training devices.

(U) FY 1994
- (U) Completed Cockpit Upgrade Avionics Study (PE65808F and PE64201F funded)

(U) FY 1995
- (U) Develop and finalize acquisition strategy; develop System Requirements Document; develop and release Request for Proposal (RFP), receive proposals, and begin Source Selection (PE64201F funded)

(U) FY 1996
- (U) Complete Source Selection process; award contract for Engineering and Manufacturing Development (EMD) with options for production, installation and support for 425 AT/T-38 aircraft; begin EMD - conduct System Requirement Review; conduct hardware Preliminary Design Review (PDR) ($16,018K)

(U) FY 1997
- (U) Continue EMD phase - conduct system/software PDR and Critical Design Review (CDR); start system integration and contractor testing and complete demonstrations ($23,778K)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4376

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| Appropriated Value | 0 | 0 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | | | | |
| b. SBIR | | | | | |
| c. Omnibus or Other Above Threshold Reprogramming | | | | | |
| d. Below threshold Reprogramming | | | | | |
| Adjustments to Budget Years Since FY95 PB | | | 16,018 | 23,778 | |
| Current Budget Submit/President's Budget | 0 | 0 | 16,018 | 23,778 | 50,741 |

(U) Change Summary Explanation:

(U) Funding: Establishment of new project

(U) Schedule: N/A

(U) Technical: N/A

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, Air Force | | | | | | | | | | |
| 0804741F Avionics Upgrade, MN-6029 | 0 | 0 | 0 | 0 | 31,321 | 128,913 | 118,244 | 124,063 | 249,059 | 651,600 |

Related RDT&E: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4376

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **Acquisition Milestones** | | | | | | | | | | | | | | | | |
| Strategic Roundtable | | | | | x | | | | | | | | | | | |
| Tactical Roundtable | | | | | | x | | | | | | | | | | |
| Milestone 0/I/II | | | | | | | x | | | | | | | | | |
| **Engineering Milestones** | | | | | | | | | | | | | | | | |
| Completed T-38 Avionics Upgrade Study | x | | | | | | | | | | | | | | | |
| Develop Systems requirement Document | | | | | | | | x | | | | | | | | |
| Begin Engineering and Manufacturing Development (EMD) | | | | | | | | | | x | | | | | | |
| Complete PDRs (H/W, S/W, System) | | | | | | | | | | | | | x | | | |
| Complete CDR (H/W, S/W, System) | | | | | | | | | | | | | | | x | |
| **T&E Milestones** | | | | | | | | | | | | | | | | |
| Draft Test and Evaluation Master Plan (TEMP) | | | | | | | x | | | | | | | | | |
| TEMP | | | | | | | | | x | | | | | | | |
| Begin Systems Integration Laboratory Demonstrations | | | | | | | | | | | | x | | | | |
| Begin Contractor System Testing | | | | | | | | | | | | | | | x | |
| **Contract Milestones** | | | | | | | | | | | | | | | | |
| Release Request for Proposal (RFP) | | | | | | | | x | | | | | | | | |
| Source Selection | | | | | | | | | x | | | | | | | |
| Contract award | | | | | | | | | | x | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4376

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Prime Mission Equipment | | | 584 | 248 |
| Platform Integration | | | | |
| - Electronic System Integration | | | 3,617 | 3609 |
| - Platform Mod Kit | | | | 6,817 |
| - Platform Software | | | 4,786 | 4,429 |
| System Test & Evaluation | | | | |
| - Developmental Test & Evaluation | | | 211 | 2,465 |
| - Mockups | | | 1,370 | 903 |
| - Test & Evaluation Support | | | 2 | 174 |
| System Engineering / Project Management | | | | |
| - System Engineering (NON - ILS) | | | 218 | 214 |
| - System Engineering Program Management | | | 1,617 | 1,308 |
| Technical Data | | | | |
| - Data (NON - ILS) | | | 36 | 15 |
| - Data (ILS) | | | 1,303 | 1,297 |
| Training | | | | |
| - Training Equipment | | | 1,128 | 1,143 |
| Spare & Repair Parts | | | | |
| - Initial Spare & Repair Parts | | | 64 | 59 |
| Other (Engineering Change Order & Other Government Costs) | | | 1,082 | 1,097 |
| Total | | | 16,018 | 23,778 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4376

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| TBD | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| TBD | | | | | | | | | | | |
| Test and Evaluation Organizations | | | | | | | | | | | |
| TBD | | | | | | | | | | | |

Note: Breakout by performing organization not available at this time; will be estimated after Acquisition Strategy Panel.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604233F, Specialized Undergraduate Pilot Training

PROJECT NO.: 4376

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:** N/A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Subtotal Product Development | | | | | | | |
| Subtotal Support and Management | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | |
| Total Project | 0 | 0 | 0 | 16,018 | 23,778 | 10,945 | 50,741 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604239F F-22 EMD

| COST ($ in Thousands) | FY 1994 & Prior | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost* (FY94-Compl) |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 9,566,953 | 2,281,135 | 2,138,718 | 1,957,067 | 1,355,019 | 997,118 | 781,521 | 404,776 | 0 | 19,482,307 |

* FY95 and FY96 budget reductions have left insufficient funding to meet current contract requirements. Based on experience from past renegotiations, we estimate first flight will slip three months and all subsequent milestones will slip six months. The resulting cost increase to the Engineering and Manufacturing Development (EMD) program is currently being assessed and will be reflected in future program documentation.

A. (U) Mission Description and Budget Item Justification
(Dollars in Thousands)

(U) The F-22 Program is developing the next-generation air superiority fighter for the USAF to counter emerging worldwide threats. The F-22 is designed to penetrate enemy airspace and achieve a first look, first kill capability against multiple targets. The F-22 is characterized by a low observable, highly maneuverable airframe, advanced integrated avionics, and aerodynamic performance that allows supersonic cruise without the use of afterburner. The F-22 is currently in the Engineering and Manufacturing Development (EMD) phase of acquisition and plans to release long lead production funding for Pre-Production Verification (PPV) aircraft in FY97. The contract is Cost Plus Award Fee with Lockheed Aeronautical Systems Company (LASC) and Pratt & Whitney (P&W) to produce the F119 engines. The engines are provided to LASC as Government Furnished Equipment (GFE).

The EMD phase effort consists of:
- Design, fabrication, development, test and delivery of nine flight test vehicles (7 single seat and 2 dual seat) and two ground test vehicles (static and fatigue).
- Design, fabrication, development, test, and delivery of 27 flight qualified engines.
- Design, fabrication, development, integration, and test of the EMD avionics suite including air-to-surface provisions.
- Updating the YF-22 Avionics Flying Laboratory with EMD assets and software to become a Flying Test Bed (FTB) to support avionics integration.
- Design, development, and test of F-22 weapon system support and training systems.
- Renovation of facilities at Edwards Air Force Base (AFB) in support of the F-22 program.

(U) FY 1994
- (U) Air Vehicle ($1,144,495)
  - Initiated fabrication of EMD aircraft #1 parts. (Not Separately Priced (NSP))
  - Continued subsystem design, development, and test activity. Accomplished over 80% of detailed weapon system design. (NSP)
  - Completed Training Systems Requirements Review Update (RRU). (NSP)
  - Initiated initial Production Readiness Review (PRR) assessments. (NSP)
  - Design of Integrated Maintenance Information System (IMIS) completed. (NSP)
  - Continued design and development of Air Vehicle support system products. (NSP)
  - Depot Support Planning (NSP)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering & Manufacturing Development | PE NUMBER AND TITLE: 0604239F F-22 EMD |

A. (U) Mission Description and Budget Item Justification (CON'T)
(Dollars In Thousands)

- (U) Avionics ($643,798)
  - Conducted successful mission software Preliminary Design Review (PDR). (Not Separately Priced (NSP))
  - Conducted successful Radar Core, Controls & Displays (C&D), Stores Management System (SMS) Critical Design Reviews (CDR). (NSP)
  - Finalized Flying Test Bed (FTB) requirements. (NSP)
  - Continued avionics subsystem design in preparation of CDR. (NSP)
  - Accomplished definition of system modeling/simulation requirements (NSP)
- (U) Engine ($270,511)
  - Continued engine development test program with 3 engines. (NSP)
  - Continued analysis and redesign of development engine components. (NSP)
  - Continued design and development of engine support system products. (NSP)

(U) FY 1995
- (U) Air Vehicle ($1,381,763 )
  - Finalize FTB test configuration. (NSP)
  - Complete Air Vehicle CDR/Initial Production Readiness Review (PRR). (NSP)
  - Continue to design/fabricate support system equipment for test. (NSP)
  - Continue technical order development. (NSP)
  - Initiate assembly of Engineering and Manufacturing Development (EMD) aircraft #1. (NSP)
  - Fabricate major sub-assembly items for EMD aircraft #2 and Static Test aircraft. (NSP)
  - Continue Detailed Design. (NSP)
  - Continue design and development of Air Vehicle support system products (NSP)
  - Depot support planning. (NSP)
  - Fabricate & deliver Support Equipment (SE) in support of final aircraft assembly. (NSP)
- (U) Avionics ($636,319)
  - Continue development of initial Block 0 software release. (NSP)
  - Conduct Avionics, subsystem CDR's. (NSP)
  - Conduct mission software Block 1 CDR, initiate Block 2 design. (NSP)
  - Initiate FTB design and structural modification design. (NSP)
  - Controls & Displays (C&D), Stores Management System (SMS) first article delivery. (NSP)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering & Manufacturing Development | PE NUMBER AND TITLE<br>0604239F F-22 EMD |

A. (U) Mission Description and Budget Item Justification (CON'T)
(Dollars in Thousands)

- (U) Engine ($292,638)
  - Continue engine development test program-add (2) test engines (5 Total). (Not Separately Priced (NSP))
  - Initiate long lead for initial flight test engines. (NSP)
  - Continued engine support system product development/fabrication for flight test. (NSP)

(U) FY 1996
- (U) Air Vehicle ($1,358,175)
  - Complete assembly of Engineering and Manufacturing Development (EMD) aircraft #1 and #2. (NSP)
  - Software Block 0 release. (NSP)
  - Initiate assembly of static test article, and EMD aircraft #3. (NSP)
  - Initiate modification of Flying Test Bed (FTB). (NSP)
  - Initiate fabrication of fatigue article. (NSP)
  - Fabricate Support System elements for F-22 first flight. (NSP)
  - Conduct Two-Seat Air Vehicle Preliminary Design Review (PDR). (NSP)
  - Complete Two-Seat Air Vehicle Critical Design Review (CDR). (NSP)
  - Complete Training System Requirements Description Review Update. (NSP)
  - Continued design and development of Air Vehicle support system product (NSP)
  - Depot support planning (NSP)
  - Complete fabrication & delivery of Support Equipment in support of final assembly. (NSP)
  - Fabricate & deliver Support Equipment to support flight test. (NSP)
  - Complete initial depot activation planning. (NSP)
- (U) Avionics ($502,339)
  - Conduct mission software Block 2 PDR, Block 2 CDR. (NSP)
  - Complete mission software Block 1 coding, Computer Software Component (CSC) test. (NSP)
  - Inertial Reference System (IRS), Common Integrated Processor (CIP) first article delivery. (NSP)
  - Initiate mission software Block 3 design. (NSP)
  - Continue FTB modification and initial avionics installation. (NSP)
- (U) Engine ($278,204)
  - Continued engine development test program and initial flight clearance qualification. (NSP)
  - Build and test initial flight test engines. (NSP)
  - Deliver and validate engine support system products. (NSP)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering & Manufacturing Development | PE NUMBER AND TITLE<br>0604239F F-22 EMD |

A. (U) Mission Description and Budget Item Justification (CON'T)
(Dollars in Thousands)

(U) FY 1997

- (U) Air Vehicle ($1,337,587)
  - Conduct Interim Production Readiness Review (PRR). (Not Separately Priced (NSP))
  - Conduct F-22 first flight. (NSP)
  - Continue modification of Flying Test Bed (FTB). (NSP)
  - Fabricate fatigue test article. (NSP)
  - Initiate test of static article. (NSP)
  - Initiate fabrication of Engineering & Manufacturing Development (EMD) aircraft #4, #5, #6, and #7. (NSP)
  - Complete Requirements Review for Initial Operations and Depot. (NSP)
  - Design, development, and verification of Air Vehicle support system products (NSP)
  - Depot Support Planning (NSP)
  - Conduct First Flight Readiness Review (FRR). (NSP)
  - Tech order data for 1st Developmental Test & Evaluation (DT&E) aircraft available. (NSP)
  - Integrated Maintenance Information System (IMIS) for flight test available. (NSP)
  - Initial Operations/Depot Requirements Review. (NSP)
  - Supply Support Provisioning Management System implemented. (NSP)
  - Complete initial supportability assessment. (NSP)
- (U) Avionics ($423,786)
  - Continue Avionics Integration Laboratory (AIL) integration in preparation of Block 1 integration testing. (NSP)
  - Complete FTB modifications, conduct air worthiness review. (NSP)
  - Complete mission software Block 2 coding and integration test. (NSP)
  - Conduct mission software Block 3 Preliminary Design Review (PDR) and Critical Design Review (CDR). (NSP)
  - Communication, Navigation, and Identification (CNI) first article delivery. (NSP)
  - Complete mission software Block 1 Integration. (NSP)
  - Complete mission software Block 2 coding and Computer Software Unit (CSU) test. (NSP)
- (U) Engine ($195,694)
  - Initiate production engine qualification testing. (NSP)
  - Deliver and support flight test engines. (NSP)
  - Begin verification of engine support system products. (NSP)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604239F F-22 EMD

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost (FY94 - Compl) |
|---|---|---|---|---|---|
| Previous President's Budget (FY95 PB) | 2,082,904 | 2,461,149 | 2,318,520 | 1,582,961 | 18,879,400 |
| Appropriated Value | 2,082,904 | 2,351,049 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Undistributed General Reductions | -24,100 | -25,757 | | | |
| b. Below Threshold Reprogrammings | | | | | |
| c. Small Business Innovative Research (SBIR) | | -44,157 | | | |
| d. Adjustments to Budget Years Since FY95 PB | | | -179,802 | 374,106 | |
| Current Budget Submit/President's Budget | 2,058,804 | 2,281,135 | 2,138,718 | 1,957,067 | 19,482,307 |

Change Summary Explanation:

FY96 PB Funding Changes:
- FY94/95 Budget Cut Restoral
- SBIR Restoral
- HAZMAT Policy Compliance
- MILCON Schedule Adjustment
- Congressional cut of $110M in FY95
- OSD cut of $200M in FY96
- Adjustment of Inflation Indices

FY96 PB Schedule Changes:
- 3 month slip in Critical Design Review (CDR)/8 month slip in first flight as a result of FY94 and FY95 funding reductions.
- Production slip of one year also resulting from FY94/FY95 Funding reductions
- FY95 and FY96 budget reductions have left insufficient funding to meet current contract requirements. Negotiations with the development contractors to reschedule FY95 and FY96 efforts have been initiated. Initial estimates of the schedule impacts are 3 month slip in first flight, 6 month delay to production and Initial Operational Capability (IOC).

FY96 PB Technical Changes:
- JTIDS-Receive Only, AIM-9X, and Helmet Mounted Cueing System integration capability were added to the baseline aircraft as POM initiatives

| | DATE |
|---|---|
| | February 1995 |

| BUDGET ACTIVITY | PE NUMBER AND TITLE |
|---|---|
| 5 - Engineering & Manufacturing Development | 0604239F F-22 EMD |

C. (U) Other Program Funding Summary ($ in Thousands)

| | PY | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl* | Total Cost* |
|---|---|---|---|---|---|---|---|---|---|---|
| Military Construction (PE 0604239F) | 0 | 4,550 | 12,100 | 4,400 | 0 | 0 | 0 | 0 | 0 | 21,050 |
| Military Construction (PE 0207219F) | 0 | 0 | 0 | 0 | 5,500 | 4,400 | 20,423 | 25,250 | 108,600 | 164,173 |
| Aircraft Procurement (PE 0207219F) | 0 | 0 | 0 | 91,368 | 996,729 | 1,221,947 | 2,253,458 | 3,554,469 | 45,868,029 | 53,986,000 |

D. (U) Schedule Profile*

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FY Quarter | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Aircraft Delivered (EMD Test Articles) | | | | | | | | | | | | | | 1 | | 1 |

Program Milestones
- DAB: PPV Full release; LRIP LL, 1QFY98
- DAB Review MS III, 2QFY2002

Engineering Milestones
- Air Vehicle CDR, 2QFY95 — X
- 2 Seat Air Vehicle CDR, 4QFY96 — X
- First Flight, 2QFY97 — X
- First Avionics Flight, 4QFY98

T&E Milestones
- DT&E First Flight, 2QFY97 — X
- Dedicated IOT&E, 2QFY01

EMD = Engineering & Manufacturing Development, DAB = Defense Acquisition Board, PPV = Pre-Production Verification (Aircraft) , LRIP = Low Rate Initial Production, LL = Long Lead, MS = Milestone, CDR = Critical Design Review, DT&E = Developmental Test & Evaluation, IOT&E = Initial Operational Test & Evaluation

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| ENGINEERING & MANUFACTURING DEVELOPMENT | 0604239F F-22 EMD | 4069 |

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Air Vehicle/Avionics | 1,739,977 | 1,942,063 | 1,803,599 | 1,688,465 |
| Engine | 263,291 | 285,700 | 269,700 | 184,800 |
| Government Cost | | | | |
| - Government Test | 36,037 | 27,336 | 48,075 | 61,916 |
| - Mission Support | 13,600 | 16,600 | 14,664 | 15,108 |
| - GFE | 5,899 | 9,436 | 2,680 | 6,778 |
| Total | 2,058,804 | 2,281,135 | 2,138,718 | 1,957,067 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604239F F-22 EMD

PROJECT NO.: 4069

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC** | Project Office EAC** | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete* | Total Program* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Lockheed (Air Veh) | C/CPAF | Aug 91 | 11,169,100 | 12,778,200 | 2,896,700 | 1,739,977 | 1,942,063 | 1,803,599 | 1,688,465 | 2,770,115 | 12,840,919 |
| Pratt & Whitney | C/CPAF | Aug 91 | 1,904,800 | 2,134,100 | 743,309 | 263,291 | 285,700 | 269,700 | 184,800 | 197,245 | 1,944,045 |
| Support and Management Organizations | | | | | | | | | | | |
| Support Contracts | Various | Various | | | 3,116 | 1,997 | 2,368 | 2,375 | 2,390 | 6,772 | 19,018 |
| In House Support | Various | Various | | | 18,884 | 11,603 | 14,232 | 12,289 | 12,718 | 65,112 | 134,838 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| AEDC | PO | | | | 53,972 | 22,952 | 17,174 | 21,861 | 19,115 | 20,158 | 155,232 |
| AFFTC | PO | | | | 5,681 | 6,000 | 9,550 | 13,777 | 33,995 | 445,354 | 514,357 |
| All other test | Various | Various | | | 4,310 | 7,085 | 612 | 12,437 | 8,806 | 520 | 33,770 |
| Test and Evaluation Property. | | | | | | | | | | | |
| none | | | | | | | | | | | |
| Government Furnished Equipment | | | | | | | | | | | |
| GFE | Various | Various | | | 2,366 | 5,899 | 9,436 | 2,680 | 6,778 | 33,158 | 60,317 |
| Total | | | | | 3,728,338 | 2,058,804 | 2,281,135 | 2,138,718 | 1,957,067 | 3,538,434 | 15,702,496 |

* Does not include impacts of rephase due to FY95 & FY96 cuts.

** Reflects December 31, 1994 SAR Estimated Price at Completion

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEB 1995

BUDGET ACTIVITY: #5-Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604240F B-2 ADVANCED TECHNOLOGY BOMBER

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | | | | | | | | | | |
| 64240F | 776,323 | 376,690 | 623,616 | 446,225 | 425,578 | 160,787 | 165,573 | 170,494 | 0 | 24,808,012 |

A. Mission Description and Budget Item Justification

(U) The B-2 is an all-wing, two-crew aircraft with provisions for a third crew member and has twin weapons bays of over 20,000 pounds capacity each. It is powered by four F118-GE-100 turbofan engines. The low wing loading provides efficient cruise and good airfield performance. The B-2 bomber exploits breakthroughs in low observables technology (radar, infrared, visual, electromagnetic, and acoustic) to achieve vehicle signatures that will allow penetration of current and postulated enemy air defenses. The B-2 will have the capability to perform worldwide conventional and nuclear delivery missions consistent with Air Combat Command requirements. Survivability will be enhanced by reduction of observable signatures and a complementary defensive management system. The B-2 will also have a low altitude terrain following capability and a penetration speed commensurate with high probability of survival without unduly penalizing mission range. The research category for the program is engineering and manufacturing development. The management and acquisition strategy provides the user a capability for the lowest possible cost.

(U) FY 1994
- (U) Continued developmental test and evaluation. ($190,391)
- (U) Continued development and support acquisition. ($75,861)
- (U) Continued primary hardware development. ($510,071)

(U) FY 1995
- (U) Continued developmental test and evaluation. ($168,376)
- (U) Continued development and support acquisition. ($71,580)
- (U) Continued primary hardware development. ($136,734)

(U) FY 1996
- (U) Continue developmental test and evaluation. ($153,530)
- (U) Continue development and support acquisition. ($100,299)
- (U) Continue primary hardware development. ($369,787)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEB 1995

BUDGET ACTIVITY: #5-Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604240F B-2 ADVANCED TECHNOLOGY BOMBER

A. Mission Description and Budget Item Justification (continued)

(U) FY 1997
- (U) Continue developmental test and evaluation. ($126,421)
- (U) Continue development and support acquisition. ($85,027)
- (U) Continue primary hardware development. ($234,777)

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 785,820 | 408,500 | 511,835 | 448,810 | 24,658,000 |
| Appropriated Value | 790,497 | 388,543 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | (4,677) | (4,463) | | | |
| b. SBIR | (9,035) | (7,294) | | | |
| c. Omnibus Reprogramming | | | | | |
| d. Below Threshold Reprogramming | (462) | (96) | | | |
| Adjustment to Budget Years Since FY95 PB | | | 111,781 | (2,585) | 123,180 |
| Current Budget Submit/President's Budget | 776,323 | 376,690 | 623,616 | 446,225 | 24,808,012 |

Change Summary Explanation:

Funding: A requirements review has substantiated a $111.8M budget transfer in FY 96 between Production and RDT&E. This request is for subcontractor software sustaining and Automatic Test Equipment / Test Program Set (ATE/TPS) integration requirements. It also accounts for additional Terrain Following system integration efforts, data recorder modifications, and additional lab LRU's to support completion of development efforts and inflation adjustments.

Schedule: N/A

Technical: N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEB 1995

BUDGET ACTIVITY: #5-Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604240F B-2 ADVANCED TECHNOLOGY BOMBER

C. Other Program Funding Summary ($ in Thousands)

| | 1994/P | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Aircraft Procurement, Air Force, Combat Aircraft / BA01 / B-2A / PE 11127F | 16,280,833 | 337,001 | 279,921 | 216,900 | 223,481 | 180,550 | 240,330 | 36,153 | 271,216 | 18,066,385 |
| (U) Aircraft Procurement, Air Force, Modifications/ BA05 / B-2A / PE 11127F | 23,590 | 63,982 | 17,286 | 5,640 | 6,139 | 4,559 | 7,683 | 7,684 | 0 | 136,563 |
| (U) Aircraft Procurement, Air Force, Common Support Equipment / BA07 / Items Less than $2,000,000 / PE 11127F | 9,710 | 3,938 | 538 | 471 | 497 | 497 | 497 | 497 | 0 | 16,645 |
| (U) Aircraft Procurement, Air Force, Aircraft Support Equipment and Facilities/ BA07 / Industrial Preparedness / PE 78011F | 0 | 8,500 | 15,700 | 5,400 | 5,400 | 5,600 | 5,700 | 0 | 0 | 46,300 |
| (U) Aircraft Procurement, Air Force, Aircraft Support Equipment and Facilities/ BA07 / Bomber Industrial Base Support / PE 78011F | 0 | 125,000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125,000 |
| (U) Aircraft Procurement, Air Force, Aircraft Replenishment Spares/ BA06 / B-2A / PE 11127F | 576 | 1,833 | 5,792 | 7,722 | 8,247 | 8,607 | 8,851 | 9,102 | 0 | 50,730 |
| (U) Aircraft Procurement, Air Force, Aircraft Initial Spares/ BA06 / B-2A / PE 11127F | 869,970 | 2,351 | 59,300 | 122,406 | 184,045 | 83,344 | 7,404 | 3,547 | 0 | 1,332,367 |
| (U) Missile Procurement, Air Force, Other Missles / BA42 / GPS Aided Munition / PE 28030F | 0 | 24,830 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24,830 |
| (U) Procurement (Other), Air Force/ BA 02, 03, 04 / B-2A / PE 11127F | 147,690 | 459 | 65,585 | 20,701 | 17,448 | 11,312 | 12,295 | 12,661 | 0 | 288,144 |
| (U) MILCON / BA01 / PE 11127F | 478,900 | 23,000 | 24,600 | 5,400 | 24,200 | 0 | 0 | 0 | 0 | 566,100 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-2)

DATE: FEB 1995

BUDGET ACTIVITY: #5-Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604240F B-2 ADVANCED TECHNOLOGY BOMBER

PROJECT NO.

D. Schedule Profile

| | FY 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Block 10 | X* | | | | | | | | | | | | | | | |
| (U) First Article Delivery | X* | | | | | | | | | | | | | | | |
| (U) Complete Climatic Lab Testing | | X* | | | | | | | | | | | | | | |
| (U) Complete Envelope Expansion | | | | | | | | X | | | | | | | | |
| (U) Complete GPS Testing | | | | | | | | X | | | | | | | | |
| (U) Block 20 | | | | | | | | | | | | X | | | | |
| (U) Complete Arctic & Tropic Testing | | | | | | | | | | | | X | | | | |
| (U) Complete GATS Testing | | | | | | | | | | | X | | | | | |
| U) Block 30 | | | | | | | | | | | | | | | | X |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEB 1995

BUDGET ACTIVITY: #5-Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604240F B-2 ADVANCED TECHNOLOGY BOMBER

PROJECT NO.:

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Equipment Development & Evaluation | 650,523 | 271,838 | 493,919 | 330,255 |
| Government Test | 89,857 | 60,810 | 64,510 | 65,710 |
| Other Government Costs (OGC) | 11,463 | 18,471 | 13,413 | 13,374 |
| Other - Direct Release | 24,480 | 25,571 | 51,774 | 36,886 |
| Total | 776,323 | 376,690 | 623,616 | 446,225 |

B. Budget Acquisition History and Planning Information ($ in Thousands)

Performing Organizations

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC** | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Air Vehicle - NG | CPIF/AF | Nov 81 | 20,946,000 | 21,335,925 | 18,968,577 | 595,000 | 227,454 | 450,844 | 290,886 | 803,164 | 21,335,925 |
| Aircrew Training - Link | CPIF | Jul 85 | 560,704 | 562,879 | 546,079 | 12,800 | 4,000 | | | | 562,879 |
| Mission Planning | N/A* | N/A | 324,314 | 324,314 | 166,889 | 27,119 | 23,538 | 35,114 | 34,769 | 36,885 | 324,314 |
| Support and Management Organizations | | | | | | | | | | | |
| Other Govt Costs (OGC) | N/A | N/A | N/A | 624,521 | 545,264 | 11,463 | 18,471 | 13,413 | 13,374 | 22,536 | 624,521 |
| Direct Release | N/A | N/A | N/A | 414,816 | 232,900 | 24,480 | 25,571 | 51,774 | 36,886 | 43,205 | 414,816 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| Govt Test | N/A | N/A | N/A | 853,437 | 555,908 | 89,857 | 60,810 | 64,510 | 65,710 | 16,642 | 853,437 |

* Multiple Contracts

** Includes known requirements not yet on contract

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEB 1995

BUDGET ACTIVITY: #5-Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604240F B-2 ADVANCED TECHNOLOGY BOMBER

PROJECT NO.

B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

Government Furnished Property

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | | | | | | | |
| Engines - G.E. | N/A* | N/A | N/A | 539,613 | 10,442 | 7,900 | 6,800 | 4,600 | 0 | 569,355 |
| AARL - Boeing (Wichita) | FPIF | Jun 88 | N/A | 107,568 | 5,162 | 8,946 | 1,161 | 0 | 0 | 122,837 |
| * Multiple Contracts | | | | | | | | | | |
| Support and Management Property | | | | | | | | | | |
| N/A | | | | | | | | | | |
| Test and Evaluation Property | | | | | | | | | | |
| N/A | | | | | | | | | | |
| Subtotal Product Development | | | | 20,328,726 | 650,523 | 271,838 | 493,919 | 330,255 | 840,049 | 22,915,310 |
| Subtotal Support and Management | | | | 778,164 | 35,943 | 44,042 | 65,187 | 50,260 | 65,741 | 1,039,337 |
| Subtotal Test and Evaluation | | | | 555,908 | 89,857 | 60,810 | 64,510 | 65,710 | 16,642 | 853,437 |
| Total Project | | | | 21,662,798 | 776,323 | 376,690 | 623,616 | 446,225 | 922,432 | 24,808,012 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: **#5, Engineering and Manufacturing Development (EMD)**

PE NUMBER AND TITLE: **#0604243F Manpower, Personnel, and Training Development**

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 4,756 | 4.466 | 5,300 | 5,174 | 5,365 | 4,471 | 4,604 | 4,742 | Cont | TBD |
| 3818 Maintenance Skills Tutor (MST) | 4,607 | 4,466 | 4,270 | 4,168 | 4,311 | 4,471 | 4,604 | 4,742 | Cont | TBD |
| 4369 Air Education and Training Management System (AETMS) * | 0 | 0 | 1,030 | 1,006 | 1,054 | 0 | 0 | 0 | 0 | 3,090 |
| 3817 Base Training System (BTS) | 149 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Program Complete | 3,116 |

(U) A. Mission Description and Budget Item Justification This program is in the research category/budget activity EMD as it provides engineering development of manpower, personnel and training (MPT) technologies to improve effectiveness of Air Force training/delivery, performance, assessment, personnel acquisition, job assignment, force management, and human performance in weapon systems. MSTs are designed to leverage senior maintenance personnel experience, through the use of artificial intelligence, for use in training junior specialists. AETMS will be the major Air Education and Training Command (AETC) training system with emphasis on centralized training focus for a decentralized training environment. AETC will benefit from more standardized training command wide. Acquisition strategies are covered under individual projects.

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,811 | 4,636 | 4,293 | 4,190 | TBD |
| Appropriated Value | 4,811 | 4,636 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Undistributed reductions | -55 | -84 | | | |
| b. SBIR | | -86 | | | |
| Adjustments to budget years since FY95 PB | | | +1,007 | +984 | |
| Current Budget Submit/President's Budget | 4,756 | 4,466 | 5,300 | 5,174 | TBD |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE FEBRUARY 1995 |
|---|---|
| BUDGET ACTIVITY<br>**#5, Engineering and Manufacturing Development (EMD)** | PE NUMBER AND TITLE<br>**#0604243F Manpower, Personnel, and Training** |
| | PROJECT NO.<br>**3818** |

(U) B. Program Change Summary Continued ($ in Thousands)

Change Summary Explanation:

Funding: AETMS was generated in the transfer of the Advanced Training System from PE 0604227F, in FY96. BPAC reflects non-pay purchases inflation; FY94 $55 actuals reduction; FY95 reduction for FFRDC, NON-FFRDC, university research, and travel

Technical: Not Applicable

Schedule: Not Applicable.

(U) C. Other Program Funding Summary ($ in Thousands) Not Applicable

(U) D. Schedule Profile See individual projects

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604243F Maintenance Skills Tutors (MST)

PROJECT NO.: 3818

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3818, Maintenance Skills Tutors (MST) | 4,607 | 4,466 | 4,270 | 4,168 | 4,311 | 4,471 | 4,604 | 4,742 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

MST will field multiple computer-based tutors for the Combat Air Forces and other Air Force agencies to improve training of complex skills for a broad range of Air Force jobs; primarily aircraft maintenance troubleshooting. These MST's may include some initial skills training, but primary emphasis will be on the more difficult cognitive skills such as understanding and trouble shooting problems that the maintenance aiding equipment and systems are unable to diagnose. Four of the initial Air Combat Command (ACC) tutors will be fieldable test/research assets developed by Armstrong Lab under the Basic Job Skills (BJS) program. The System Program Office (SPO) is developing two tutors as a pre-EMD cost and schedule risk reduction effort. This effort was approved by the Designated Acquisition Commander (DAC), HSC/CC, with support from our user, ACC/LG. The core tutor software models from this effort will be reused for the remaining five tutors. The last five tutors will be developed under EMD.

(U) FY1994 ($ in Thousands)

- (U) - Continued development of F-16 Avionics A and C shop tutors. ($2,410)
- (U) - Modified and fielded F-15 avionics intermediate shop tutor. ($1,100)
- (U) - Evaluated alternative tutor capabilities. ($1,097)

(U) FY 1995 ($ in Thousands)

- (U) - Complete development, begin operational evaluation and fielding of the F-16 flightline Avionics A and C shop tutors. ($1,416)
- (U) - Begin cognitive task analysis for the F-16 flightline Avionics B shop tutors. ($1,920)
- (U) - Begin operational evaluation and fielding of two F-15 flightline avionics tutors and two F-15 flightline pneudraulics tutors. ($400)
- (U) - Begin evaluation of tutors authorizing package options ($ 730)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5, Engineering and Manufacturing Development (EMD) | #0604243F Maintenance Skills Tutors (MST) | 3818 |

(U) FY 1996 ($ in Thousands)

(U) - Complete operational evaluation and upgrade of F-15 and F-16 avionics tutors. ($400)

(U) - Complete development and begin operational evaluation and fielding of F-16 flightline Avionics B shop tutors. ($890)

(U) - Begin development of F-16 Tactical Aircraft Maintenance Specialist (TAMS) I tutor, collect Cognitive Task Analysis (CTA) data and begin S/W design. ($2,400)

(U) - Begin evaluation and modification of Rapid Intelligent Tutor Development System (RIDES) and continue other tutor authoring software. ($580)

(U) FY 1997 ($ in Thousands)

(U) - Complete development and begin operational evaluation and fielding of the F-16 TAMS 1 tutor. ($1,600)

(U) - Begin development of F-16 TAMS 2 tutor. ($2,368)

(U) - Complete operational evaluation and fielding of F-16 flightline Avionics B shop tutor. ($200)

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4,662 | 4,636 | 4,293 | 4,190 | TBD |
| Appropriated Value | 4,662 | 4,636 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Universal reductions | -55 | -84 | | | |
| b. SBIR | | -86 | | | |
| Adjustments to budget years since FY95 PB | | | -23 | -22 | |
| Current Budget Submit/President's Budget | 4,607 | 4,466 | 4,270 | 4,168 | TBD |

Change Summary Explanation:

Funding: FY95 reduction for FFRDC, NON FFRDC, university research, and travel. FY96-97 reflect non-pay purchases inflation.

Technical: Not Applicable

Schedule: Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604243F Maintenance Skills Tutors (MST)

PROJECT NO.: 3818

(U) C. Other Program Funding Summary ($ in Thousands) Not Applicable

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Field F-15 Avionics Intermediate Shop Tutor(AIS) | | X* | X** | | | | | | | | | | | | | |
| F-15 Pneudraulics Tutor | | | | X** | | | | | | | | | | | | |
| F-15 Alternative Pneudralics Dev. | X* | | | X** | | | | | | | | | | | | |
| Evaluation of Alt Tutors | | | | X* | | | X** | | | | | | | | | |
| F-16 C Shop Tutor | X* | | | | | X** | | | | | | | | | | |
| F-16 C Shop OPS EVAL & Interim Contractor Support (ICS) | | | | | | | | | X* | | | | | | X** | |
| F-16 A Shop Tutor | | | | | X* | | | X** | | | | | | | | |
| F-16 A OPS EVAL & ICS | | | | | | | | X* | | | | X** | | | | |
| F-15 C Shop OPS EVAL & ICS (LAB DEV) | | | | | | X* | | | | X** | | | | | | |
| F-15 A Shop OPS EVAL & ICS (lab DEV) | | | | | | | | X* | | | X** | | | | | |
| F-16 B Shop Development | | | | | | | | | X* | | | X** | | | | |
| F-16 B OPS EVAL & ICS | | | | | | | | | | | | X* | | | | X** |
| F-16 Tactical Aircraft Maintenance Specialist (TAMS) I Development | | | | | | | | | | | | X* | | | | X** |
| F-16 TAMS I OPS EVAL & ICS | | | | | | | | | | | | | | | | X* |
| F-16 TAMS II development | | | | | | | | | | | | | | | X* | |

* = Start
** = Completion

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604243F Maintenance Skills Tutors (MST)

PROJECT NO.: 3818

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Software Development | 2,190 | 1,667 | 2,002 | 2,198 |
| Interim Contractor Support (ICS) software Maintenance | 366 | 252 | 358 | 81 |
| Contractor Eng. Support Total | 589 | 928 | 685 | 527 |
| Cognitive Task Analysis Support | 508 | 866 | 464 | 473 |
| Govt Logistics Mgt Support | 300 | 310 | 275 | 275 |
| Govt Audio/Visual Support | 51 | 52 | 52 | 52 |
| Travel | 100 | 125 | 150 | 102 |
| Misc. | 503 | 266 | 284 | 460 |
| TOTAL | 4,607 | 4,466 | 4,270 | 4,168 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEBRUARY 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5, Engineering and Manufacturing Development (EMD) | #0604243F Maintenance Skills Tutors (MST) | 3818 |

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

Performing Organizations:

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Bolt, Beranek, & Newman (BBN) | SS/CPFF & CPAF | Feb 94 | 2,500 | 2,650 | 0 | 1,840 | 732 | 105 | 0 | 0 | 2,677 |
| UNIV. Pittsburgh | SS/CP | Feb 93 | 1,537 | 1,537 | 957 | 350 | 150 | 117 | 0 | 0 | 1,574 |
| Galaxy Scientific | SS/CPFF | Jan 94 | 350 | 1,036 | 0 | 350 | 686 | 0 | 0 | 0 | 1,036 |
| EMD Contractor TBD | C/CPFF CPAF | Nov 95 | N/A | 3,984 | 0 | 0 | 0 | 1,250 | 729 | 1,630 | 3,609 |
| EMD Second Source TBD | C/CPFF CPAF | Oct 96 | N/A | 7,101 | 0 | 0 | 0 | 576 | 1,112 | 5,413 | 7,101 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604243F Maintenance Skills Tutors (MST)

PROJECT NO.: 3818

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management Organizations | | | | | | | | | | | |
| SPO, SA-ALC<br>ACC, AETC<br>SETA | N/A | N/A | N/A | N/A | 1,743 | 1,559 | 2,038 | 1,758 | 1,855 | TBD | TBD |
| Test and Evaluation Organizations Not Applicable | | | | | | | | | | | |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | | | | | | | |
| CTA Data provided by the SPO to the software development contractors. The data describes the systems/subsystems/components and the faults problems to be simulated. CTA data collection and analysis is performed by the SPO SETA contractor (Operational Technologies Corp. (OPTECH)) | C/CPFF | Feb 94 | Cont | 0 | 508 | 860 | 464 | 473 | 900 | 3,205 |
| Support and Management Property Not Applicable | | | | | | | | | | |
| Test and Evaluation Property Not Applicable | | | | | | | | | | |
| Subtotal Product Development | | | | 957 | 3,048 | 2,428 | 2,512 | 2,314 | 7,943 | 19,202 |
| Subtotal Support and Management | | | | 1,743 | 1,559 | 2,038 | 1,758 | 1,854 | TBD | TBD |
| Total Project | | | | 2,700 | 4,607 | 4,466 | 4,270 | 4,168 | TBD | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604243F Air Education Training Management System 4369

PROJECT NO.: 4369

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4369, Air Education and Training Management System (AETMS) | 0 | 0 | 1,030 | 1,006 | 1,054 | 0 | 0 | 0 | 0 | 3,090 |

(U) A. Mission Description and Budget Item Justification

AETMS expands the Advanced Training System (ATS) to support Technical Training and Professional Education at all AETC training activities, providing a single command wide training development, delivery, and management system. Commercial hardware and software will yield a reliable and easily maintainable system. AETMS will build upon the existing ATS and other commercial/newly developed software, simplifying development. This project was generated in the transfer of the ATS project from PE 64227F, Training Systems Development, beginning in FY96. Acquisition strategy for AETMS contractor development activities will be awarded through full and open competition.

(U) FY 1994 Not Applicable

(U) FY 1995 Not Applicable

(U) FY 1996 ($ in Thousands -- Project transferred from ATS project in PE 64227F)
- (U) - Complete software redevelopment of portions of ATS for tech training. ($230)
- (U) - Initiate software development to incorporate Professional Education functionality. ($800)

(U) FY 1997 ($ in Thousands)
- (U) - Complete software development to incorporate professional education functionality. ($300)
- (U) - Install prototype ATS at professional education site. ($300)
- (U) - Initiate migration of proven ATS functionality to Client/Server architecture. ($406)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604243F Air Education Training Management System 4369

PROJECT NO. 4369

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| Appropriated Value | 0 | 0 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Undistributed reduction | | | | | |
| Current Budget Submit/President's Budget | None | None | 1,030 | 1,006 | 3,090 |

Change Summary Explanation: AETMS was generated in the transfer of the ATS project beginning in FY96 from PE 64227F (FY96 $1,035; FY97 $1,011)

Funding: BPAC reflects non-pay purchases inflation reduction to transferred funding
Schedule: Not Applicable
Technical: Not Applicable

(U) C. Other Program Funding Summary ($ in Thousands) Not Applicable

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Redevelopment for tech training | | | | | | | | | | X** | | | | | | |
| Development for Professional Education | | | | | | | | | | X* | | | | X** | | |
| AETMS prototype | | | | | | | | | | | | | | X* | X** | |
| Migration to Client/Server architecture | | | | | | | | | | | | | | | X* | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE: #0604243F Air Education Training Management System 4369

PROJECT NO. 4369

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Software Development | 0 | 0 | 730 | 413 |
| Teams | 0 | 0 | 145 | 141 |
| Travel | 0 | 0 | 72 | 71 |
| Training Development | 0 | 0 | 10 | 10 |
| Contract Administration | 0 | 0 | 73 | 71 |
| AETMS prototype | 0 | 0 | 0 | 300 |
| Total | 0 | 0 | 1,030 | 1,006 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE / PROJECT NO.: #0604243F Air Education Training Management System 4369

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Loral FSC | C/FFP/IF/AFT | May 89 | 35,025 | 40,958 | 29,650* | 1,898* | 1,438* | 875 | 854 | TBD | TBD |
| Support and Management Organizations | | | | | 0 | 0 | 0 | 155 | 152 | TBD | TBD |
| HSC/YARA | | | | | | | | | | | |

Test and Evaluation Organizations: Not Applicable

* Actual funding for these years came from PE 64227 Training Systems Development, ATS Project.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: #5, Engineering and Manufacturing Development (EMD)

PE NUMBER AND TITLE / PROJECT NO.: #0604243F Air Education Training Management System 4369

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | | | | | | | |
| DT III/IV HW & SW PR | | various | various | 482* | 0 | N/A | N/A | N/A | N/A | 482 |
| Support and Management Property | Not Applicable | | | | | | | | | |
| Test and Evaluation Property | Not Applicable | | | | | | | | | |
| Subtotal Product Development | | | | 30,132* | 1,898* | 1,438* | 875 | 854 | TBD | TBD |
| Subtotal Support and Management | | | | 0 | 0 | 0 | 155 | 152 | TBD | TBD |
| Total Project | | | | 30,132* | N/A | N/A | 1,030 | 1,006 | TBD | TBD |

* Actual funding for these years came from PE 64227 Training Systems Development, ATS Project.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604249F/ Night/Precision Attack

PROJECT NO.: 2693

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 1,490 | 21,029 | 8,708 | 4,803 | 1,990 | 1,194 | 1,293 | 1,194 | Continuing | TBD |
| Proj 2693 LANTIRN | 1,490 | 21,029 | 8,708 | 4,803 | 1,990 | 1,194 | 1,293 | 1,194 | Continuing | TBD |

A. (U) Mission Description and Budget Item Justification The need for Low Altitude Navigation and Targeting Infra-Red for Night (LANTIRN) is documented in Tactical Air Forces' Statement of Operational Need 302-81, Night Attack Capabilities. LANTIRN responds to that need by providing the capability to conduct close air support and interdiction missions at night and under-the-weather for F-15E and F-16C/D fighter aircraft. LANTIRN provides the capability not only to attack at night, but also to attack with precision laser guided weapons at altitudes of up to 40,000 ft. day or night and in conditions of limited visibility. The LANTIRN program includes development and testing of a wide angle raster head-up display, a navigation pod, and a targeting pod. The navigation pod contains a terrain following radar and a fixed Forward-Looking Infra-Red (FLIR) sensor; the targeting pod contains a gimbaled FLIR, a laser designator, an automatic tracker, a missile boresight correlator, and growth provisions for an automatic target recognizer. This Program Element is devoted to Engineering and Manufacturing Development (EMD) of LANTIRN and other Night-Attack related aircraft equipment.

(U) FY 1994 Program:

- (U) Risk reduction efforts for development of Laser Spot Tracker (LST) to support Close Air Support program. ($1,300)
- (U) Program office mission support requirements. ($190)

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: PE: #0604249F Night/Precision Attack — PROJECT NO.: 2693 |

A. (U) Mission Description and Budget Item Justification (Cont.)

(U) FY 1995 Program:

- (U) Continue risk reduction efforts for development of Laser Spot Tracker (LST) to support Close Air Support (CAS) program. ($1,400)
- (U) Initiate development of targeting pod Laser Spot Tracker (LST) capability for incorporation into the F-16 Block 40 production aircraft, in support of the (CAS) mission and modification of Laser to increase operating envelope to 40,000 ft. ($17,136)
- (U) Flight test 1996 OFP software changes resulting from changes in the F-16 and F-15E software suites. ($1,993)
- (U) Program office mission support requirements. ($500)

(U) FY 1996 Planned Program

- (U) Continue development of targeting pod LST and 40,000 ft. laser capability. ($5,908)
- (U) Develop software updates for LST program, including OFP and Support Equipment test software. (NSP)
- (U) Begin production planning for LST, for FY97 production decision. (NSP)
- (U) Program office mission support requirements, ($2,800)

(U) FY 1997 Planned Program

- (U) Complete targeting pod LST and 40,000 ft. laser EMD effort for F-16 CAS program. ($2,503)
- (U) Flight test LST hardware modifications and 1998 Operational Flight Program (OFP) software changes resulting from LST and F-16 and F-15E software changes. ($2,300)

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604249F Night/Precision Attack

PROJECT NO.: 2693

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Proj 2693 LANTIRN | 1,490 | 21,029 | 8,708 | 4,803 | 1,990 | 1,194 | 1,293 | 1,194 | Continuing | TBD |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 82,210 | 21,672 | 753 | 928 | TBD |
| Appropriated Value | 0 | 21,672 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Below Threshold Reprogramming | 1,490 | | | | |
| b. General Undistributed Reduction | 0 | -236 | | | |
| c. SBIR | | -407 | | | |
| Adjustments to Budget Years since FY95 PB | | | 7,955 | 3,875 | |
| Current Budget Submit/President's Budget | 1,490 | 21,029 | 8,708 | 4,803 | TBD |

Change Summary Explanation:
Funding: FY94 RDT&E funds deleted per congressional action. Reprogrammed FY94 RDT&E funds from PE 64212F (Aircraft Equipment Development) to PE 64249F to provide funding for program support costs. FY95 FFRDC, Non-FFRDC, University Research, and travel. FY96 and FY97 RDT&E increased by transfer from Low Altitude Navigation and Targetting Infra-red for Night (LANTIRN) production to support Laser Spot Tracker development.

Schedule: No changes

Technical: No changes

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604249F/ Night/Precision Attack

PROJECT NO.: 2693

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Proj 2693 LANTIRN | 1,490 | 21,029 | 8,708 | 4,803 | 1,990 | 1,194 | 1,293 | 1,194 | Continuing | TBD |

C. (U) Other Program Funding Summary ($ in Thousands)

| Aircraft Procurement, AF | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| PE 27249 LANTIRN Procurement | 25,948 | 16,027 | 14,222 | 40,911 | 9,394 | 11,392 | 11,671 | 12,160 | Continuing | TBD |

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| -Organic Depot (Target Pod) | | ✳ | | | | | | | | | | | | | | |
| -Organic Depot (Support Equipment) | | ✳ | | | | | | | | | | | | | | |
| -Final Delivery (Targeting Pod) | | | | ✳ | | | | | | | | | | | | |
| -Software Release for FY95 Operational Flight Program (OFP) (F-16 Block 40/42 & F-15E) | | | | | | | X | | | | | | | | | |
| -LST EMD contract award | | | | | | | X | | | | | | | | | |
| -Software Release for FY96 OFP (F-16 Block 40/42 & F-15E) | | | | | | | | | | | | X | | | | |

✳ - Effort completed
X - Effort planned

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 - Engineering Manufacturing & Development | PE: #0604249F Night/Precision Attack | 2693 |

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Laser Spot Tracker EMD | 0 | 17,136 | 5,908 | 2,503 |
| Laser Spot Tracker Risk Red. | 1,300 | 1,400 | 0 | 0 |
| Program Management Support | 190 | 500 | 2,800 | 0 |
| Flight Test | 0 | 1,993 | 0 | 2,300 |
| Total | 1,490 | 21,029 | 8,708 | 4,803 |

Exhibit R-3

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604249 Night/Precision Attack

PROJECT NO.: 2693

B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Martin Marietta | Competitive CFIF/FPIF/EPA | Sep 80 | 373,800 | 378,647 | 350,400 | 1,300 | 18,536 | 5,908 | 2,503 | 0 | 378,647 |
| Misc other contracts | | | | 78,700 | 78,700 | 0 | 0 | 0 | 0 | 0 | 78,700 |
| Support and Management Organizations | | | | | | | | | | | |
| Program Mgmt Support | | | | 26,100 | 17,800 | 0 | 0 | 2,100 | 0 | 4,200 | 24,100 |
| Travel | | | | 15,700 | 12,300 | 190 | 500 | 700 | 0 | 1,500 | 15,190 |

Exhibit R-3

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604249 Night/Precision Attack

PROJECT NO.: 2693

B. Budget Acquisition History and Planning Information ($ in Thousands) (Cont.)

Test and Evaluation Organizations

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Martin Marietta | Comp-CPAF/ FPIF/EPA | Sep 80 | 55,300 | 55,300 | 49,500 | 0 | 1,993 | 0 | 2,300 | 0 | 53,793 |
| AFFTC | Project Order | | | 25,400 | 25,400 | 0 | 0 | 0 | 0 | 0 | 25,400 |
| AFOTEC | Project Order | | | 3,500 | 3,500 | 0 | 0 | 0 | 0 | 0 | 3,500 |

**Government Furnished Property:** Not Applicable

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | 457,347 | 429,100 | 1,300 | 18,536 | 5,908 | 2,503 | 0 | 457,347 |
| Subtotal Support and Management | 41,800 | 30,100 | 190 | 500 | 2,800 | 0 | 5,700 | 39,290 |
| Subtotal Test and Evaluation | 84,200 | 78,400 | 0 | 1,993 | 0 | 2,300 | 0 | 82,693 |
| Total | 583,347 | 537,600 | 1,490 | 21,029 | 8,708 | 4,803 | 5,700 | 579,330 |

Exhibit R-3

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604256F Threat Simulator Development

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 41,152 | 40,068 | 53,377 | 48,171 | 39,343 | 31,589 | 29,894 | 30,851 | Continuing | TBD |
| 3321 Electronic Warfare Ground Test Resources | 37,012 | 33,313 | 38,987 | 33,280 | 26,420 | 22,473 | 23,160 | 23,864 | Continuing | TBD |
| 6510 Electronic Warfare Flight Test Resources | 3,140 | 5,843 | 10,520 | 11,067 | 9,029 | 5,145 | 2,703 | 2,897 | Continuing | TBD |
| 2900 RATSCAT Upgrade (1) | 0 | 0 | 1,990 | 1,990 | 1,990 | 1,990 | 1,990 | 1,989 | Continuing | TBD |
| 2907 Electronic Warfare Intel Support (2) | 0 | 0 | 1,880 | 1,834 | 1,904 | 1,981 | 2,041 | 2,101 | Continuing | TBD |
| 1006 HAVE NOTE | 1,000 | 912 | 0 | 0 | 0 | 0 | 0 | 0 | Continuing | TBD |

(1) This project was transferred from PE 0605708F, Nav/Radar/Sled Track Support, effective FY 96.
(2) This project was transferred from PE 0305887F, Electronic Combat Intelligence Support, effective FY 96.
Note: The following FY 94/95 funding totals represent what the totals would be including the two projects added in FY 96 ($3,900 per year). These totals provide a more meaningful funding trend analysis for this PE:

| | FY 1994 | FY 1995 |
|---|---|---|
| Total PE | 45,052 | 44,317 |

(U) A. **Mission Description and Budget Item Justification:** This Program Element (PE) provides funding for the elements necessary to support the Air Force Electronic Warfare (EW) Test Process. This test process provides a methodology to ensure the effective disciplined and efficient testing of Air Force EW and avionics systems. Each capability or facility improvement is pursued in concert with the others so as to avoid duplicate capabilities while at the same time produce the proper mix of test resources needed to support the Air Force EW Test Process. This PE provides funding for the management and technical oversight of implementation activities, the Air Force-led tri-Service effort to establish a common modeling and simulation architecture, measurement facilities operation and improvements, hardware in the loop test facilities operation and improvements, installed system test facility improvement, and development and improvement of open air threat simulators for flight testing. This PE also provides funding to support the Radar Target Scatter (RATSCAT) program (supports Radar Cross Section measurement), and the Foreign Materiel Program, specifically, operational exploitation.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 41,631 | 40,075 | 61,681 | 50,516 | Cont |
| (U) Appropriated Value | | 41,075 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -658 | | | |
| b. SBIR | | -768 | | | |
| c. Omnibus or Other Above Threshold Reprogramming | | -349 | | | |
| d. Below Threshold Reprogramming | -479 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -8,304 | -2,345 | |
| (U) Current Budget Submit/President's Budget | 41,152 | 40,068 | 53,377 | 48,171 | Cont |

(U) Change Summary Explanation:

Funding:

FY 96:

| | |
|---|---|
| Project 2907, EW Intel Support | +1,880 |
| Project 2900, RATSCAT | +1,990 |

FY 97:

| | |
|---|---|
| Project 2907, EW Intel Support | +1,834 |
| Project 2900, RATSCAT | +1,990 |

Schedule: For Electronic Warfare Ground Test Resources (3321), Real-time Electromagnetically Controlled Analyzer and Processor (REDCAP) (Sukhoi Airborne Warning and Control System/Battle Management Command Control and Communication (SUAWACS/BMC3) project completed in 1Q FY 94 (vs 3Q FY 95). Initiation of Air Force Electronic Warfare Evaluation System (AFEWES) Reconfigurable Surface-to-Air Missile (RSAM) upgrade project delayed from FY 94 to FY 95 and Initial Operational Capability (IOC) slipped from 3Q FY 96 to 4Q FY 97.

Technical: None.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604256F Threat Simulator Development

**(U) C. Other Program Funding Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) PE 0605807F, (ECIT MILCON) | | | 11,100 | 4,900 | | | | | 0 | 16,000 |
| (U) PE 0604940D (CTEIP) | | 4,125 | 4,100 | 7,820 | 4,370 | 3,500 | 0 | 0 | 0 | 23,915 |
| (U) PE 0604940D, Central T&E Improve. Prog. | 0 | 2,500 | 8,000 | 8,000 | | | | | | 18,500 |
| (U) PE 0604940D, CTEIP | 3,500 | 2,500 | 5,300 | 10,000 | 3,000 | | | | | 26,300 |

Related RDT&E:

(U) PE 0604759F, Major T&E Investment
(U) PE 0604735F, Combat Training Ranges
(U) PE 0207122F, F-16
(U) PE 0604239F, F-22
(U) PE 0604231F, C-17
(U) PE 0604226F, B-1

**(U) D. Schedule Profile:**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) REDCAP Architecture/Link project upgrade IOC. | | | | | | X | | | | | | | | | | |
| (U) REDCAP IADS IOC. | | | | x | | | | | | | | | | | | |
| (U) AFEWES RAI upgrade IOC. | | | | | | | X | | | | | | | | | |
| (U) J-MASS releases. | | | | | | X | | | X | | | X | | | | |
| (U) Rome Lab multi-spectral capability to support F-22 complete. | | | | | | | | X | | | | | | | | |
| (U) ECIT MILCON complete. | | | | | | | | | | | | | | | | X |
| (U) RSAM C IOC. | | | | | | | | | | | | | | | | X |
| (U) REDCAP Option E IOC. | | | | | | | | | | | | | | | | X |
| (U) ECIT IOC (4Q FY 98). | | | | | | | | | | | | | | | | |
| (U) AAIS Initial Oper. Cap. (3Q FY 99) | | | | | | | | | | | | | | | | |

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604256F Threat Simulator Development

PROJECT: 3321

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3321 Electronic Warfare Ground Test Resources | 37,012 | 33,313 | 38,987 | 33,280 | 26,420 | 22,473 | 23,160 | 23,864 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** The AF requires a comprehensive set of ground test facilities to implement the Air Force Electronic Warfare (EW) Test Process. In order that program risk throughout the weapon system acquisition life cycle is managed effectively and flight testing is conducted effectively and efficiently, a range of ground test capabilities from modeling and simulation architecture to the installed system test facility (ISTF) are required. The EW Test Process Support task provides for management, and coordinated technical oversight of the investment in and application of EW test facilities including analyses, studies and related documentation. The Joint Modeling and Simulation System (J-MASS) is an Air Force-led, Tri-Service project to establish a DoD-wide common digital simulation architecture in support of test and evaluation. This standard architecture will provide for credibility and correlation of test and evaluation results for all phases of the weapon system acquisition life cycle. The Hardware in the Loop (HITL) test facilities evaluate electronic support and countermeasures effectiveness prior to installation on the aircraft. Together the two AF HITL facilities, the Air Force Electronic Warfare Evaluation Simulator (AFEWES) and the Real Time Electromagnetic Digitally Controlled Analyzer and Processor (REDCAP) provide the ability to realistically evaluate hardware components against manned hardware threat representations early enough to affect final system design. The Electronic Combat Integrated Test (ECIT) project upgrades the AF ISTF at Edwards AFB, CA. The ISTF provides for thorough weapon system evaluation in a large instrumented anechoic chamber prior to and during flight test. Three sources of funding are required to support the ECIT upgrade. Funding from this program element will provide for Air Force-unique and general infrastructure. Air Force funds from the F-22, C-17, B-1, and F-16 programs will provide for aircraft-specific test requirements. OSD funding from the Central Test and Evaluation Improvement Program (CTEIP) will provide for joint Navy/Air Force development of the radar target generator, infrared (IR) target generator, and the communication, navigation, and identification friend or foe (CNI) simulator system. These three systems will be incorporated into both the AF ISTF and Navy ISTF at Patuxent River, MD. The antenna measurement and analysis facilities at Rome Laboratory, NY, supported by this project are transitioning to full customer funding beginning in FY 96.

(U) FY 1994 Program:

- (U) EW Test Process Support. Further analyzed existing test facility capabilities to support AF EW Test Process. Evaluated consolidation alternatives. Improved inter-facility correlation of test results. Investigated mechanisms to link test facilities for simultaneous testing. Improved EW Test Process implementation. ($1,466)
- (U) J-MASS. Continued development of enhanced modeling and simulation architecture to support one-on-one simulations. Upgraded to latest Distributed Interactive Simulation (DIS) interface standard. ($1,444)
- (U) AFEWES Operation and Upgrade. Continued operation of the AFEWES in support of Army, Navy, Air Force and non-DoD customers. Continued work on the Reconfigurable Airborne Interceptor (RAI) simulator to provide closed-loop simulations of three air-to-air threat radars. Continued work on the Test Director System (TDS) to provide improved test control and data analysis capabilities. Completed the Multiple Emitter Generator (MEG) which evaluates radar warning receivers and power managed Electronic Countermeasures (ECM) systems. ($10,108)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development | PROJECT<br>3321 |

– (U) REDCAP Operation and Upgrade. Continued REDCAP operations in support of Army, Navy, Air Force and non-DoD customers. Completed development of the ground Integrated Air Defense System (IADS), the new computer architecture segment, and the link capability. Began efforts to integrate the existing surveillance radars into the new computer architecture. ($11,057)
– (U) ECIT. Developed a preliminary architecture for a generic EW and avionics installed system test facility. Conducted technology development and trade studies of alternatives for risk reduction, leading to issue of the draft Request for Proposal. ($9,791)
– (U) ECCM. Completed Guided Weapons Evaluation Facility (GWEF) Global Positioning System (GPS) simulation to provide time-space position information for Electronic Counter-counter Measures (ECCM) analysis. Completed develop of a Reconfigurable Ground Jammer for weapons ECCM testing. ($932)
– (U) Rome Laboratory Antenna Measurement Facilities. Continued operation, development and improvement of ground and airborne far field antenna measurement and analysis facilities in support of SPOs and DOD agencies and contractors. Completed computer, data and fiber optic network linking Rome Lab facilities and customers. Established new low reflectivity test range and provided 967,000 pattern measurements for F-22 CNI and EW PDRs. ($2,214)

(U) FY 1995 Planned Program:
– (U) EW Test Process Support. Begin the definition of a test facilities network that will support the definition of a network of test facilities that will support the full application of the EW Test Process in each phase of the DoD System Acquisition Process for federated and integrated avionics systems. ($1,000)
– (U) J-MASS. Release software upgrade. Continue development of enhanced modeling and simulation architecture to support one-on-one simulations. Develop real-time applications and few-on-few modeling capability. ($2,459)
– (U) AFEWES Operation and Upgrade. Continue operation of the AFEWES in support of Army, Navy, Air Force and non-DoD customers. Complete TDS. Continue work on the RAI. Begin development of Reconfigurable Surface-to-Air Missile (RSAM) simulator. Integrate the MEG with the RAI simulator to provide multiple threat signals to the jammer being tested against the RAI. ($4,840)
– (U) REDCAP Operation and Upgrade. Continue REDCAP operations in support of Army, Navy, Air Force and non-DoD customers. Complete integration and documentation efforts between existing REDCAP radars and the new/upgraded REDCAP facility architecture. Initiate Option E, the development of simulators for advanced surveillance radars specifically designed to detect low-flying or stealth-type aircraft. ($12,000)
– (U) ECIT. Release Request for Proposal, conduct source selection, and award risk-reduction contract for generic EW and avionics installed system test facility. ($9,208)
– (U) ECCM. Acquire additional millimeter wave (MMW) simulator channel for ECCM efforts in GWEF, and procure for PRIMES a Scenario Controller, an EO/IR Imaging simulator, and an Advanced Avionics Simulator for stores management. ($1,806)
– (U) Rome Laboratory Antenna Measurement Facilities. Continue operation, development and improvement of ground and airborne far-field antenna measurement and analysis facilities. Optimize range to support F-22 Aperture Development Program. Provide capability to support AF Special Operations Command, Warner Robins ALC, and 412TW C-130 Gunship EW and Advanced Signal Collection Upgrade Programs. Develop capability to support the F-15 production decision on Manned Destructive Suppression of Enemy Air Defenses Program. Modify B-1B testbed to support the Conventional Mission Upgrade Program. ($2,000)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0604256F Threat Simulator Development — PROJECT: 3321 |

(U) FY 1996 Planned Program:

- (U) EW Test Process Support. Continue the definition of a test facilities network that will provide definition of a network of test facilities that will support the full application of the EW Test Process in each phase of the DoD System Acquisition Process for federated and integrated avionics systems. Formulate an investment strategy and implementation plan to realize this network. ($1,500)
- (U) J-MASS. Develop capability to run simulations composed of models that can be written in a variety of languages. Integrate MOSAIC models to provide an infrared simulation capability. Integrate Suppresser to provide mission training. Continue providing J-MASS user support and training. ($2,284)
- (U) AFEWES Operation and Upgrade. Continue AFEWES operations in support of Air Force, Army, Navy and non-DoD test customers. Continue the development of the RSAM simulator. ($7,592)
- (U) REDCAP Operation and Upgrade. Continue REDCAP operations in support of Air Force, Army, Navy and non-DoD test customers. Continue acquisition and integration of advanced surveillance radars under Option E. ($7,500)
- (U) ECIT. Complete risk-reduction phase and select contractor for full-scale development of generic EW and avionics installed system test facility. Begin military construction of ECIT facilities. (Source of funds for MILCON is PE 0605807F) ($20,111)
- (U) Rome Labs. The antenna pattern measurement activities of this facility will transition to full funding by customers.

(U) FY 1997 Planned Program:

- (U) EW Test Process Support. Begin implementation of the EW test facilities network. Continue the analysis and planning of upgrades to the network to improve implementation of the EW Test Process and support emerging EW technologies. ($1,536)
- (U) J-MASS. Improve model and scenario development tools, such as visual programming, graphical user interface, hardware-in-the-loop and man-in-the-loop, and data management capabilities. Increase the number of hardware platforms that J-MASS can support. Support a growing library of models, and provide user training, support and documentation. ($2,058)
- (U) AFEWES Operation and Upgrade. Continue AFEWES operations in support of Air Force, Army, Navy and non-DoD test customers. Complete RSAM simulator development. ($3,069)
- (U) REDCAP Operation and Upgrade. Continue REDCAP operations in support of Air Force, Army, Navy and non-DoD test customers. Continue the acquisition and integration of advanced surveillance radars under Option E. ($6,936)
- (U) ECIT. Continue development of infrastructure and generic EW and avionics installed system test capabilities. Complete military construction efforts for ECIT facilities (funding source for MILCON is PE 0605807F). ($19,681)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0604256F Threat Simulator Development — PROJECT: 3321 |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 37,491 | 32,962 | 46,111 | 35,533 | TBD |
| (U) Appropriated Value | | 33,962 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -300 | | | |
| b. SBIR | | -461 | | | |
| c. Omnibus or Other Above Threshold Reprogramming | | -349 | | | |
| d. Below Threshold Reprogramming | -479 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -7,124 | -2,253 | |
| (U) Current Budget Submit/President's Budget | 37,012 | 33,313 | 38,987 | 33,280 | TBD |

(U) Change Summary Explanation:

Funding:

FY 95 funding changes (Congressional):

| | |
|---|---|
| REDCAP | +5,000 |
| AFEWES | -4,000 |

FY 96/97 Funding: ECCM and Rome Labs were zeroed and J-MASS was reduced due to overall Air Force budget constraints. Antenna pattern measurement activities at Rome Labs will be totally customer funded beginning in FY 96. Sources for customer funding for ECIT ($5,600 in FY 96 and $5,400 in FY 97) were identified (C-17, F-16, B-1, F-22), and transferred to this PE.

Schedule: REDCAP SUAWACS/BMC3 project completed in 1Q FY 94 (vs 3Q FY 95). Initiation of AFEWES RSAM upgrade project delayed from FY 94 to FY 95 and IOC slipped from 3Q FY 96 to 4Q FY 97

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| PE 0605807F, (ECIT MILCON) | | | 11,100 | 4,900 | | | | | 0 | 16,000 |
| PE 0604940D, (CTEIP) | | 4,125 | 4,100 | 7,820 | 4,370 | 3,500 | 0 | 0 | 0 | 23,915 |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development |
| | PROJECT<br>3321 |

Related RDT&E:

(U) PE 0604759F, Major T&E Investment
(U) PE 0604735F, Combat Training Ranges
(U) PE 0207122F, F-16
(U) PE 0604239F, F-22
(U) PE 0604231F, C-17
(U) PE 0604226F, B-1

**(U) D. Schedule Profile:**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) REDCAP Architecture/Link project upgrade IOC. | | | | | | X | | | | | | | | | | |
| (U) REDCAP IADS IOC. | | | | x | | | | | | | | | | | | |
| (U) AFEWES RAI upgrade IOC. | | | | | | | X | | | | | | | | | |
| (U) J-MASS releases. | | | | | | X | | | X | | | X | | | | |
| (U) Rome Lab multi-spectral capability to support F-22 complete. | | | | | | | | X | | | | | | | | |
| (U) ECIT MILCON complete. | | | | | | | | | | | | | | | | X |
| (U) RSAM C IOC. | | | | | | | | | | | | | | | | X |
| (U) REDCAP Option E IOC. | | | | | | | | | | | | | | | | X |
| (U) ECIT IOC (4Q FY 98). | | | | | | | | | | | | | | | | |

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604256F Threat Simulator Development

PROJECT: 6510

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 6510 Electronic Warfare Flight Test Resources | 3,140 | 5,843 | 10,520 | 11,067 | 9,029 | 5,145 | 2,703 | 2,897 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** This project funds those resources, including simulators and instrumentation, necessary to support flight test in an open-air environment. It includes the development of advanced signal sources to represent ground and airborne threats and the upgrade of existing threat simulators to maintain currency with the latest intelligence. This project funds the development of an Advanced Airborne Interceptor Simulator (AAIS) in conjunction with the Central Test and Evaluation Improvement Program (CTEIP). CTEIP funds the non-recurring engineering (NRE) portion of AAIS development, whereas this project acquires the AAIS hardware.

(U) FY 1994 Program:
- (U) Electromagnetic Test Environment (EMTE). Continued incorporation of the latest intelligence information into the SADS V (Missile), SADS X, SADS XI, and SADS XI (Missile). Incorporated the latest intelligence information into simulators for threats for which real systems are not available. ($2,177)
- (U) AAIS. Conducted AF analyses of technical approaches for meeting requirements, evaluating existing simulation and actual hardware systems, and preparing request for proposal. ($963)

(U) FY 1995 Planned Program:
- (U) EMTE. Acquire SADS XII antenna. Continue instrumentation and closed-loop missile simulation on foreign surface-to-air missile (SADS VM). Incorporate the latest intelligence information into simulators for threats for which real systems are not available. ($2,277)
- (U) AAIS. Award contract to develop, fabricate, integrate, and test an airborne test simulator to be completed 4Q FY 98. ($3,566)

(U) FY 1996 Planned Program:
- (U) AAIS. Complete design phase and begin fabrication phase. ($10,520)

(U) FY 1997 Planned Program:
- (U) AAIS. Complete fabrication phase. Begin preparation for integration/testing phases. ($11,067)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development<br>PROJECT 6510 |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 3,140 | 6,201 | 14,652 | 14,059 | Cont |
| (U) Appropriated Value | | 6,201 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -358 | | | |
| b. SBIR | | -307 | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -4,132 | -2,992 | |
| (U) Current Budget Submit/President's Budget | 3,140 | 5,843 | 10,520 | 11,067 | Cont |

(U) Change Summary Explanation:

Funding: Planned FY 96/97 simulator modification upgrades have been deferred.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) PE 0604940D, Central T&E Improvement Program | 0 | 2,500 | 8,000 | 8,000 | | | | | | 18,500 |

Related RDT&E:

PE 0604759F, Major T&E Investment
PE 0604735F, Combat Training Ranges

(U) **D. Schedule Profile:** AAIS Initial Operational Capability (3Q FY 99)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development<br>PROJECT<br>2900 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2900 RATSCAT Upgrade (1) | 0 | 0 | 1,990 | 1,990 | 1,990 | 1,990 | 1,990 | 1,989 | Continuing | TBD |

(1) This project transferred from PE 0605708F, Nav/Radar/Sled Track Support, effective FY 96. (FY 94/95 funding was $2,000 per year.)

**(U) A. Mission Description and Budget Item Justification:** This project provides improvements to the Radar Target Scatter (RATSCAT) facility in order to assure support to address radar cross section (RCS) measurement requirements of DoD customers. Key areas of improvement include radar upgrades, standardization of data processing equipment and techniques, bistatic testing, pylon skirts with low radar returns, low frequency measurement capability upgrades, advanced real-time radar calibration equipment, security system upgrades, efficiency related equipment. The DoD continues an aggressive R&D program to achieve low-observable technology. This project provides a continuous effort to allow test technology to keep pace with these activities. OSD funding though the Central Test and Evaluation Improvement Program (CTEIP) provides funding for Data Acquisition and Processing System (DAPS), Bistatic Coherent Measurement System (BICOMS), and the next generation pylons. For DAPS, CTEIP funds the hardware, development, instrumentation, and spares. For BICOMS CTEIP funds part of the hardware and labor. For the next generation pylons, CTEIP funds the pylons.

(U) FY 1994 Program:
– (U) Completed final acquisition phase for RATSCAT Advanced Measurement System VHF/UHF Measurement System (RVUMS), provided support for the Advanced Static RCS project, initiated deficiency corrections for Integrated Radar Measurement System (IRMS), and completed fabrication of radar for the West Range. ($2,000)

(U) FY 1995 Planned Program:
– (U) Procure RAMS security system, procure risk reduction hardware for North Range Radar (previously Integrated Radar Measurement System) efficiency upgrades, complete the preliminary design review for BICOMS, and complete acquisition of advanced technology pylon skirts. ($2,000)

(U) FY 1996 Planned Program:

– (U) Complete development of DAPS for Mainsite and RATSCAT Advanced Measurement System (RAMS) low frequency radars. Continue North Range Radar improvements. Initiate RAMS radar development to improve the dynamic range and system sensitivity. ($1,990)

(U) FY 1997 Planned Program:
– (U) Continue RAMS radar system design and hardware purchase. Complete improvements to the North Range Radar. ($1,990)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development |
| | PROJECT<br>2900 |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | N/A | N/A | 1,990 | 1,990 | Cont |
| (U) Appropriated Value | | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| (U) Current Budget Submit/President's Budget | N/A | N/A | 1,990 | 1,990 | Cont |
| (U) Funding from PE 0605708F | 2,000 | 2,000 | | | |

(U) Change Summary Explanation:

Funding: This project is covered under PE 0605708F for FY 1994 and FY 1995.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) PE 0604940D, CTEIP | 3,500 | 2,500 | 5,300 | 10,000 | 3,000 | 0 | 0 | 0 | 0 | 26,300 |

(U) **D. Schedule Profile:** Not applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development | PROJECT<br>2907 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2907 Electronic Warfare Intel Support (2) | 0 | 0 | 1,880 | 1,834 | 1,904 | 1,981 | 2,041 | 2,101 | Continuing | TBD |

(1) This project was transferred from PE 0305887F, Electronic Combat Intelligence Support, effective FY 96. (FY 94 funding was $2,100 and FY 95 funding was $1,788.)

(U) **A. Mission Description and Budget Item Justification:** This project provides funding to support Foreign Materiel Operational Test and Evaluation (FMOT&E) which ensures the ability of operational commands to test and develop effective Electronic Attack/Electronic Protection (EA/EP) and tactics. Funds are required for: deployment of blue systems to test facilities, travel for personnel to the test sites to evaluate and validate test results real-time, reimbursement for industrial-funded range and laboratory costs; costs for instrumentation of blue systems; contracted engineering support for the conduct of tests and subsequent reporting. Funding for this program is required to prevent future aircraft losses due to improper and inaccurate aircrew tactics (e.g., lack of evasive action or proper tactics training to avoid missile attack).

(U) FY 1994 Program:
- (U) See PE 0305887F.

(U) FY 1995 Planned Program:
- (U) See PE 0305887F.

(U) FY 1996 Planned Program:
- (U) Funds testing for foreign materiel operational exploitation. Extensive evaluations and reporting to be accomplished. ($1,880)

(U) FY 1997 Planned Program:
- (U) Continues funding for testing foreign materiel operational exploitation. Extensive evaluations and reporting to be accomplished. ($1,834)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development<br>PROJECT 2907 |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | N/A | N/A | 1,889 | 1,843 | N/A |
| (U) Appropriated Value | | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -9 | -9 | |
| (U) Current Budget Submit/President's Budget | N/A | N/A | 1,880 | 1,834 | N/A |
| Funding from PE 0305887F: | 2,100 | 1,788 | | | |

(U) Change Summary Explanation:

Funding: Transferred from PE 0305887F, effective FY 96.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

(U) **D. Schedule Profile:** Not applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0604256F Threat Simulator Development / PROJECT: 1006 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1006 HAVE NOTE | 1,000 | 912 | 0 | 0 | 0 | 0 | 0 | 0 | Continuing | TBD |

**(U) A. Mission Description and Budget Item Justification:** Developed, improved and supported the Rome Laboratory Electromagnetic Radiation (EMR) test facilities including an anechoic chamber for free space electromagnetic environments simulations; a mode-tuned reverberation chamber for rapid "quick look" evaluations; a small anechoic chamber used for subsystem evaluations; and a radio frequency (RF) and microwave instrumentation development facility. The electromagnetic susceptibility data produced at these facilities is used to perform weapon system and C3I system vulnerability assessments and update test methods, acquisition specifications, hardening design guidelines, and maintenance of technical orders. For FY 96 and the out years, this project is transitioning to full customer funding.

(U) FY 1994 Program:
- (U) Continued operation, development and improvement of Electromagnetic Environmental Effects assessment facility. Provided capability for vulnerability assessment of Advanced Medium Range Air-to-Air Missile Producibility Enhancement Program (APREP) hardware. Provided capability for vulnerability assessment of DSU-33C Proximity Fuse. Completed vulnerability assessment of Sensor Fuzed Weapon (SFW) Producibility Transition Program (PTP) hardware. Published MIL-HDBK-335 update. Completed Automated Data Acquisition and Control System (ADACS) software transfer and validation for AMRAAM vulnerability assessment. Established support to Joint Direct Attack Missile (JDAM) Systems Program Office (SPO). ($1,000)

(U) FY 1995 Planned Program:
- (U) Continue operation, development and improvement of Electromagnetic Environmental Effects Assessment Facilities. Configure anechoic chamber to support vulnerability assessment of SFW Pre-planned Product Improvement ($P^3I$) hardware. Procure replacement of $400 multiband high-power traveling wave tube power supply and modulator. Prepare and instrument anechoic chamber facility to support JDAM SPO. ($912)

(U) FY 1996 Planned Program:
- (U) Becomes fully customer funded.

(U) FY 1997 Planned Program:
- (U) Fully customer funded.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604256F Threat Simulator Development<br>PROJECT 1006 |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1,000 | 912 | 918 | 924 | Cont |
| (U) Appropriated Value | | 912 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -918 | -924 | |
| (U) Current Budget Submit/President's Budget | 1,000 | 912 | 0 | 0 | N/A |

(U) Change Summary Explanation:

Funding: Becomes fully customer funded beginning in FY 96.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

(U) **D. Schedule Profile:** Not applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6 - Management Support

PE NUMBER AND TITLE: #0604258F Target Systems Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 9,882 | 7,346 | 5,362 | 5,234 | 5,427 | 5,656 | 5,823 | 5,997 | Cont | TBD |
| Full Scale Aerial Target System/3165 | 7,307 | 6,457 | 1,185 | 0 | 0 | 0 | 0 | 0 | 0 | 51,113 |
| Target Payloads/2459 | 2,575 | 889 | 4,177 | 5,234 | 5,427 | 5,656 | 5,823 | 5,997 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

Aerial Targets are used to determine air-to-air weapons effectiveness and mission proficiency of our tactical systems against enemy aircraft. The overall objective is to improve air-to-air weapon system accuracy and reliability by developing aerial target systems for Air Force weapon system test and evaluation. This effort is in the research category/budget activity for Management Support, since it provides overall support to research and development activities. The acquisition strategy is competitive, cost plus contracts.

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 10,154 | 7,576 | 5,859 | 5,840 | TBD |
| Appropriated Value | 10,154 | 7,576 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -102 | -88 | | | |
| b. Below Threshold Reprogramming (BTR) | -54 | | | | |
| c. Small Business Innovative Research (SBIR) | -116 | -142* | | | |
| Adjustment to Budget Years Since FY95 Budget | | | -497 | -608 | |
| Current Budget Submit/President's Budget | 9,882 | 7,346 | 5,362 | 5,234 | TBD |

* SBIR adjustments not reflected in ABIDES database.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6 - Management Support

PE NUMBER AND TITLE: #0604258F Target Systems Development

(U) B. Program Change Summary Continued ($ in Thousands)

Change Summary Explanation:

Funding: Program reduced in FY96-97 to fund higher priority requirements.

Schedule: None

Technical: FY97 cuts reduced the scope of new technology upgrades and the RF survivability effort and technology upgrades for both Full Scale Aerial Targets and Subscale Aerial Targets.

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| PE 35116F: Appropriation: Weapon Procurement, AF Budget Activity: 4, Program Title: Target Drones | | | | | | | | | | |
| WSC: M107 (MQM-107E) | 26,140 | 10 | 10,694 | 9,385 | 12,105 | 12,606 | 12,986 | 13,378 | Cont | TBD |
| WSC: M04AQF (QF-4E) | 4,653 | 22,872 | 28,456 | 25,675 | 29,882 | 31,107 | 32,044 | 33,012 | Cont | TBD |
| Spares (Firebee, QF-4E, MQM-107, QF-106) | 657 | 1,437 | 1,322 | 3,951 | 4,104 | 4,268 | 4,397 | 4,529 | Cont | TBD |
| PE 35116F: Appropriation: Operations and Maintenance, AF Budget Activity 4, Program Title: Target Drones | | | | | | | | | | |
| | 108 | 720 | 953 | 953 | 2,679 | 2,766 | 2,849 | 2,934 | Cont | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6 - Management Support

PE NUMBER AND TITLE: #0604258F Target Systems Development

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **Full Scale Aerial Target Systems** | | | | | | | | | | | | | | | | |
| QF-4E Contract Award 2/92 | | | | | | | | | | | | | | | | |
| Developmental Test & Evaluation (DT&E) | | X* | | X** | | | | | | | | | | | | |
| Operational Test & Evaluation (OT&E) | | | | X* | X** | | | | | | | | | | | |
| White Sands DT&E/OT&E | | | | | | X* | X** | | | | | | | | | |
| Production Decision | | | | | | X | | | | X | | | | X | | |
| Deliveries Begin | | | | | | | | | | X | | | | X | | |
| IOC | | | | | | | | | | | | X | | | | |
| **Target Payloads** | | | | | | | | | | | | | | | | |
| NAVS | | | | | | | | | | | | | | | | |
| Hardware (HW) Preliminary Design Review (PDR)/Software (SW) Software Specification Review (SSR) | | | X | | | | | | | | | | | | | |
| SW PDR | | | | | X | | | | | | | | | | | |
| HW Critical Design Review (CDR) | | | | | X | | | | | | | | | | | |
| SW CDR | | | | | | X | | | | | | | | | | |
| Quality Testing | | | | | | | X* | X** | | | | | | | | |
| Ground Accuracy Tests | | | | | | | | X* | X** | | | | | | | |
| Flight Tests | | | | | | | | | X* | | X** | | | | | |
| Milestone III | | | | | | | | | | | | | X | | | |
| Production Option | | | | | | | | | | | | | X | | | |

Note: X* = Milestone Beginning X** = Milestone Completion

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

**#6 - Management Support**

PE NUMBER AND TITLE: **#0604258F Target Systems Development**

PROJECT NO.: **3165**

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Full Scale Aerial Target System/3165 | 7,307 | 6,457 | 1,185 | 0 | 0 | 0 | 0 | 0 | 0 | 51,113 |

(U) A. Mission Description and Budget Item Justification

The Air Force is lead for a tri-service program for the development of the QF-4E full scale aerial target. The QF-4E is the follow-on to the QF-106 full scale target used today. The final buy of the QF-106 was in FY93 with deliveries complete in 4Qtr FY94. The first QF-4E production is scheduled for delivery in 2Qtr FY96 and is funded by PE 35116F procurement. Additional production options are scheduled to begin delivery in 2Qtr97 and 2Qtr98 respectively The first QF-4E will be tested and operated at Tyndall AFB, FL to meet over-water test requirement, and then tested at the White Sands Missile Range, NM to meet over-land test requirement. The Navy will begin using the QF-4E in FY99. Full-scale targets are fully representative of the threat, with realistic maneuvering performance, radar cross section and afterburning engine infrared (IR) signature. The overall objective is to improve air-to-air weapon system accuracy and reliability by developing aerial target systems for Air Force weapon system test and evaluation. Public law mandates all new or upgraded weapon systems must demonstrate lethality against a representative threat before approval to proceed with procurement. In addition to AMRAAM, AIM-7, AIM-9X, and F-22, full-scale targets are also used to support US Army air defense test and evaluation programs such as the Divisional Air Defense follow-on program, Stinger, Patriot and Improved Hawk.

(U) FY 1994

- (U) Complete development of electronic countermeasure (ECM) pod ($100)
- (U) Complete development of basic flight tests ($4,200)
  - -- (U) Complete development of tri-service flight termination system (NSP)
  - -- (U) Completed contractor flight tests (NSP)
  - -- (U) Conducted flight readiness review (NSP)
  - -- (U) Conducted preliminary software physical configuration audit (PCA) (NSP)
- (U) Test and Evaluation Support ($2,882)
  - -- (U) Began DT&E/IOT&E at Tyndall AFB for the integrated QF-4E system (NSP)
  - -- (U) Complete testing of mobile control station (NSP)
- (U) Other technical support ($125)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | #0604258F Target Systems Development | 3165 |

(U) FY 1995
- (U) Complete development of basic system through Drone Formation Control System testing ($4,000)
  - -- (U) Conduct Production Readiness Review #2 (NSP)
  - -- (U) Make production decision (exercise production option #1) (NSP)
  - -- (U) Conduct final software Physical Configuration Audit (PCA) (NSP)
  - -- (U) Complete Engineering and Manufacturing Development (EMD) phase of contract (NSP)
- (U) Test and Evaluation Support ($2,457)
  - -- (U) Begin DT&E/IOT&E at White Sands Missile Range for the integrated QF-4E system (NSP)

(U) FY 1996
- (U) Complete EMD phase of program ($1,185)
  - -- (U) Conduct drone operations training (NSP)
  - -- (U) Conduct QF-4E PCAs (NSP)
  - -- (U) Deliver FSAT system level III drawing package (NSP)
  - -- (U) Exercise production option #2 (NSP)
  - -- (U) Receive first production QF-4E target (NSP)

(U) FY 1997
- (U) No funds required.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6 - Management Support

PE NUMBER AND TITLE: #0604258F Target Systems Development

PROJECT NO.: 3165

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 7,572 | 6,610 | 1,191 | 0 | TBD |
| Appropriated Value | 7,572 | 6,610 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -95 | -64 | | | |
| b. Below Threshold Reprogramming (BTR) | -54 | | | | |
| c. Small Business Innovative Research (SBIR) | -116 | -89* | | | |
| Adjustment to Budget Years Since FY95 Budget | | | -6 | 0 | |
| Current Budget Submit/President's Budget | 7,307 | 6,457 | 1,185 | 0 | 51,113 |

* SBIR adjustments not reflected in ABIDES database.

Change Summary Explanation: FY96 reduced to reflect revised inflation.

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| PE 35116F: Appropriation: Weapon Procurement, AF Budget Activity: 4, Program Title: Target Drones | | | | | | | | | | |
| WSC: M04AQF (QF-4E) | 4,653 | 22,872 | 28,643 | 26,029 | 30,048 | 31,272 | 32,210 | 33,176 | Cont | TBD |

(U) D. Schedule Profile

Refer to Program Element Schedule page 3, section D.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6 - Management Support

PE NUMBER AND TITLE: #0604258F Target Systems Development

PROJECT NO.: 2459

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Target Payloads/2459 | 2,575 | 889 | 4,177 | 5,234 | 5,427 | 5,656 | 5,823 | 5,997 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

Specialized payload subsystems are developed for full-scale and subscale targets for missile scoring, electronic and infrared (IR) countermeasures, and radar and IR signature augmentation. Current scoring systems provide only miss distance information. Noncooperative Airborne Vector Scoring (NAVS), is the tri-service system under development provides missile path and position relative to the target at point of closest approach, which are essential to accurately calculate the probability of kill. IR signature augmentation on subscale targets provides a signature representative of threat military jet engines. Electronic and IR countermeasures (ECM & IRCM) include systems such as chaff and flare dispensers. Drone Radar Cross Section (RCS) Electronic Enhancement Mechanism (DREEM) provides RCS enhancement of Aerial Targets to replicate threats, and is used for Developmental Test & Evaluation/Inital Operational Test & Evaluation of air-to-air missiles, air-to-air Weapons Systems Evaluation Program (WSEP). The acquisition strategy is competitive, cost plus contracts.

(U) FY 1994
- (U) Continued to participate in tri-service development of NAVS ($1,500)
- (U) Initiate integrated schedule ($500)
- (U) Collect and compile target signature data for use in test planning and incorporate into target handbook ($200)
- (U) Initiate Interim Vector Scorer ($375)

(U) FY 1995
- (U) Continue to participate in tri-service development of NAVS ($500)
- (U) Collect and compile target signature data for use in test planning ($200)
- (U) Initiate radio frequency (RF) survivability efforts ($100)
- (U) Other technical support ($89)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | #0604258F Target Systems Development | 2459 |

(U) FY 1996
- (U) Complete Engineering and Manufacturing Development and Flight Test in tri-service development of Noncooperative Airborne Vector Scoring (NAVS) ($1,100)
- (U) Initiate DEMVAL for Drone Radar Cross Section (RCS) Electronic Enhancement Mechanism (DREEM) ($2,177)
- (U) Initiate Follow-on aerial target study ($300)
- (U) Collect and compile target signature data for use in test planning ($300)
- (U) Continue radio frequency survivability efforts ($200)
- (U) Initiate Alternative Countermeasure program ($100)

(U) FY 1997
- (U) Continue Follow-on aerial targets study ($1,500)
- (U) Continue DEMVAL for DREEM ($2,634)
- (U) Continue Alternative Countermeasure program ($300)
- (U) Continue signature measurement and handbook efforts ($500)
- (U) Initiate upgrades for subscale electronics ($300)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | #0604258F Target Systems Development | 2459 |

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,582 | 966 | 4,668 | 5,840 | TBD |
| Appropriated Value | 2,582 | 966 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -7 | -24 | | | |
| b. Small Business Innovative Research (SBIR) | | -53* | | | |
| Adjustment to Budget Years Since FY95 Budget | | | -491 | -606 | |
| Current Budget Submit/President's Budget | 2,575 | 889 | 4,177 | 5,234 | TBD |

* SBIR adjustments not reflected in ABIDES database.

Change Summary Explanation:

Funding: Program reduced in FY96-97 to fund higher priority requirements.

Schedule: None

Technical: FY97 cuts reduced the scope of new technology upgrades and the RF survivability effort and technology upgrades for both Full Scale Aerial Targets and Subscale Aerial Targets.

(U) C. Other Program Funding Summary ($ in Thousands)

Not Applicable

(U) D. Schedule Profile

Refer to Program Element Schedule page 3, section D.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE |
|---|---|
| #7 - Operational Systems Development | #0604268F ** - Aircraft Engine Component Improvement Program (CIP) |

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost * | 102,542 | 92,564 | 103,700 | 105,600 | 99,523 | 101,825 | 104,880 | 108,026 | CONT | CONT |

A. (U) Mission Description and Budget Item Justification

(U) CIP provides critical sustaining engineering support (only source) for in-service Air Force engines to maintain flight safety (highest priority), to correct service revealed deficiencies, to improve system Operational Readiness (OR) and Reliability and Maintainability (R&M), to reduce engine Life Cycle Cost (LCC), and to keep older engines operational. Historically, aircraft systems change missions, tactics, and environments to meet changing threats throughout their lives. Numerous new problems can develop in the engines through actual use during deployment, production, and service, and CIP provides the only funds to develop fixes for these field problems. CIP starts with acceptance of the first production engine and continues over the engine's life, gradually decreasing to a minimum level (safety/depot repairs) sufficient to keep older inventory engines operational. CIP addresses usage and life not covered by engine warranty and enables the Air Force to obtain improved warranties when manufacturers incorporate CIP improvements into production engines. Since changes continue throughout a system's operational life, CIP must be maintained at a level to provide the engineering support to make changes which are essential for satisfactory system performance at affordable costs. CIP ensures continued improvements in engine R&M factors, which reduces outyear support costs. Typically, CIP efforts reduce outyear Operations and Maintenance (O&M) and spares costs by a ratio greater than 21 to 1. O&M and spares budgeting assumes a viable CIP effort is in place. Without the outyear cost avoidance provided by CIP, outyear support costs would have to be increased drastically. CIP funding is driven by field events and types/maturity of engines, not by the total engine quantity. This Program is in Budget Activity/Research Category Operational Systems Development as most efforts support currently operating systems.

* Funding for FY96-01 transitioned from Budget Activity/Research Category Engineering and Manufacturing Development.

** PE number will change to 0207268F with the submission of the FY1997 President's Budget.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY | PE NUMBER AND TITLE |
| #7 - Operational Systems Development | #0604268F - Aircraft Engine Component Improvement Program (CIP) |

A. (U) Mission Description and Budget Item Justification (Cont'd)

(U) There are no individual Projects within this PE. The following describe the overall Program :
(Dollars in Thousands)

(U) FY 1994 Program:

- (U) - Continued effort to reduce air aborts, aircraft safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance man hours, and overall costs. Completed 7744 test hours (6532 sea level, 1212 altitude, 82 flight tests) to analyze, verify and qualify CIP tasks. Also completed 637 CIP tasks (237 redesign tasks, 317 repair development tasks, 83 analysis tasks) generating $2.7 Billion in LCC (Life Cycle Cost) savings. (Total program $102,542)
- (U) - F100 (F-16/F-15) Redesigned F100-PW-229 second High Pressure Turbine Vane for improved durability. Provides full 4300 TAC (Total Accumulated Cycle) part life and reduces the probability of turbine failure. - $ 23.0 Million LCC saving. ($303)
- (U) - F110 (F-16) Developed Digital Engine Control for the F110-GE-100. Reduces In Flight Shutdown rate by half (.14 to .07). - $92.0 Million LCC savings. ($2,017)
- (U) - F101 (B-1) Redesigned fuel/lube system bolt flanges. Reduces oil leak potential and IFSD rate. LCC saving $10M. ($250)
- (U) - The balance of the program (some 634 separate tasks) supported improvements to the reliability and maintainability of 46 different engine types in Air Force service, and the testing and verification of those improvements. ($99,972)

(U) FY 1995 Planned Program:

- (U) - Continue effort to increase engine operability and supportability, reduce air aborts, aircraft safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance man hours, and overall costs. Program will include 9296 test hours (8291 sea level, 890 altitude), to analyze, verify and qualify CIP tasks. (Total program $92,564)
- (U) - There will be 675 CIP tasks (231 redesign tasks, 373 repair development tasks, 71 analysis tasks) generating $2.5 Billion in LCC savings. (NSP)
- (U) - A typical task is the completion of the F110-GE-100 Digital Engine Control development and its Flight Testing. Expected completion in FY 95. ($2,250)

(U) FY 1996 Planned Program:

- (U) - Continue effort to increase engine operability and supportability, reduce air aborts, aircraft safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance man hours, and overall costs. (Total program $103,700)
- (U) - Program will include approximately 7500 test hours (6300 sea level, 1200 altitude), to analyze, verify and qualify CIP tasks. (NSP)
- (U) - 620 CIP tasks (230 redesign tasks, 310 repair development tasks, 80 analysis tasks) generating $2.6 Billion in LCC savings. (NSP)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE |
|---|---|
| #7 - Operational Systems Development | #0604268F - Aircraft Engine Component Improvement Program (CIP) |

A. (U) Mission Description and Budget Item Justification (Cont'd)

(U) FY 1997 Planned Program:

(U) - Continue effort to increase engine operability and supportability, reduce air aborts, aircraft safety incidents, non-mission capable rates, scheduled and unscheduled engine removals, maintenance man hours, and overall costs. (Total program $105,600)

(U) - To include approximately 600 CIP tasks and 7500 hours of testing (230 redesign tasks, 300 repair development tasks, 70 analysis tasks) generating $2.6 Billion in Life Cycle Cost savings. (NSP)

B. (U) Program Change Summary ($ in Thousands)

| | FY94 | FY95 | FY96 | FY97 | Total |
|---|---|---|---|---|---|
| Previous President's Budget | 102,704 | 97,399 | 98,589 | 97,933 | CONT |
| Appropriated Value | 102,704 | 95,399 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Cong Gen reduction | -2,631 | -1,043 | | | |
| b. BTR | 3,638 | | | | |
| c. SBIR | -1,169 | -1,792 | | | |
| Adjustments to Budget Years Since FY95 PB | | | 5,111 | 7,667 | |
| Current Budget Submit/President's Budget | 102,542 | 92,564 | 103,700 | 105,600 | CONT |

Change Summary Explanation:

Funding: The 1996 and 1997 PBs were increased to cover the Falcon 229 initiative. The remaining funds sustain known flight safety improvement tasks but decrease activity on some modifications that had been planned to reduce maintenance costs and improve reliability.

Schedule: Lower priority tasks deferred to following year. The Engine Advisory Group assesses the program and budget annually and reviews progress regularly to reconcile budget reductions, shifting priorities and newly identified, urgent problems.

Technical: No change.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY | PE NUMBER AND TITLE |
| #7 - Operational Systems Development | #0604268F - Aircraft Engine Component Improvement Program (CIP) |

C. (U) Other Program Funding Summary ($ in Thousands): Not applicable.

(U) RELATED ACTIVITIES:

(U) - PE # 0603202F, Aircraft Propulsion Subsystem Integration, provides fan and low pressure turbine technology
(U) - PE # 0603216F, Advanced Turbine Engine Gas Generator, provides compressor, combustor, and high pressure turbine technology
(U) - PE # 0604218F, Engine Model Derivative Program, provides additional component and engine test data
(U) - PE # 0708011F, Industrial Preparedness Program, provides materials processing and component fabrication demonstration
(U) - PEs # 0604268A and #0604268N, Army/Navy Aircraft Engine CIPs. These PEs will change to #0203752A and #0205633N in FY97.

D. (U) Schedule Profile

Not applicable. CIP is an ongoing level-of-effort program.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE / PROJECT |
|---|---|
| #7 - Operational Systems Development | #0604268F - Aircraft Engine Component Improvement Program (CIP) |

A. Project Cost Breakdown ($ in Thousands)

Not applicable. CIP is a level-of-effort program that has been ongoing for forty years, now level funded at about $100 million per year. There are hundreds of separate tasks executed each year from the list of candidates, but there are no separate Projects within the CIP program.

B. Budget Acquisition History and Planning Information ($ in Thousands)

Not applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604270F EW Development

| | COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Program Element (PE) Cost | 116,998 | 115,692 | 50,203 | 84,111 | 80,474 | 58,760 | 58,547 | 25,738 | Continuing | TBD |
| 1011 | Joint Service Electronic Combat Systems Tester (JSECST) | 1,012 | 3,508 | 7,837 | 11,566 | 9,990 | 0 | 0 | 0 | 0 | 33,913 |
| 2066 | EF-111A Upgrade (SIP) | 58,078 | 56,327 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD |
| 2272 | ALE-47 Countermeasures Dispenser | 2,343 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2462 | Compass Call (CC) | 10,789 | 4,898 | 1,351 | 1,781 | 1,354 | 844 | 833 | 933 | Continuing | TBD |
| 3108 | Airlift Defensive Systems (ADS) | 188 | 190 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3891 | Advanced Infrared Countermeasures (AIRCM) | 0 | 0 | 41,015 | 70,764 | 69,130 | 57,916 | 57,714 | 24,805 | TBD | TBD |
| 3896 | Advanced Strategic & Tactical Infrared Expendables (Aste) | 8,056 | 11,461 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4076 | On-Board EW System (Obews) | 14,002 | 17,108 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4077 | Advanced Missile Warning (AMW) | 13,440 | 22,200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5618 | F-15 Protective Systems | 9,090 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(U) A. **Mission Description and Budget Item Justification**

This program element (PE) consolidates engineering development efforts related to Air Force Electronic Warfare (EW) requirements. The EW Development Program objective is to transition advanced development technologies to installed operational capabilities via Engineering and Manufacturing Development (EMD) programs qualifying this as an RDT&E effort. The PE includes three projects (2272, 4076, and 5618) that have no RDT&E money beyond FY94. Project 2272, ALE-47 Countermeasures Dispenser System, project 5618, F-15 Protective Systems and project 3108, ADS completed their approved EMD programs and are in production. Funding was added to the FY95 PB for Project 4076, On-Board Electronic Warfare System. The EF-111A retires in FY97 and the EF-111A SIP has been canceled in FY96.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development |

(U) A. Mission Description and Budget Item Justification: (Continued)

In addition, two other projects (3896-ASTE and 4077- AMW) are combined under project 3891, AIRCM Development, beginning in FY96. The components of infrared countermeasures are warning, tracking, and countermeasures. These components were combined because managing them as a total system is the most efficient and effective way to meet user requirements. This combined project (3891) is not a new start.

(U) B. Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 143,433 | 88,774 | 119,761 | 153,007 | TBD |
| (U) Appropriated Value | 118,666 | 119,275 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | -1,191 | -1,313 | | | |
| b. Below Threshold Reprogramming | +874 | -30 | | | |
| c. SBIR | -1,351 | -2,240 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -69,558 | -68,896 | |
| (U) Current Budget Submit/President's Budget | 116,998 | 115,692 | 50,203 | 84,111 | TBD |

(U) Change Summary Explanation ($ in Thousands):

FY94 Funding: (U) $586 Undistributed reduction taken from projects 2272, 4076, and 5618. Other reductions described in project summaries.
(U) Reprogramming actions described in project summaries.
(U) Outyear funding reduced to fund higher priority Air Force requirements

FY95 Funding: (U) $3,553 Undistributed reduction and SBIR taken from project 4076.
(U) Outyear funding reduced (EF-111A SIP) to fund higher priority Air Force requirements.

Schedule: (U) See Project Summaries

Technical: (U) See Project Summaries

(U) C. Other Program Funding Summary ($ in Thousands): See Project Summaries.

(U) D. Schedule Profile: See Project Summaries.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development | PROJECT<br>1011 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1011 Joint Service Electronic Combat Systems Tester (JSECST) | 1,012 | 3,508 | 7,837 | 11,566 | 9,990 | 0 | 0 | 0 | 0 | 33,913 |

(U) A. Mission Description and Budget Item Justification

(U) The JSECST will fill both an Air Force and Navy operational requirement for a small, adaptable, and highly mobile tester capable of verifying the system level performance of installed electronic countermeasures systems. Present maintenance concepts rely on the built-in-test (BIT) capabilities of the line replaceable units (LRUs) to verify system performance. This method fails to detect failures in LRU interfaces and installed aircraft (Group A) hardware. Particular emphasis will be placed on size and weight since the test set must deploy with the operational unit.

(U) FY 1994
- (U) Initiate technical assessment and cost benefit analysis (CBA) of potential solutions ($590)
- (U) Establish formal program cost estimates based on cost benefit analysis ($222)
- (U) Prepare for EMD ($200)

(U) FY 1995
- (U) Continue tech assessment/CBA (1600)
- (U) Finalize Operational Requirements Document (NSP)
- (U) Obtain MS II approval for EMD (NSP)
- (U) RFP Release (NSP)
- (U) Start O&M Test Requirements Document development (950)
- (U) SPO Support (958)
- (U) EMD Source Selection (NSP)

(U) FY 1996
- (U) Begin EMD efforts (6,370)
- (U) Begin Test Program Set Development (TPS) (500)
- (U) SPO Support (967)

(U) FY 1997
- (U) Continue EMD Contract (8,566)
- (U) Continue TPS development (2,500)
- (U) SPO Support (500)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development | PROJECT<br>1011 |

(U) B. Program Change Summary ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1,430 | 3,508 | 11,370 | 11,625 | 32,658 |
| (U) Appropriated Value | 1,430 | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | -17 | | | | |
| b. Below Threshold Reprogramming | -385 | | | | |
| c. SBIR | -16 | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -3,533 | -59 | |
| (U) Current Budget Submit/President's Budget | 1,012 | 3,508 | 7,837 | 11,566 | 33,913 |

(U) Change Summary Explanation:

Funding:

Schedule: Program office Acquisition Strategy is being rephased . EMD contract will be awarded in 2QFY96, instead of 1QFY96.

Technical: A technical assessment allowed program to proceed from Milestone 0 to Milestone II eliminating requirement for previously planned Dem/Val program.

(U) C. Other Program Funding Summary ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Aircraft Procurement, AF | 0 | 0 | 0 | 0 | 0 | 12,424 | 13,621 | 14,034 | 14,715 | 54,794 |
| (U) PE 27442F(Common ECM) In Service Direct Ground Support Equipment | | | | | | | | | | |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development<br>PROJECT 1011 |

(U) D. Schedule Profile

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Draft ORD | | X | | | | | | | | | | | | | | |
| (U) Develop Acquisition Strategy | | | X | | | | | | | | | | | | | |
| (U) Prepare Draft RFP | | | | | | X | | | | | | | | | | |
| (U) Tech Assessment | | | | | | X | | | | | | | | | | |
| (U) Final ORD | | | | | | X | | | | | | | | | | |
| (U) MS II Approval | | | | | | | X | | | | | | | | | |
| (U) RFP Release | | | | | | | X | | | | | | | | | |
| (U) Source Selection | | | | | | | | X | | | | | | | | |
| (U) Contract Award | | | | | | | | | | X | | | | | | |
| (U) DT&E Start | | | | | | | | | | | | | | | X | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604270F EW Development

PROJECT: 1011

(U) A. Project Cost Breakdown ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) EMD Prep | 200 | | | |
| (U) Conduct Tech Assessment | 590 | 1,600 | | |
| (U) Conduct cost estimate | 222 | | | |
| (U) EMD contract | | | 6,370 | 8,566 |
| (U) TPS development | | | 500 | 2,500 |
| (U) SPO support | | 1,958 | 967 | 500 |
| (U) Total | 1,012 | 3,508 | 7,837 | 11,566 |

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Contractor(s) TBD | | | | | | | | 6,870 | 11,066 | 9,465 | 27,401 |
| Support and Management Organizations | | | | | | | | | | | |
| ASC/LNA, NAVAIR, Wright Labs | | | | | | 1,012 | 3,508 | 967 | 500 | 525 | 6,512 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| TBD | | | | | | | | | | | |
| **TOTAL** | | | | | | 1,012 | 3,508 | 7,837 | 11,566 | 9,990 | 33,913 |

**Government Furnished Property:** Not applicable

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604270F EW Development

PROJECT: 2462

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 Compass Call (CC) | 10,789 | 4,898 | 1,351 | 1,781 | 1,354 | 844 | 833 | 933 | Continuing | TBD |

(U) **A.** **Mission Description and Budget Item Justification:** COMPASS CALL (CC)is an EC-130H developed for command and control warfare (C2W) as a stand-off jamming platform to disrupt enemy air defenses and ground operations. **[INFORMATION DELETED]**. It is optimally employed as part of an integrated electronic combat (EC) package as it complements both present and future air, ground, and sea based systems to provide theater commanders with a coordinated jamming platform. This program element provides a continuing technology program to keep the EC-130H current with the rapidly evolving threat.

(U) Ongoing development programs are:

(U) HBS (High Band System) - Integrates HBS countermeasures into system support facility for CC Block III upgrades. Contractor: MAGNAVOX, Ft Wayne, IN.

(U) P-35 - **[INFORMATION DELETED. ]**

(U) HBE (High Band Exciter) - ECP to HBS, **[ INFORMATION DELETED]**. Contractor: MAGNAVOX, Ft. Wayne, IN.

(U) TRACS (Tactical Radio Acquisition and Countermeasures) - **[ INFORMATION DELETED]**.
Contractor: Lockheed-Sanders, Nashua, NH.

(U) FY 1994

- (U) Continued development of HBE (5,385)
- (U) Integrated HBS into system support facility (SSF) (1,361)
- (U) Continued TRACS EMD (2,377)
- (U) **[ INFORMATION DELETED]** (NSP)
- (U) Conducted ground proof-of-concept with AFFTC relating to future SAR program activities (NSP)
- (U) Conducted SSF integration testing of digital acquisition receiver and interference cancellation subsystems (NSP)
- (U) **[ INFORMATION DELETED]** (NSP)
- (U) Monitor MOA approval process (NSP)
- (U) **[ INFORMATION DELETED]** (NSP)
- (U) **[INFORMATION DELETED]** (1,166)
- (U) Began integration of upgrades into the test aircraft (NSP)
- (U) Began new time and materials system support contract (500)
- (U) Closed out low band DF subsystem EMD contract (NSP)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE: 0604270F EW Development / PROJECT: 2462 |

(U) A. Mission Description and Budget Item Justification: (Continued)

(U) FY 1995
- (U) Complete integration of HBS into aircraft (2,878)
  - (U) CONUS and OCONUS combined flight tests for HBS and JM/SA subsystems
- (U) Continue TRACS EMD (2,020)
  - (U) [INFORMATION DELETED]
  - (U) [ INFORMATION DELETED]
  - (U) Update MOA with SPM developing agency
  - (U) [ INFORMATION DELETED]

(U) FY 1996
- (U) Complete integration of Block 3 upgrades (HBS and JM/SA) on aircraft (1,249)
  - (U) Conduct flight test of Block 3 upgrades
  - (U) Correct test deficiencies
  - (U) Complete users manuals/training
- (U) Continue TRACS EMD (102)

(U) FY 1997
- (U) Support IOT&E of Block 3 upgrades (1,000)
- (U) Continue TRACS EMD (170)
  - (U) Develop counters to evolving threat (611)

(U) B. Program Change Summary ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 14,200 | 4,898 | 1,582 | 3,581 | TBD |
| (U) Appropriated Value | 11,213 | 4,898 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | -424 | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -231 | 1,800 | |
| (U) Current Budget Submit/President's Budget | 10,789 | 4,898 | 1,351 | 1,781 | TBD |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE: 0604270F EW Development — PROJECT: 2462 |

(U) B. Program Change Summary: (Continued)

(U) Change Summary Explanation:

(U) Funding: 95-97 reduced to fund higher priority Air Force requirements.

(U) Schedule:

(U) Technical: Sub programs that address programmable wideband jamming, digital acquisition, interference cancellation, and LPI countermeasures are no longer full Engineering and Manufacturing Development (EMD) programs but have been reduced to technology capture and risk reduction programs.

(U) C. Other Program Funding Summary ($ in Thousands)

| (U) Aircraft Procurement, AF<br>(U) PE 27253F (Compass Call) | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Modifications | 18,989 | 45,227 | 0 | 7,229 | 7,737 | 8,350 | 8,602 | 8,860 | Cont. | N/A |
| (U) Acft Replen Spares & Repairs | 14,093 | 8,469 | 8,158 | 5,626 | 5,869 | 6,333 | 6,524 | 6,722 | Cont. | N/A |
| (U) Acft Initial Spares & Repairs | 7,899 | 14,277 | 2,508 | 4,468 | 4,259 | 3,856 | 3,974 | 4,093 | Cont. | N/A |
| (U) Other Charges | 24,728 | 4,010 | 8,026 | 6,371 | 11,242 | 0 | 0 | 0 | 0 | N/A |
| (U) TOTAL | 65,669 | 71,983 | 18,692 | 23,694 | 29,107 | 18,539 | 19,100 | 19,675 | Cont. | N/A |

(U) D. Schedule Profile

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) BLOCK III System Integration | X* | | | | | | X** | | | | | | | | | |
| (U) TRACS CDR | | X | | | | | | | | | | | | | | |
| (U) TRACS ECP2 (Note 1) | | X* | | | | | | | | | | | | | | |
| (U) P-35 ECP 3 | | X | | | | | | | | | | | | | | |
| (U) HBE CDR (Note 2) | | X* | | | | | | | | | | | | | | |
| (U) Block III CONUS Flight Test | | | | | | | X* | X** | | | | | | | | |
| (U) BLOCK III OCONUS Flight Test | | | | | | | | | X | | | | | | | |
| (U) AFOTEC OT&E | | | | | | | X* | | | | | | | X** | | |
| (U) 1st BLK III Delivery to ACC | | | | | | | | | | | X | | | | | |

(U) Note 1: TRACS is a continuing program to keep the aircraft current with the evolving threat

(U) Note 2: Preplanned ECP to HBE program completes 2 Qtr FY98 (Additional frequency coverage using new generation amplifiers)

* = Start ** = Complete

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development<br>PROJECT 2462 |

(U) A. Project Cost Breakdown ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) HBE/HBS | 5,746 | 1,168 | 626 | 1,000 |
| (U) TRACS | 2,377 | 2,020 | 102 | 170 |
| (U) P-35 | 1,166 | 500 | 258 | 0 |
| (U) ADCAT | 200 | 0 | 0 | 0 |
| (U) CCMS Ops | 990 | 930 | 0 | 0 |
| (U) Travel | 100 | 60 | 50 | 50 |
| (U) Miscellaneous | 210 | 220 | 315 | 561 |
| (U) Total | 10,789 | 4,898 | 1,351 | 1,781 |

(U) [ NOTE: **INFORMATION DELETED.**] ADCAT funding was for contract closeout. CCMS operations funding completed a previous program.

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Magnavox | SS/CPAF | 2Q | | | 17,354 | 5,385 | 2,312 | 626 | 1,170 | Continuing | TBD |
| GTE | SS/CPIF | 2Q | | | 7,669 | 1,166 | 1,186 | 258 | 0 | 0 | 10,279 |
| Sanders | SS/CPIF | 2Q | | | 19,136 | 2,420 | 200 | 0 | 0 | 0 | 21,756 |
| Support and Management Organizations | | | | | | | | | | | |
| MISC (SPO,Labs) | Various | 1-4Q | | | | 1,618 | 1,100 | 367 | 511 | Continuing | TBD |

Test and Evaluation Organizations: Air Warfare Center conducts tests using its own funds.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development | PROJECT<br>2462 |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | | | | | | | |
| Misc | Misc | | | 1,300 | 200 | 100 | 100 | 100 | Continuing | TBD |
| Subtotal | | | | | | | | | | |
| Product Dev | | | | 45,459 | 9,171 | 3,798 | 984 | 1,270 | Continuing | TBD |
| Support Mgt | | | | 0 | 1,618 | 1,100 | 367 | 511 | Continuing | TBD |
| Total | | | | 45,459 | 10,789 | 4,898 | 1,351 | 1,781 | Continuing | TBD |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development | PROJECT<br>3891 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3891 Advanced Infrared Countermeasures (AIRCM) | 0 | 0 | 41,015 | 70,764 | 69,130 | 57,916 | 57,714 | 24,805 | TBD | TBD |

(U) A. Mission Description and Budget Item Justification

The operating commands require AIRCM to increase aircraft survivability against threats increasing in numbers and capability. The synergistic use of AIRCM (missile warning, expendables, dispensers, and directable countermeasures (DC) offers the most protection. This project focuses on developing an AIRCM suite that can be tailored and integrated into current generation combat, airlift and special operations aircraft. Without the AIRCM suite, survivability of current generation aircraft will decrease due to proliferation of and improvements in threat missile systems (i.e., advanced electro-optics, infrared and radio frequency missile seekers). The AIRCM project has two principal thrusts: 1) providing advanced missile warning (AMW) and advanced expendable (ADVEX) capabilities to combat attack aircraft (with growth to DC); and 2) developing and integrating a directable Infrared Countermeasures (IRCM) system on airlift and special operations aircraft. The subsystems are being developed in an integrated fashion to optimize the performance of the whole suite, versus each part. The program plan maximizes commonality across Air Force aircraft and is a joint effort as well. We are finalizing a common Operational Requirements Document with the Navy for AMW for fighters, and with both the Army and Navy for ADVEX. Demonstration and Validation (Dem/Val) of DC concepts is planned to prove directed/focused infrared energy is an effective countermeasure for large aircraft. Both the AMW and ADVEX portions of the AIRCM suite are preparing to enter EMD. ADVEXs will be functionally compatible with existing dispenser systems. Internal AMW installation is planned for the F-16 and F-15 aircraft. A pod mechanization system is also a candidate for AMW installation on the A/OA-10 and any other aircraft capable of carrying an electronic attack pod.

(U) FY 1994 The following figures reflect activities associated with projects previously reported as 3108 with 3896 and 4077 continuing in this project.

- (U) Project 3108
  - (U) Evaluate requirements for AAR-47 changes (168)
  - (U) Continue definition of needs for AIRCM (20)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE: 0604270F EW Development |
| | PROJECT: 3891 |

(U) A. Mission Description and Budget Item Justification: (Continued)

- (U) Project 3896
  - (U) Completed live fire missile tests against advanced Infrared (IR) decoys (150)
  - (U) Complete assessment of IR decoy requirements for each identified user platform (500)
  - (U) Initiate in-house development efforts with Naval Surface Warfare Center - Crane Division (900)
  - (U) Milestone II preparation (500)
  - (U) Conduct ASTE unique range improvements for DT&E (1,800)
  - (U) Continue engagement modeling and analysis in support of EMD (2,606)
  - (U) Add missile warning, jammers, and new threats to IR modeling system (1,600)
- (U) Project 4077
  - (U) IDAL support (1,200)
  - (U) Contractor support (China Lake NAWC) (200)
  - (U) Scheduling & Configuration/Data management (150)
  - (U) Flight Demonstration (750)
  - (U) Internal feasibility studies (Navy/Marine Corps) (2,200)
  - (U) System threat assessment (30)
  - (U) ALQ-131 pod demonstration (50)
  - (U) Logistics support (100)
  - (U) Internal feasibility studies (Air Force Platforms) (3,000)
  - (U) Navy COEA support (375)
  - (U) MOSAIC modeling & simulation (2,800)
  - (U) MFQ/QA support (25)
  - (U) Miscellaneous program efforts (755)
  - (U) System engineering support (700)
  - (U) ECAC project & ECO (150)
  - (U) Testing support DT&E (50)
  - (U) Information systems integration and planning (125)
  - (U) Advanced Threat Infrared Countermeasures (ATIRCM)/AMWS independent review (100)
  - (U) Integrated Program Documentation products (180)
  - (U) Mission support (500)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development | PROJECT<br>3891 |

(U) A. Mission Description and Budget Item Justification: (Continued)

(U) FY 1995 The following figures reflect activities associated with projects previously reported as 3108 with 3896 and 4077 continuing in this project.

- (U) Project 3108
  - (U) Completion of test and evaluation of the AAR-47 improvements program and ALE-47 on aircraft. (190)
- (U) Project 3896
  - (U) Continue in-house development efforts with Naval Surface Warfare Center - Crane Division (1200)
  - (U) Award and execute EMD contract(s) for advanced decoy development (4500)
  - (U) Conduct early ground and safety of flight testing (1100)
  - (U) Initiate production planning for advanced IR decoys (500)
  - (U) Complete DT&E test planning (500)
  - (U) Continue engagement modeling and analysis in support of EMD (1161)
  - (U) Continue improvement of IR engagement modeling system (500)
  - (U) Fabricate assets for and initiate DT&E testing of advanced decoys (2000)
- (U) Project 4077
  - (U) Advanced Missile Approach Warning System (Group B) EMD Contract (8,400)
  - (U) False alarm/ missile plume characterization (1,400)
  - (U) F-15 aircraft (Group A) EMD integration (2,000)
  - (U) F-16 aircraft (Group A) EMD integration (3,600)
  - (U) A-10 aircraft (Group A) EMD integration (1,000)
  - (U) Pods (Group A) EMD integration (3,300)
  - (U) Mission and Program Support (2,500)

(U) FY 1996

- (U) Major Contracts (29,120)
- (U) Support Contracts (1,832)
- (U) In-House Contracts (8,071)
- (U) GFE/Other (1,992)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development | PROJECT<br>3891 |

(U) A. Mission Description and Budget Item Justification: (Continued)

(U) FY 1997

- (U) Major Contracts (35,338)
- (U) Support Contracts (3,390)
- (U) In-House Contracts (26,664)
- (U) GFE/Other (5,372)

(U) B. Program Change Summary ($ in Thousands)

| | FY 1994* | FY 1995* | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 25,230 | 30,441 | 0 | 0 | TBD |
| (U) Appropriated Value | 22,324 | 33,881 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | 200 | | | | |
| b. Below Threshold Reprogramming | 441 | -30 | | | |
| (U) Current Budget Submit/President's Budget | 21,683 | 33,851 | 41,015 | 70,764 | TBD |

* Reflects funding for projects 3108,3896, and 4077.

(U) Change Summary Explanation:

Funding: Projects 3896 and 4077 combined into this project beginning in FY96.
Schedule: Based on a thorough schedule risk assessment and direction to combine AF/Naval efforts into a joint program (AF lead), EMD schedule rebaselined from 36 to 50 month program.
Technical: None.

(U) C. Other Program Funding Summary ($ in Thousands)

| | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|
| (U) Aircraft Procurement, AF | 0 | 0 | 0 | 0 | 46,281 | 83,530 | 120,857 | TBD | TBD |
| (U) PE 27442F (Missile Warning only) | | | | | | | | | |
| (U) Modifications | | | | | | | | | |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development<br>PROJECT 3891 |

(U) D. Schedule Profile

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Project 3108, ADS | | | | | | | | | | | | | | | | |
| (U) Qualification OT&E | X* | | | | | | X* | | | | | | | | | |
| (U) Project 3896, ASTE | | | | | | | | | | | | | | | | |
| (U) Tactical Roundtable | | | | X | | | | | | | | | | | | |
| (U) Acquisition Strategy Panel | | | | | | X | | | | | | | | | | |
| (U) RFP Release | | | | | | | X | | | | | | | | | |
| (U) MS II Decision | | | | | | | | X | | | | | | | | |
| (U) EMD Contract Award | | | | | | | | X | | | | | | | | |
| (U) Project 4077, AMW | | | | | | | | | | | | | | | | |
| (U) Pod Demos | | X | | | | | | | | | | | | | | |
| (U) Internal Demos | | | | X | | | | | | | | | | | | |
| (U) Acquisition Strategy Panel | | | | X | | | | | | | | | | | | |
| (U) MS II Decision | | | | | | | X | | | | | | | | | |
| (U) EMD Contract Award | | | | | | | X | | | | | | | | | |
| (U) System Design Review | | | | | | | X | | | | | | | | | |
| (U) Project 3891, AIRCM | | | | | | | | | | | | | | | | |
| (U) ADVEX PDR | | | | | | | | | X* | | | | | | | |
| (U) ADVEX CDR | | | | | | | | | | | X | | | | | |
| (U) ADVEX DT&E | | | | | | | | | | | X* | | | | | |
| (U) AMW PDR | | | | | | | | | | X | | | | | | |
| (U) AMW CDR | | | | | | | | | | | X | | | | | |
| (U) AMW Qual Test | | | | | | | | | | | X* | | X** | | | |
| (U) ADVEX FCA | | | | | | | | | | | | | | X | | |
| (U) ADVEX Fab OT&E Units | | | | | | | | | | | | | | | X | |
| (U) ADVEX OT&E Start | | | | | | | | | | | | | | | X* | |
| (U) AMW Platform Integration | | | | | | | | | | | | | | X* | | |
| (U) AMW DT&E Preparation | | | | | | | | | | | | | | | | X* |

* = Start ** = Complete

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development | PROJECT<br>3891 |

(U) A. Project Cost Breakdown ($ in Thousands)

| | FY 1994* | FY 1995* | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Project 4077/3891 | | | | |
| (U) AMW Group B | | 9,400 | 12,100 | 8,500 |
| (U) AMW Group A | | 8,000 | 16,500 | 39,000 |
| (U) AMW Integration | 5,700 | | 7,100 | 13,600 |
| (U) AMW System Eng/Program Mgt | 6,790 | 4,310 | 1,300 | 1,500 |
| (U) AMW System T&E | 950 | | 100 | 600 |
| (U) AMW Other Gov Costs | | 490 | 1,218 | 2,464 |
| (U) Project 3896/3891 | | | | |
| (U) ADVEX Prime Mission Product | | | | |
| (U) Special Material Decoys | | 900 | | 600 |
| (U) Advanced Kinematic Decoys | | 3,500 | | 1,700 |
| (U) ADVEX Other Gov. Dev. effort | 900 | 2,361 | | |
| (U) ADVEX System Eng/Program Mgt | 3,000 | 2,700 | 200 | |
| (U) ADVEX Eng. Change Orders | 700 | 700 | | 700 |
| (U) ADVEX System Test & Eval | | 700 | 1,697 | 1,700 |
| (U) ADVEX Mission Support | 2,200 | 600 | 800 | 400 |
| (U) ADVEX Dem/Val tasks | 1,255 | | | |
| (U) Project 3108 | | | | |
| (U) Testing | | 190 | | |
| (U) System Engineering | 188 | | | |
| (U) Total | 21,683 | 33,851 | 41,015 | 70,764 |

* Project 4077, 3896 and 3108.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604270F EW Development | PROJECT<br>3891 |

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | |
| Prime Contractor(s) is(are) TBD | | | | 22,785 | | 14,900 | 13,100 | 8,500 | | TBD |
| Integration contractor (Airframe contractors) | | | | | 5,700 | 9,900 | 22,882 | 52,600 | | TBD |
| Support and Management Organizations | | | | | | | | | | |
| ASC/LN, TEMS, Wright Labs, Naval Surface Warfare Center | | | | 2,785 | 15,983 | 7,951 | 3,236 | 7,364 | | TBD |
| Test and Evaluation Organizations | | | | | | | | | | |
| TBD (AFOTEC or Navy test organization) | | | | 12,501 | | 1,100 | 1,797 | 2,300 | | TBD |
| TOTAL | | | | 38,071 | 21,683 | 33,851 | 41,015 | 70,764 | TBD | TBD |

**Government Furnished Property:** Not Applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604321F Combat Intelligence System

PROJECT: 2758

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2758 Combat Intelligence System | 5,630 | 8,315 | 3,938 | 2,035 | 1,678 | 1,042 | 1,073 | 1,105 | Continuing | TBD |

(U) Note: FY94 Actuals include $3,565 from PE 0207431F to reflect true program funding. This program element will not be submitting a desctriptive summary. Starting in FY96, RDT&E funds move from 0207431F to 0604321F.

(U) **A. Mission Description and Budget Item Justification**

(U) Combat Intelligence System (CIS) will be the single, standard Air Force intelligence system to optimize both component and unit-level intelligence functions to provide warfighters with the most accurate and timely intelligence data available. CIS will be the core capability for automating the receipt, correlation, and dissemination of intelligence information to a variety of intelligence and operational systems supporting combat planning and execution. CIS will be able to build and maintain in-theater situational awareness while deploying to the theater and provides indications and warning (I&W) support upon arrival. CIS provides the capability to receive all source intelligence near-real-time from national, theater, tactical reconnaissance, and intelligence functions. CIS is electronically interoperable and compatible with other intelligence systems to provide an integrated system capable of intelligence support to operational users while providing multi-source electronic countermeasures systems and radar warning receivers. The category of research being performed in this program element is Engineering and Manufacturing Development.

(U) Acquisition Approach: Full and open competition leading to a cost plus award fee contract.

(U) FY 1994
- (U) Initiated developing SCI level correlation capability. ($1,050)
- (U) Initiated integrating CIS with upgrades including imagery storage, imagery exploitation, target support, and security level message handling. ($4,350)
- (U) Initiated developing a single interface to CIS applications for a common data source. ($230)

(U) FY 1995 (See note on page 1)
- (U) Implement SCI level correlation capability and begin to enhance capability. ($1,514)
- (U) Continue integrating upgrades to CIS including mapping, imagery, multimedia, and air/ground situations. ($4,812)
- (U) Begin CIS software development under TBM (Theater Battle Management) Core Systems. ($1,989)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604321F Combat Intelligence System |
| | PROJECT<br>2758 |

(U) FY 1996
- (U) Complete SCI level correlation enhancements. ($633)
- (U) Continue CIS software development under TBM Core Systems to include targeting, damage assessment, and mission reporting. ($2,972)
- (U) Conduct studies for future CIS intelligence interoperability with Global Command and Control System. ($333)

(U) FY 1997
- (U) Continue software development under TBM Core Systems. ($1,473)
- (U) Implement results of studies into CIS software under TBM Core Systems. ($450)
- (U) Continue studies for CIS intelligence interoperability. ($112)

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 5,686 | 8,666 | 3,958 | 2,045 | TBD |
| (U) Appropriated Value | 5,686 | 8,666 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | | -190 | | | |
| b. Below Threshold Reprogramming | -32 | | | | |
| c. SBIR | -24 | -161 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -20 | -10 | |
| (U) Current Budget Submit/President's Budget | 5,630 | 8,315 | 3,938 | 2,035 | TBD |

(U) Change Summary Explanation:

Funding: Starting in FY95, RDT&E funds move from 0207431F to 0604321F. FY94 Actuals include $2,065 from PE 0604321F and $3,565 from PE 0207431F. 0207431F is not submitting a RDT&E Descriptive Summary.

Schedule:

Technical:

| | DATE |
|---|---|
| | February, 1995 |

| BUDGET ACTIVITY | PE NUMBER AND TITLE |
|---|---|
| 5 - Engineering And Manufacturing Development | 0604321F Combat Intelligence System |

**(U) C. Other Program Funding Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Other Procurement, PE 0207431F | 10,666 | 9,693 | 1,973 | 2,269 | 1,976 | 1,204 | 1,210 | 1,192 | Cont | TBD |
| (U) Combat Air Intelligence System | | | | | | | | | | |
| (U) (Sentinel Byte renamed CIS) | | | | | | | | | | |
| (U) Other Procurement, PE 0207414F | | 5,383 | 9,225 | 10,253 | 9,094 | 5,565 | 5,732 | 5,904 | Cont | TBD |
| (U) Pacific Command /Control System | | | | | | | | | | |
| (U) (CIS) | | | | | | | | | | |

**(U) D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Acquisition Strategy Panel | | | X | | | | | | | | | | | | | |
| (U) CIS 1.0 Release | | | | X | | | | | | | | | | | | |
| (U) Draft Request for Proposal | | | | X | | | | | | | | | | | | |
| (U) Formal Request for Proposal | | | | | X | | | | | | | | | | | |
| (U) CIS 1.1 Release | | | | | | | X | | | | | | | | | |
| (U) Contract Award | | | | | | | | X | | | | | | | | |
| (U) Development Test & Evaluation (DT&E) Start | | | | | | | | | | | X | | | | | |
| (U) DT&E Complete for Software Increment (S/W) #1 | | | | | | | | | | | | X | | | | |
| (U) Initial Operational Test & Evaluation (IOT&E) Start | | | | | | | | | | | | X | | | | |
| (U) IOT&E Complete for S/W #1 | | | | | | | | | | | | | X | | | |
| (U) Version Release S/W #1 | | | | | | | | | | | | | X | | | |
| (U) Inital Operational Capability | | | | | | | | | | | | | | | X | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604321F Combat Intelligence System<br>PROJECT 2758 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Software Development | 2,456 | 5,425 | 2,818 | 1,183 |
| (U) Test and Evaluation | 87 | 143 | 125 | 110 |
| (U) Program Management Support | 1,224 | 968 | 330 | 275 |
| (U) Travel | 175 | 242 | 175 | 125 |
| (U) Government Engineering Support | 275 | 203 | 276 | 215 |
| (U) System Engineering Support | 1,052 | 743 | 214 | 127 |
| (U) Miscellaneous | 254 | 329 | | |
| (U) PBD Reductions | 107 | 262 | | |
| (U) Total | 5,630 | 8, 315 | 3,938 | 2,035 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604321F Combat Intelligence System

PROJECT: 2758

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| BTG, Inc<br>F19628-92-D0005 | SS/CPAF | Sep 92 | 3,154 | 3,154 | | 1,008 | 1,513 | 633 | | | 3,154 |
| CIS Software Dev | TBD | TBD | TBD | TBD | | 2,259 | 4,948 | 2,636 | 1,523 | Cont | TBD |
| Support and Management Organizations | | | | | | | | | | | |
| | Ongoing | | | | | 1,052 | 743 | 214 | 127 | Cont | TBD |
| TEMS-<br>Various<br>Contractors | Ongoing | | | | | 1,224 | 968 | 330 | 275 | Cont | TBD |
| Test and Evaluation Organizations | | | | | | | | | | | |
| Test Support | Ongoing | | | | | 87 | 143 | 125 | 110 | Cont | TBD |
| Subtotal Product Development | | | | | | 3,267 | 6,461 | 3,269 | 1,523 | Cont | TBD |
| Subtotal Support and Management | | | | | | 2,276 | 1,711 | 544 | 402 | Cont | TBD |
| Subtotal Test and Evaluation | | | | | | 87 | 143 | 125 | 110 | Cont | TBD |
| Total Project | | | | | | 5,630 | 8,315 | 3,938 | 2,035 | Cont | TBD |

**Government Furnished Property:** Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604441F Space Based InfraRed System High Element EMD

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 0 | 112,981 | 152,219 | 198,982 | 350,213 | 566,098 | 661,490 | 698,109 | Continuing | Continuing |
| 3616 SBIRS High Element EMD | 0 | 84,681 | 142,819 | 198,982 | 350,213 | 566,098 | 661,490 | 698,109 | Continuing | Continuing |
| 0002 Miniature Sensor Technology Integration (MSTI)* | 0 | 28,300 | 9,400 | 0 | 0 | 0 | 0 | 0 | 0 | 37,700 |

*NOTE: FY95 funding for Project 0002 (MSTI) includes a planned reprogramming of $13,000,000 from PE #603402F to this Program Element.

(U) A. **Mission Description and Budget Item Justification**

(U) The purpose of the Space Based InfraRed System (SBIRS) program is to develop a system which provides increased performance over the existing Defense Support Program (DSP) system. The system's primary mission is to provide initial warning of a ballistic missile attack on the continental US, its deployed forces and allies . SBIRS will incorporate new technologies that would enhance detection, provide direct reporting of ICBM/SLBM and tactical ballistic missile launches, and provide critical mid-course tracking and discrimination data for national and theater missile defense. The integrated system architecture consists of sensors located in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and Low Earth Orbits (LEO) and an integrated, centralized ground station serving all space elements of the SBIR System, as well as DSP. This Program Element funds SBIRS Engineering and Manufacturing Development (EMD) activities, and is therefore assigned to Budget Activity Research Category Engineering and Manufacturing Development. Funding is also provided in FY95 and FY96 for the Miniature Sensor Technology Integration (MSTI) program. Funding for the SBIRS program is also provided by PE #603441F and PE #305915F.

(U) **Acquisition Strategy:**

(U) The SBIRS program is a lead program for acquisition streamlining. Program documentation has been consolidated into a single document, the Single Acquisition and Management Plan (SAMP). The pre-EMD contract will be competed in a full and open competition. Two contracts will be awarded for the pre-EMD phase, and a downselect to a single contractor is planned for the EMD phase.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604441F Space Based InfraRed System High Element EMD |

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | | 111,000 | 153,000 | 200,000 | Continuing |
| (U) Appropriated Value | | 104,000 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | - 1,864 | | | |
| b. SBIR | | - 2,155 | | | |
| c. Omnibus or Other Above Threshold Reprogram | | + 13,000 | | | |
| d. Below Threshold Reprogramming | | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -781 | -1,018 | |
| (U) Current Budget Submit/President's Budget | | 112,981 | 152,219 | 198,982 | Continuing |

(U) Change Summary Explanation:

Funding: FY95 Above Threshold Reprogramming reflects a planned reprogramming of $13,000,000 from PE #603402F to this Program Element for the MSTI program. This reprogramming realigns funds which were added by Congress for MSTI to the appropriate program element. Adjustments to Budget Years Since FY95 PB reflect a decrease ($781,000 in FY96, $1,018,000 in FY97) due to inflation changes.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Other Procurement | | | 19,895 | 23,877 | 0 | 20,887 | 6,363 | 8,954 | Continuing | Continuing |
| (U) Operations & Maintenance | | | | | 16,949 | 15,952 | 16,947 | 16,945 | Continuing | Continuing |

**Related RDT&E:**

(U) PE #603441F - Space Based InfraRed System - Dem/Val

(U) PE #305911F - Defense Support Program (DSP)

(U) PE #603216C - TALON SHIELD (BMDO Advanced Development)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604441F Space Based InfraRed System High Element EMD |

(U) **D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) DRB Architecture Approval | | | | X | | | | | | | | | | | | |
| (U) DAE Program Review | | | | | | X | | | | | | | | | | |
| (U) RFP Release | | | | | | X | | | | | | | | | | |
| (U) Pre-EMD Contract Award | | | | | | | X | | | | | | | | | |
| (U) System Requirements Review | | | | | | | | | | | X | | | | | |
| (U) System Functional Review | | | | | | | | | | | | X | | | | |
| (U) DAE Program Review | | | | | | | | | | | | X | | | | |
| (U) EMD Authority To Proceed (ATP) | | | | | | | | | | | | | X | | | |
| (U) *Other Events Beyond Budget Years* | | | | | | | | | | | | | | | | |
| (U) PDR (SBIR Consolidated Ground) | | | 1st Qtr FY98 | | | | | | | | | | | | | |
| (U) PDR (HIGH Space Segment) | | | 2nd Qtr FY98 | | | | | | | | | | | | | |
| (U) Consolidated Grnd IOC for DSP | | | 2nd Qtr FY99 | | | | | | | | | | | | | |
| (U) Consolidated Grnd IOC for HIGH | | | 1st Qtr FY01 | | | | | | | | | | | | | |
| (U) First Satellite Delivery | | | 2nd Qtr FY01 | | | | | | | | | | | | | |
| (U) First GEO Launch | | | FY02 | | | | | | | | | | | | | |
| (U) First HEO Launch | | | FY02 | | | | | | | | | | | | | |

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604441F Space Based InfraRed System High Element EMD

PROJECT: 3616

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3616 SBIRS High Element EMD | 0 | 84,681 | 142,819 | 198,982 | 350,213 | 566,098 | 661,490 | 698,109 | Continuing | Continuing |

**(U) A. Mission Description and Budget Item Justification**

(U) The purpose of the Space Based InfraRed System (SBIRS) program is to develop a system which provides increased performance over the existing Defense Support Program (DSP) system. The system's primary mission is to provide initial warning of a ballistic missile attack on the continental US, its deployed forces and allies. SBIRS will incorporate new technologies that would enhance detection, provide direct reporting of ICBM/SLBM and tactical ballistic missile launches, and provide critical mid-course tracking and discrimination data for national and theater missile defense. The integrated system architecture consists of sensors located in Geosynchronous Orbits (GEO), Highly Elliptical Orbits (HEO) and Low Earth Orbits (LEO) and an integrated, centralized ground station serving all space elements of the SBIR System, as well as DSP. This Program Element funds SBIRS Engineering and Manufacturing Development (EMD) activities. Funding for the SBIRS program is also provided by PE #603441F and PE #305915F.

(U) FY 1994
- (U) Request For Proposals (RFP) Development ($0)
- (U) Operational Requirements Document (ORD) Development ($0)

(U) FY 1995
- (U) Award Pre-EMD contracts for Space and Ground segment development ($44,300)
- (U) Begin Space Based InfraRed technology and phenomenology projects ($12,400)
- (U) Defense Acquisition Executive (DAE) Program Review (Feb 95)
- (U) Continue Program Office activities ($17,981)
- (U) RFP Release for Pre-EMD phase (Mar 95)
- (U) Contract Award (Jun 95)
- (U) Continue Cobra Brass Project ($10,000)

(U) FY 1996
- (U) Continue Pre-EMD contracts for Space and Ground segment Development ($96,700)
- (U) Continue Space Based InfraRed technology and phenomenology projects ($23,900)
- (U) DAE Program Review (Jun 96) for EMD Phase

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604441F Space Based InfraRed System High Element EMD |
| | PROJECT<br>3616 |

- (U) Continue Program Office activities ($22,219)
- (U) Source Selection for down-select for EMD Phase (Jun 96)

(U) FY 1997
- (U) Initiate EMD contracts for Space and Ground segment Development ($157,982)
- (U) Continue Program Office activities ($24,000)
- (U) Continue Space Based InfraRed technology and phenomenology projects ($17,000)

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | | 111,000 | 153,000 | 200,000 | Continuing |
| (U) Appropriated Value | | 104,000 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | - 1,864 | | | |
| b. SBIR | | - 2,155 | | | |
| c. Omnibus or Other Above Threshold Reprogram | | - 15,300 | | | |
| d. Below Threshold Reprogramming | | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | - 19,581 | - 1,018 | |
| (U) Current Budget Submit/President's Budget | | 84,681 | 142,819 | 198,982 | Continuing |

(U) Change Summary Explanation:

Funding: FY95 Above Threshold Reprogramming reflects realignment of $15,300,000 from this project to project 0002. Adjustments to Budget Years Since FY95 PB reflect a decrease ($781,000 in FY96, $1,018,000 in FY97) due to inflation changes, and a decrease in FY96 ($9,400,000) for realignment to Project 0002 (MSTI).

Schedule: Not Applicable.

Technical: Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604441F Space Based InfraRed System High Element EMD<br>PROJECT 3616 |

(U) C. **Other Program Funding Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Other Procurement | | | 19,895 | 23,877 | 0 | 20,887 | 6,363 | 8,954 | Continuing | Continuing |
| (U) Operations & Maintenance | | | | | 16,949 | 15,952 | 16,947 | 16,945 | Continuing | Continuing |

(U) D. **Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) DRB Architecture Approval | | | | X | | | | | | | | | | | | |
| (U) DAE Program Review | | | | | | X | | | | | | | | | | |
| (U) RFP Release | | | | | | X | | | | | | | | | | |
| (U) Pre-EMD Contract Award | | | | | | | X | | | | | | | | | |
| (U) System Requirements Review | | | | | | | | | | | X | | | | | |
| (U) System Functional Review | | | | | | | | | | | | X | | | | |
| (U) DAE Program Review | | | | | | | | | | | | X | | | | |
| (U) EMD Authority To Proceed (ATP) | | | | | | | | | | | | | X | | | |
| (U) *Other Events Beyond Budget Years* | | | | | | | | | | | | | | | | |
| (U) PDR (SBIR Consolidated Ground) | | | 1st Qtr FY98 | | | | | | | | | | | | | |
| (U) PDR (HIGH Space Segment) | | | 2nd Qtr FY98 | | | | | | | | | | | | | |
| (U) Consolidated Grnd IOC for DSP | | | 2nd Qtr FY99 | | | | | | | | | | | | | |
| (U) Consolidated Grnd IOC for HIGH | | | 1st Qtr FY01 | | | | | | | | | | | | | |
| (U) First Satellite Delivery | | | 2nd Qtr FY01 | | | | | | | | | | | | | |
| (U) First GEO Launch | | | FY02 | | | | | | | | | | | | | |
| (U) First HEO Launch | | | FY02 | | | | | | | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604441F Space Based InfraRed System High Element EMD

PROJECT: 3616

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Pre-EMD Contract | | 44,300 | 96,700 | 0 |
| (U) EMD Contract | | 0 | 0 | 157,982 |
| (U) Technology | | 5,000 | 13,500 | 9,000 |
| (U) Phenomenology | | 7,400 | 10,400 | 8,000 |
| (U) Cobra Brass | | 10,000 | 0 | 0 |
| (U) System Program Office Support | | 10,381 | 11,019 | 12,000 |
| (U) Aerospace Corp | | 7,600 | 11,200 | 12,000 |
| (U) Total | | 84,681 | 142,819 | 198,982 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| TBD(Pre-EMD) | C/CPFF | Jul 95 | TBD | 161,000 | 0 | 0 | 44,300 | 96,700 | | | 141,000 |
| TBD(EMD) | C/CPAF | Oct 96 | TBD | TBD | 0 | 0 | 0 | 0 | 157,982 | Cont | TBD |
| TBD(Technology) | TBD | Sep 95 | TBD | 27,500 | 0 | 0 | 5,000 | 13,500 | 9,000 | 0 | 27,500 |
| TBD(Phenomena) | TBD | Sep 95 | TBD | 26,800 | 0 | 0 | 7,400 | 10,400 | 8,000 | 0 | 25,800 |
| TBD(Cobra Brass) | TBD | Sep 95 | TBD | 10,000 | 0 | 0 | 10,000 | 0 | 0 | 0 | 10,000 |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604441F Space Based InfraRed System High Element EMD | PROJECT<br>3616 |

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management Organizations | | | | | | | | | | | |
| Aerospace Corp | MORD | Sep 95 | | | 0 | 0 | 7,600 | 11,200 | 12,000 | Cont | TBD |
| Prgm Mgmt Supt | Various | Sep 95 | | | 0 | 0 | 10,381 | 11,019 | 12,000 | Cont | TBD |
| Test and Evaluation Organizations | | | | | | | | | | | |
| Not Applicable. | | | | | | | | | | | |
| Subtotal Product Development | | | | | | | 66,700 | 120,600 | 174,982 | Cont | TBD |
| Subtotal Support and Management | | | | | | | 17,981 | 22,219 | 24,000 | Cont | TBD |
| Subtotal Test and Evaluation | | | | | | | | | | | |
| Total Project | | | | | | | 84,681 | 142,819 | 198,982 | Cont | TBD |

(U) B. **Budget Acquisition History and Planning Information Continued ($ in Thousands)**

**Government Furnished Property:** Not Applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604441F Space Based InfraRed System High Element EMD

PROJECT: 0002

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0002 Miniature Sensor Technology Integration (MSTI)* | 0 | 28,300 | 9,400 | 0 | 0 | 0 | 0 | 0 | 0 | 37,700 |

*NOTE: FY95 funding for Project 0002 (MSTI) includes an internal administrative reprogramming of $13,000,000 from PE #603402F to properly align funding prior to execution.

(U) **A. Mission Description and Budget Item Justification**

(U) The Miniature Sensor Technology Integration (MSTI) program will provide phenomenology data for the SBIRS program. In FY95, an additional $13,000,000 was appropriated and is being transferred from PE #603402F.

(U) FY 1995
- (U) Complete payload calibration and spacecraft test ($15,680)
- (U) Perform launch integration and operations ($4,950)
- (U) Perform on-orbit operations and program support ($8,570)

(U) FY 1996
- (U) Perform on-orbit operations and program support ($9,400)

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | | 0 | 0 | 0 | 0 |
| (U) Appropriated Value | | +13,000* | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | | | | |
| b. SBIR | | | | | |
| c. Internal Realignment Reprogramming | | + 15,300 | | | |
| d. Below Threshold Reprogramming | | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | + 9,400 | | |
| (U) Current Budget Submit/President's Budget | | 28,300 | 9,400 | 0 | 37,700 |

* NOTE: Funds appropriated in PE 63402F will be used for the purpose for which appropriated. Realigned for administrative purposes only.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604441F Space Based InfraRed System High Element EMD<br>PROJECT 0002 |

(U) Change Summary Explanation:

Funding: FY95 Above Threshold Reprogramming reflects realignment of $15,300,000 to this project from Project 3616. Adjustments to Budget Years Since FY95 PB reflect an increase in FY96 of $9,400,000 from Project 3616. In addition, $13,000,000 was appropriated for MSTI in FY95, and is being realigned from PE #603402F to this PE.

Schedule: Not Applicable.

Technical: Not Applicable.

**(U) C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

**(U) D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Spacecraft Complete | | | | | | | X | | | | | | | | | |
| (U) MSTI Spacecraft Launch | | | | | | | | X | | | | | | | | |
| (U) On-orbit Operations | | | | | | | | | X | X | X | X | | | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604441F Space Based InfraRed System High Element EMD<br>PROJECT 0002 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) MSTI Spacecraft | | 14,780 | | |
| (U) Launch | | 4,950 | | |
| (U) On-orbit Ops and Support | | 8,570 | 9,400 | |
| (U) Total | | 28,300 | 9,400 | |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| TBD | TBD | Sep 95 | 37,700 | 37,700 | 0 | 0 | 28,300 | 9,400 | | | 37,700 |

Support and Management Organizations
Not Applicable.

Test and Evaluation Organizations
Not Applicable.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604441F Space Based InfraRed System High Element EMD<br>PROJECT 0002 |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:**
Not Applicable.

| Contractor or Government Performing Activity | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | | | | | | 28,300 | 9,400 | | | 37,700 |
| Subtotal Support and Management | | | | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | | | | |
| Total Project | | | | | | 28,300 | 9,400 | | | 37,700 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604479F Milstar LDR/MDR Satellite Communications

PROJECT NO.: 5010

| COST (In Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 5010 MILSTAR Sat Comm Sys | 828,375* | 585,491 | 649,666 | 744,990 | 703,412 | 631,762 | 383,764 | 142,704 | 335,000 | 9.978,164 |

* The FY94 actuals reflect the actuals for the Space and Mission Control segments only. Funding was budgeted and appropriated in PE #303601F.

(U) **A. Mission Description and Budget Item Justification**

Milstar is a joint service program to develop and acquire extremely high frequency (EHF) satellites, satellite mission control segment, and new or modified Army, Navy, and Air Force communication terminals for survivable, jam-resistant, world-wide, secure communications for the strategic and tactical warfighter in all levels of conflict. This descriptive summary addresses the space and mission control segments of the Milstar program. This program is in research category 5, Engineering, Manufacturing, and Development, based on Defense Acquisition Board and Defense Planning Guidance direction to fabricate and launch Satellites 3M through 6.

(U) FY 1994

- (U) Milstar I ($267,975)
  - (U) Removed Satellite 1 from storage and shipped to launch base.
  - (U) Integrated Satellite 1 to launch vehicle and completed pre-launch checkout.
  - (U) Launched Satellite 1 and performed on-orbit checkout.
  - (U) Started and completed satellite 1 Developmental Test and Evaluation (DT&E).
  - (U) Started Phase I Initial Operational Test and Evaluation (IOT&E).
  - (U) Implemented engineering change proposals (ECPs).
  - (U) Developed and implemented modifications to Mission Control Element (MCE) to support multi-satellite mission control operations.
  - (U) Continued contractor support for MCS software sustainment for mission planning and satellite operations.
- (U) Milstar II ($467,600)
  - (U) Awarded Satellite 3M Supplemental Agreement on Milstar II contract.
  - (U) Continued Milstar II EMD; complete MDR payload critical design review (CDR).
  - (U) Continued MDR payload manufacturing on Satellite 3M.
  - (U) Continued bus component manufacturing on Satellites 3M and 4.
  - (U) Completed LDR payload manufacturing on Satellite 3M.
  - (U) Continued LDR payload manufacturing on Satellite 4.
  - (U) Started LDR integration and test on Satellite 3M.
- (U) Other Government Costs ($92,800)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: 0604479F Milstar LDR/MDR Satellite Communications — PROJECT NO.: 5010 |

(U) FY 1995
- (U) Milstar I ($115,600)
  - (U) Completed Milstar I Phase I IOT&E Dedicated Asset Test (DAT).
  - (U) Delivered Satellite 2 and placed in storage.
  - (U) Launch and perform on-orbit checkout of Satellite 2.
  - (U) Complete Milstar I Phase I IOT&E.
  - (U) Implement ECPs as needed based on operational requirement.
  - (U) Transition from MCE to Satellite Mission Control Subsystem (SMCS).
  - (U) Continue contractor support for MCS software sustainment for mission planning and satellite operations.
  - (U) Develop and field operator training equipment.
- (U) Milstar II ($390,440)
  - (U) Continue MDR payload manufacturing for Satellites 3M.
  - (U) Complete bus component manufacturing for Satellite 3M.
  - (U) Complete MDR System CDR.
  - (U) Continue bus component manufacturing for Satellite 4.
  - (U) Continue LDR integration and test for Satellite 3M.
  - (U) Continue LDR payload manufacturing on Satellite 4.
  - (U) Awarded contract to start acquisition of Satellites 5 and 6.
  - (U) Procure parts and start fabrication for Satellites 5 and 6.
  - (U) Start Milstar II upgrade of MCS software for mission planning.
- (U) Other Government Costs ($79,451)

(U) FY 1996
- (U) Milstar I ($89,100)
  - (U) Continue to support on-orbit operations for Satellites 1 and 2.
  - (U) Start and complete Milstar I Phase II IOT&E
  - (U) Implement ECPs as needed based on operational requirement.
  - (U) Develop and implement modifications to SMCS to enhance mission control operations.
  - (U) Continue contractor support for MCS software sustainment for mission planning and satellite operations.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: 0604479F Milstar LDR/MDR Satellite Communications — PROJECT NO.: 5010 |

- (U) Milstar II ($497,366)
  - (U) Complete MDR payload manufacturing on Satellite 3M, and start MDR integration and test on Satellite 3M.
  - (U) Start MDR payload manufacturing for Satellites 4.
  - (U) Start and complete bus integration and test for Satellite 3M.
  - (U) Continue bus component manufacturing for Satellites 4.
  - (U) Complete LDR integration and test on Satellite 3M, and start LDR integration and test on Satellite 4.
  - (U) Complete LDR payload manufacturing on Satellite 4.
  - (U) Continue to procure parts and build Satellites 5 and 6.
  - (U) Continue Milstar II upgrade of MCS software for mission planning
- (U) Other Government Costs ($63,200)

(U) FY 1997

- (U) Milstar I ($68,700)
  - (U) Continue to support on-orbit operations for Satellites 1 and 2.
  - (U) Implement ECPs as needed based on operational requirement.
  - (U) Continue to implement modifications to MCS to enhance mission control operations.
  - (U) Transition to organic support for MCS software sustainment for mission planning and satellite operations.
- (U) Milstar II ($610,592)
  - (U) Complete MDR payload manufacturing on Satellite 4, and start MDR integration and test on Satellite 4.
  - (U) Complete bus component manufacturing on Satellite 4 and start bus integration and test on Satellite 4.
  - (U) Continue LDR integration and test on Satellite 4.
  - (U) Continue component/subsystem fabrication of satellites 5 and 6.
  - (U) Start Satellite integration and test on Satellite 3M.
  - (U) Continue Milstar II upgrade of MCS software for mission planning
- (U) Other Government Costs ($65,698)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| 5 - Engineering and Manufacturing Development | 0604479F Milstar LDR/MDR Satellite Communications | 5010 |

(U) **B. Program Change Summary ($ in Thousands)**

| | * FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Previous President's Budget | 868,162 | 607,248 | 757,801 | 810,889 |
| (U) Appropriated Value | 849,100 | 607,248 | | |
| (U) Adjustments to Appropriated Value | | | | |
| a. Cong Gen Reductions | -7,625 | -10,238 | | |
| b. SBIR | -13,100 | -11,337 | | |
| c. Omnibus and Other Above Threshold Reprogram | 0 | 0 | | |
| d. Below Threshold Reprogramming | 0 | -182 | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -108,135 | -65,899 |
| (U) Current Budget Submit/President's Budget | 828,375 | 585,491 | 649,666 | 744,990 |

* The FY94 actuals reflect the actuals for the Space and Mission Control segments only. Funds were appropriated in PE #303601F .

(U) Change Summary Explanation:

Funding: Funding for a portion of Mission Planning Element (MPE) Phase II modification was deleted. Funding for the Milstar Training Augmentation Device (MTAD) was deleted.

Schedule: Due to Titan IV manifest delays, Satellite 2 launch delayed to late FY95.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands)**

Not Applicable.

**Related RDT&E:**

(U) PE #303601F, Milstar Terminals
(U) PE #303603F, Milstar Satellites
(U) PE #603430F, Advanced MILSATCOM
(U) PE #603432F, Polar Adjunct

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: 0604479F Milstar LDR/MDR Satellite Communications — PROJECT NO.: 5010 |

**Related RDT&E:**
(U) PE #303142A, Defense Satellite Communications System Ground Terminals
(U) PE #303605F, SATCOM Terminals
(U) PE #303606F, Air Force Satellite Communications (AFSATCOM)
(U) PE #303110F, Defense Satellite Communications System (DSCS)
(U) PE #603433F, DSCS Replenishment
(U) PE #305144F, Titan IV Space Launch Vehicles
(U) PE #604577N, EHF Satellite Communications
(U) PE #303142A, Tactical Communications Ground Environment

**(U) D. Schedule Profile**

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Milstar I (LDR Only) | | | | | | | | | | | | | | | | |
| DFS-1Launch | | X* | | | | | | | | | | | | | | |
| DFS-2 Launch | | | | | | | | X | | | | | | | | |
| IOC I | | | | | | | | | | | | | | X | | |
| Milstar I (LDR) DT&E | | | X* | | | | | | | | | | | | | |
| Satellite 1 Dedicated Asset Test | | | | X* | | | | | | | | | | | | |
| Milstar I (LDR) OT&E, Phase I | | | | | | | | X | | | | | | | | |
| Milstar I (LDR) OT&E, Phase II | | | | | | | | | | | | X | | | | |
| Milstar II (LDR/MDR) | | | | | | | | | | | | | | | | |
| Milstar II System PDR | X* | | | | | | | | | | | | | | | |
| Milstar II Satellite CDR | | | | X* | | | | | | | | | | | | |
| Milstar II System CDR | | | | | X* | | | | | | | | | | | |
| Contract Award for DFS-5 & 6 | | | | | X* | | | | | | | | | | | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604479F Milstar LDR/MDR Satellite Communications

PROJECT NO.: 5010

| | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| DFS-3M Launch | 3QFY99 | | | | | | | | | | | | | | | | |
| DFS-4 Launch | 3QFY00 | | | | | | | | | | | | | | | | |
| DFS-5 Launch | 3QFY01 | | | | | | | | | | | | | | | | |
| DFS-6 Launch | 3QFY02 | | | | | | | | | | | | | | | | |
| MDR IOT&E | 2QFY00 | | | | | | | | | | | | | | | | |
| IOC II | 1QFY01 | | | | | | | | | | | | | | | | |
| FOC | 1QFY05 | | | | | | | | | | | | | | | | |

* Denotes completed activities.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604479F Milstar LDR/MDR Satellite Communications

PROJECT NO.: 5010

**(U) A. Project Cost Breakdown ($ in Thousands)**

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| (U) DFS-1/2/3L | 267,975 | 115,600 | 89,100 | 68,700 |
| (U) DFS-3M | 74,000 | 132,443 | 166,614 | 113,402 |
| (U) DFS-4 | 393,600 | 137,997 | 278,930 | 289,034 |
| (U) DFS-5 | | 65,000 | 39,580 | 127,821 |
| (U) DFS-6 | | 55,000 | 12,242 | 80,335 |
| (U) Other Government Costs | 92,800 | 79,451 | 63,200 | 65,698 |
| (U) Total | 828,375 | 585,491 | 649,666 | 744,990 |

**(U) B. Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC* | Project Office EAC* | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| LMSC (Milstar I) [Sats 1,2,3L] | C/CPAF | Jun 83 | 2,142,000 | 2,142,000 | 4,286,454 | 267,975 | 115,600 | 89,100 | 68,700 | 243,698 | 5,071,527 |
| LMSC (Milstar II) [Sats 3M, 4, 5, 6] | SS/CPAF | Oct 92/Nov 94 | 3,373,200 | 3,373,200 | 415,900 | 467,600 | 390,440 | 497,366 | 610,592 | 1,475,754 | 3,857,652 |

* Estimates At Completion do not include fees and incentives and reflect post over-the-target-baseline (OTB, Jan 91) costs.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604479F Milstar LDR/MDR Satellite Communications

PROJECT NO.: 5010

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC* | Project Office EAC* | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management Organizations | | | | | | | | | | | |
| Aerospace | SS/CPFF/AF | Various | | | 52,978 | 24,308 | 21,526 | 21,526 | 21,526 | 219,000 | 360,864 |
| LINCOM | SS/CPAF | Various | | | 4,750 | 4,319 | 5,322 | 4,993 | 4,498 | 3,480 | 27,362 |
| Lincoln Lab | SS/MIPR | Various | | | 3,385 | 2,500 | 11,900 | 3,087 | 2,653 | 3,000 | 26,525 |
| CSC/TAG | SS/MIPR | Various | | | 4,069 | 1,436 | 1,702 | 1,779 | 1,834 | 5,470 | 16,290 |
| Trident Data Serv | SS/CPFF | Various | | | 5,764 | 500 | 1,586 | 1,577 | 1,439 | 9,660 | 20,526 |
| ANSER | CPFF | Feb 91 | | | 1,212 | 1,166 | 1,162 | 0 | 0 | 0 | 3,540 |
| Misc | | | | | 198,488 | 58,571 | 36,253 | 30,238 | 33,748 | 236,580 | 593,878 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| None. | | | | | | | | | | | |
| Subtotal Product Development | | | | | 4,702,354 | 735,575 | 506,040 | 586,466 | 679,292 | 1,719,452 | 8,929,179 |
| Subtotal Support and Management | | | | | 270,646 | 92,800 | 79,451 | 63,200 | 65,698 | 477,190 | 1,048,985 |
| Total Project | | | | | 4,973,000 | 828,375 | 585,491 | 649,666 | 744,990 | 2,196,642 | 9,978,164 |

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604480F GPS Block IIF

PROJECT: 0005

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0005 Block IIF | 0 | 0 | 19,699 | 38,901 | 77,405 | 68,349 | 65,552 | 65,038 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification**

This program element funds Research and Development for the NAVSTAR Global Positioning System (GPS) space, and control systems of the Block IIF Sustainment Program. This includes satellite design and development; control system, training simulator, and mission operation support center development, production and test; satellite upgrade design and development; control system, simulator and support center software upgrades; and R&D efforts to support deployment of GPS Block IIF. This PE is classified as research category/budget activity Engineering and Manufacturing Development (EMD) because it supports EMD of the GPS Block IIF satellite.

(U) FY 1994
- (U) No funding in this PE.

(U) FY 1995
- (U) No funding in this PE.

(U) FY 1996
- (U) Award Contract for Block IIF - System Sustainment
  - (U) Satellite System Development ($15,088)
  - (U) Ground System/Simulator Development ($1,365)
  - (U) System Integration ($3,246)

(U) FY 1997
- (U) Continue Development of Block IIF - System Sustainment
  - (U) Satellite System Development ($30,968)
  - (U) Ground System/Simulator Development ($1,467)
  - (U) System Integration ($6,466)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604480F GPS Block IIF | PROJECT<br>0005 |

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | 0 |
| (U) Appropriated Value | 0 | 0 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | | | | |
| b. SBIR | | | | | |
| c. Omnibus or Other Above Threshold Reprogram | | | | | |
| d. Below Threshold Reprogramming | | | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | +19,699 | +38,901 | |
| (U) Current Budget Submit/President's Budget | 0 | 0 | 19,699 | 38,901 | Continuing |

(U) Change Summary Explanation:

Funding: New PE. Funding transferred from PE #305165F.

Schedule: New PE. Funding transferred from PE #305165F.

Technical: Not Applicable.

(U) **C. Other Program Funding Summary ($ in Thousands)**

(U) Not Applicable.

**Related RDT&E:**

(U) PE 0305164F, Navstar GPS (User Equipment), provides receivers to use the positioning, navigation, and timing signals from satellites.
(U) PE 0101221N, Fleet Ballistic Missile System, range positioning.
(U) PE 0301357F and 0305913F (formerly 0102433F), Nuclear Detonation Detection System (NDS), fund NDS payloads on the GPS satellites.
(U) PE 0305119F Space Boosters, funds launch services (Delta II).
(U) PE 0305130F, Consolidated Space Operations Center (CSOC), funds CSOC which hosts the operational GPS Master Control Station.
(U) PE 0305165F, NAVSTAR GPS Space/Control, funds for Block IIR, CSEL, JPO support, and current ground system.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604480F GPS Block IIF<br>PROJECT 0005 |

(U) D. **Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Award Block IIF System Sustainment Contract | | | | | | | | | X | | | | | | | |
| (U) System Design Review | | | | | | | | | | | | | X | | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604480F GPS Block IIF<br>PROJECT<br>0005 |

(U) **A. Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Block IIF Development | n/a | n/a | 19,699 | 38,901 |
| (U) Total | | | 19,699 | 38,901 |

(U) **B. Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Block IIF Development (TBD) | TBD | Nov 95 | n/a | n/a | n/a | n/a | n/a | 19,699 | 38,901 | Cont | Cont |
| Subtotal Product Development | | | | | | | | 19,699 | 38,901 | Cont | Cont |
| Subtotal Support and Management | | | | | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | | | | | |
| Total Project | | | | | | | | 19,699 | 38,901 | Cont | Cont |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604600F Munitions Dispenser Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995* Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 0 | 26,825 | 53,254 | 58,914 | 18,834 | 8,158 | 0 | 0 | 0 | 165,985 |
| 1015 Munitions Dispenser Development | 0 | 26,825 | 53,254 | 58,914 | 18,834 | 8,158 | 0 | 0 | 0 | 165,985 |

* This program was previously funded in PE 0604604F Submunitions.

(U) A. Mission Description and Budget Item Justification

This PE develops a guidance kit for the CBU-87/B, CBU-89/B, and the CBU-97/B dispensers that provide inertial navigation to correct for the effects of wind transients and ballistic errors caused by wind when these munitions are released from medium to high altitudes. WCMD Kit fitted weapons will improve effectiveness of both bombers and fighters and significantly contribute to Air Force war fighting capabilities in two nearly simultaneous Major Regional Conflicts (MRC). WCMD Kit fitted CBU-97's dropped from bombers are key to stopping enemy armored forces in the second MRC. A full and open competition in FY 95 leads to dual awards for a competitive development effort that includes a competitive fly-off and also maintains the option for competition in production. This is funded in Engineering and Manufacturing Development because it started development in FY 95. This program was previously funded in PE 0604604F.

(U) FY 1995
- Award EMD dual contracts for Test Hardware Design and Fabrication ($15,000)
- Conduct government test ($600)
- Program management support; includes travel, program office supplies and equipment, training, and technical engineering support ($4,325)
- Provide other government support, GFE ($3,400)
- Start aircraft integration ($3,500)

(U) FY 1996
- Continue dual EMD contracts for test hardware fabrication and aircraft integration ($26,600)
- Program management support; includes travel, program office supplies and equipment, training, and technical engineering support ($5,554)
- Conduct flight/ground tests ($400)
- Provide other government support, GFE ($4,400)
- Continue aircraft integration ($13,500)
- Development of Common Munitions Built-In-Test (BIT)/ Reprogramming Equipment (CMBRE) ($2,800)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604600F Munitions Dispenser Development

(U) FY 1997
- Continue dual EMD contracts ($38,300)
- Continue flight tests ($3,600)
- Program management support; includes travel, program office supplies and equipment, training, and technical engineering support ($6,314)
- Provide other government support, GFE ($4,000)
- Continue aircraft integration ($6,700)

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget (PE 64604F) | 0 | 21,468 | 23,727 | 35,615 | TBD |
| Appropriated Value | 0 | 23,468 | | | |
| Adjustments to Appropriated Value: | | | | | |
| a. Congressional Gen Reductions | | -200 | | | |
| b. Below Threshold Reprogramming | | 3,999 | | | |
| c. SBIR | | -442 | | | |
| Adjustment to Budget Year since FY95 PB | | | 29,527 | 23,299 | |
| Current Budget Submit/President's Budget (PE 64600F) | | 26,825 | 53,254 | 58,914 | 165,985 |

Change Summary Explanation:

Funding: The $2.0M congressional add in FY 95 initiates B-52 integration efforts. The congressional reductions in FY 95 were applied for SBIR ($442K) and Non-FFRDC ($200K). A below threshold reporgramming was initiated in FY 95 ($3,999K) to cover support costs and contractual requirements. The FY96 request increased by $29.5M and the FY97 request increased by $23.3M for a revised acquisition strategy which includes competitive development with option for competition in production and for WCMD Kit and Joint Standoff Weapon (JSOW) F-16 fleet integration.

Schedule: No change.

Technical: No change.

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Missile Procurement AF, BA 6, Munitions and Related Equipment | | | | | | | | | | |
| WCMD Kit Production | 0 | 0 | 0 | 0 | 16,707 | 25,817 | 82,107 | 82,126 | 1,171,300 | 1,378,057 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604600F Munitions Dispenser Development

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Acquisition Milestones | | | | | | | | | | | | | | | | |
| Milestone 0 Review* | X | | | | | | | | | | | | | | | |
| Milestone I/II Review | | | | X | | | | | | | | | | | | |
| (U) Engineering Milestones | | | | | | | | | | | | | | | | |
| Design Reviews | | | | | | X | | | | | X | | | | | |
| Pilot Production | | | | | | | | | | | | | | | X | |
| (U) T&E Milestones | | | | | | | | | | | | | | | | |
| Acft Cert Test | | | | | | | X | | | | | | | | | |
| Dev Testing | | | | | | | | | | X | | | | | | |
| Competitive Fly-off | | | | | | | | | | | | | | X | | |
| (U) Contract Milestones | | | | | | | | | | | | | | | | |
| EMD Contract Award | | | | | | X | | | | | | | | | | |
| Downselect | | | | | | | | | | | | | | | X | |
| (U) Other Program Events | | | | | | | | | | | | | | | | |

Milestone III -- FY00 2Qtr
DT/OT -- FY98 1Qtr
LRIP -- FY98 2Qtr
RAA -- FY99 4Qtr
FRP -- FY00 2Qtr

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604600F Munitions Dispenser Development

PROJECT NO.: 1015

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Major Contracts | 0 | 15,000 | 26,600 | 38,300 |
| Support Contracts | 0 | 2,500 | 2,254 | 2,314 |
| Program Office Support | 0 | 1,825 | 3,300 | 4,000 |
| Test and Evaluation | 0 | 600 | 400 | 3,600 |
| Aircraft Integration | 0 | 3,500 | 13,500 | 6,700 |
| Government Furnished Equipment (GFE) | 0 | 3,400 | 4,400 | 4,000 |
| CMBRE | | | 2,800 | |
| Total | 0 | 26,825 | 53,254 | 58,914 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604600F Munitions Dispenser Development

PROJECT NO.: 1015

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

(U) **Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (U) Product Development Organizations | | | | | | | | | | | |
| Contractors, C/CPAF<br>Alliant, Minneapolis, MN<br>Martin Marietta, Orlando, FL | | Jan 95 | | 88,400 | 0 | 0 | 15,000 | 26,600 | 38,300 | 8,500 | 88,400 |
| (U) Support and Management Organizations | | | | | | | | | | | |
| SVERDRUP, C/CPAF | | Dec 95 | | 6,918 | 0 | 0 | 1,500 | 1,454 | 1,514 | 2,450 | 6,918 |
| Unknown, C/CPAF | | Dec 95 | | 1,950 | 0 | 0 | 500 | 500 | 500 | 450 | 1,950 |
| SAIC, C/CPAF | | May 96 | | 1,700 | 0 | 0 | 500 | 300 | 300 | 600 | 1,700 |
| ASC/YH-1, Eglin AFB, FL | | Oct 95 - Sep 96 | | 11,855 | 0 | 0 | 1,825 | 3,300 | 4,000 | 2,730 | 11,855 |
| (U) Test and Evaluation Organizations | | | | | | | | | | | |
| Testing at following facilities:<br>Test Wing, Eglin AFB<br>Arnold Engr Development Center, TN | | Apr 96 | | 10,962 | 0 | 0 | 600 | 400 | 3,600 | 6,362 | 10,962 |
| Aircraft Integration | | | | 26,200 | 0 | 0 | 3,500 | 13,500 | 6,700 | 2,500 | 26,200 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604600F Munitions Dispenser Development

PROJECT NO.: 1015

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

(U) **Government Furnished Property:**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Product Development Property | | | | | | | | | | |
| Sensor Fuzed Weapon (TDS) | | Feb 95 | Dec 96 | 0 | 0 | 2,950 | 3,400 | 4,000 | 3,400 | 13,750 |
| GATOR (Honeywell or Aerojet) | | Jun 96 | Dec 96 | 0 | 0 | 0 | 500 | 0 | 0 | 500 |
| CEM (Aerojet or Alliant) | | Jun 95 | Dec 96 | 0 | 0 | 450 | 500 | 0 | 0 | 950 |
| CMBRE | | | | | | | 2,800 | | | 2,800 |
| (U) Support and Management Property | | | | | | | | | | |
| (U) Test and Evaluation Property | | | | | | | | | | |
| (U) Subtotal Product Development | | | | 0 | 0 | 18,400 | 33,800 | 42,300 | 11,900 | 106,400 |
| (U) Subtotal Support and Management | | | | 0 | 0 | 4,325 | 5,554 | 6,314 | 6,230 | 22,423 |
| (U) Subtotal Test and Evaluation | | | | 0 | 0 | 600 | 400 | 3,600 | 6,362 | 10,962 |
| (U) Aircraft Integration | | | | 0 | 0 | 3,500 | 13,500 | 6,700 | 2,500 | 26,200 |
| (U) Total Project | | | | 0 | 0 | 26,825 | 53,254 | 58,914 | 26,992 | 165,985 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604602F - Armament/Ordnance Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 11,116 | 18,294 | 8,075 | 3,815 | 1,663 | 144 | 149 | 149 | Cont | TBD |
| 2784/Armament Standardization/Control/ Munitions Material Handling Equipment | 1,887 | 1,371 | 0 | 0 | 0 | 0 | 0 | 0 | Cont | TBD |
| 3133/Bombs and Fuzes | 7,341 | 16,720 | 7,935 | 3,675 | 1,521 | 0 | 0 | 0 | 0 | 38,078 |
| 4003/Adverse Terrain Ammunition Trailer | 497 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 497 |
| 5613/Container Design Retrieval System | 1,391 | 203 | 140 | 140 | 142 | 144 | 149 | 149 | Cont. | TBD |

(U) A. Mission Description and Budget Item Justification

The Armament Standardization/Control/Munitions Material Handling Equipment (MMHE), Project 2784, and the Container Design Retrieval System (CDRS), Project 5613, satisfy several USAF and tri-service requirements for standardization of armament and support equipment and eliminate unnecessary duplication of MMHE and containers. (Funding for Project 2784 for FY96 and beyond was transferred to PE 27590F, SEEK EAGLE.) The Bomb and Fuzes Project 3133 satisfies TAF ROC 323-75, Proximity Fuzes, dated 2 Sep 75; TAF SON 305-85, Hardened Target Munitions, dated 14 Oct 86; OSD letter requirement for a common bomb fuze, dated 11 Apr 80; SAC message 041901Z Feb 87, M117 High Drag Capability(s); Joint Mission Need Statement (MNS) TAF 401-91 for Adverse Weather Strike Capability, dated 4 Nov 91; and CAF MNS 314-90 for the Advanced Fuze Family, dated 13 May 93. This project funds development of a specific fuze type for air-to-ground munitions. The Adverse Terrain Ammunition Assembly Trailer/Adverse Terrain Tow Vehicle (ATAAT/ATTV) , Project 4003, satisfies TAF SON 314-87, ATAAT/ATTV, dated 18 Nov 88, and funds development of an improved munitions trailer and tow vehicle. The RDT&E Research Category/Budget Activity is Engineering and Manufacturing Development because the projects support the EMD development phase of several munitions related items and functions.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604602F - Armament/Ordnance Development

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 11,292 | 10,853 | 10,002 | 5,734 | Continuing |
| Appropriated Value | 11,407 | 18,853 | | | Continuing |
| Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | -115 | -205 | | | |
| b. Below Threshold Reprogramming | -46 | | | | |
| c. SBIR | -130 | -354 | | | |
| Adjustments to Budget Years Since FY95 PB | | | -1,927 | -1,919 | |
| Current Budget Submit/President's Budget | 11,116 | 18,294 | 8,075 | 3,815 | Continuing |

Change Summary Explanation:

Funding: General Congressional Reductions in FY94/95 result from FFRDC, non-FFRDC, University research, and Travel reductions. FY95: Congressional increase to fund demonstration of Conventional Air-Launched Cruise Missile anti-armor variant. FY96/97: Changes result from inflation adjustment and transfer of Project 2784 (Armament/Standardization/Control/Munitions Material Handling Equipment) from PE64602 (Armament/Ordnance Development) to PE 27590F (SEEK EAGLE) starting in FY 96.

Schedule: N/A

Technical: N/A

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation Missile Procurement, AF: Budget Activity 6, Munitions and Related Equipment; PE: 0208030F Program Title: Joint Programmable Fuze WSC 276170 | 0 | 0 | 0 | 4,125 | 6,240 | 8,830 | 8,890 | 9,158 | 230,536 | 259,529 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604602F - Armament/Ordnance Development

PROJECT NO.: 2784

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Armament Standardization/Control/Munitions Material Handling Equipment | 1,887 | 1,371 | 0 | 0 | 0 | 0 | 0 | 0 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

Armament Standardization/Control/Munitions Material Handling Equipment (MMHE): This continuing project develops and improves the standardization and commonality of improved munitions handling and armament equipment to preclude duplication and proliferation. This project's efforts are limited to the study, design, and development of MMHE and armament control systems. Any procurement will be performed and funded by the applicable weapons system project. (Funding for Project 2784 for FY96 and beyond was transferred to PE 27590F, SEEK EAGLE.)

FY 1994 Accomplishments ($ in Thousands):

- Initiated/continued/completed design/development of various MMHE projects, including completing design and prototype of the B-1B RAM assembly, interim ENTERPAC Ram assembly, Conventional Bomb Module Trailer modification, GBU-28 Handling Bar, and Enhanced Missile Maintenance Stand. ($843)
- Continued robotic feasibility study and initiated conceptual design of Advanced Technology Demonstrator. ($297)
- Completed procurement action with Navy for an AF Linkless Ammunition Loading System (LALS) II prototype advanced ammo loader. ($730)
- Completed Phase 1 study for feasible Universal Armament tester. ($17)

FY 1995 Plans ($ in Thousands):

- Initiate/continue/complete design/development of various MMHE projects, including completing design of B1-B Preload Adapter, F-22 Pylon Adapter, and testing of Navy LALS, B-1 Ram Assembly, and B-1 T-bar Adapter, and conduct MHU-110 Upgrade Evaluation. ($1,026)
- Complete conceptual design robotics Advanced Technological Demonstrator. ($235)
- Complete evaluation of universal armament test capability. ($10)
- Complete design B-1/B-52/B-2 Rotary Launcher Load Adapter and B-52H Pylon Load Adapter. ($100)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 - Engineering and Manufacturing Development | #0604602F - Armament/Ordnance Development | 2784 |

(U) A. Mission Description and Budget Item Justification (cont)

FY 1996 Plans ($ in Thousands)

- Project transferred to PE 27590, SEEK EAGLE.

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,887 | 1,830 | 1,823 | 1,840 | TBD |
| Appropriated Value | 2,002 | 1,830 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | -115 | -105 | | | |
| b. Below Threshold Reprogramming | | | | | |
| c. SBIR | | -354 | | | |
| d. Adjustments to Budget Years Since FY95 PB | | | -1,823 | -1,840 | |
| Current Budget Submit/President's Budget | 1,887 | 1,371 | 0 | 0 | TBD |

Change Summary Explanation:

Funding: General Congressional Reductions in FY94/95 result from FFRDC, non-FFRDC, University research, and Travel reductions. Project funding and responsibility for FY96 and beyond was transferred to PE 27590, SEEK EAGLE.

Schedule: N/A

Technical: N/A

(U) C. Other Program Funding Summary ($ in Thousands): Not Applicable

Related Activities: There is no other unnecessary duplication of effort within the Air Force or Department of Defense.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604602F - Armament/Ordnance Development

PROJECT NO.: 2784

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| LALS II Ammo Loader | 730 | 150 | 0 | 0 |
| Robotics | 297 | 235 | 0 | 0 |
| Contractor support | 363 | 500 | 0 | 0 |
| Launcher/Pylon Adapter | 0 | 100 | 0 | 0 |
| Management Support | 266 | 246 | 0 | 0 |
| Testing | 10 | 20 | 0 | 0 |
| Other | 221 | 120 | 0 | 0 |
| Total | 1,887 | 1,371 | 0 | 0 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604602F - Armament/Ordnance Development

PROJECT NO.: 2784

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations: | | | | | | | | | | | |
| Naval Air Warfare Center | PO | Sep 93 | 830 | 1040 | | 730 | 310 | 0 | 0 | 0 | 1040 |
| Dept of Energy/NASA | PO | Mar 94 | TBD | TBD | | 267 | 235 | 0 | 0 | TBD | TBD |
| Support and Management Organizations: | | | | | | | | | | | |
| TEAS/TEAMS | CP | Oct 93 | TBD | TBD | | 330 | 398 | 0 | 0 | TBD | TBD |
| ASC/ALZ | CP | Oct 93 | TBD | TBD | | 230 | 222 | 0 | 0 | TBD | TBD |
| Other | Oct 93 | TBD | TBD | | 284 | 320 | 186 | 0 | 0 | TBD | |
| Test and Evaluation Organizations | | | | | | | | | | | |
| 46th Test Wing | PO | Cont | TBD | TBD | | 10 | 20 | 0 | 0 | TBD | TBD |
| Subtotal Product Development | | | | | | 997 | 545 | 0 | 0 | | |
| Subtotal Support and Management | | | | | 284 | 880 | 806 | 0 | 0 | | |
| Subtotal Test and Evaluation | | | | | | 10 | 20 | 0 | 0 | | |
| Total Project | | | | | 284 | 1,887 | 1,371 | 0 | 0 | CONT | TBD |

**Government Furnished Property:** Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604602F - Armament/Ordnance Development

PROJECT NO.: 3133

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Bombs and Fuzes | 7,341 | 16,720 | 7,935 | 3,675 | 1,521 | 0 | 0 | 0 | 0 | 30,078 |

(U) A. Mission Description and Budget Item Justification

Bombs and Fuzes: This project develops and improves conventional bombs and fuzes including the development of the Joint Programmable Fuze (JPF) and a unitary warhead for the Joint Direct Attack Munition (JDAM) program.

FY 1994 Accomplishments ($ in Thousands):

- Continued the Joint Programmable Fuze (JPF) development effort, including the baseline design fabricating model hardware, defining test concepts, optimizing manufacturing processes, and completing the System Functional Review and the Preliminary Design Review. ($2,034)
- Began design and fabrication of JPF component hardware. ($4,207)
- Began JPF component hardware contractor test and evaluation (CT&E). ($1,100)

FY 1995 Plans ($ in Thousands):

- Continue the JPF development effort, including completion of detail design and CT&E. ($1,000)
- Begin JPF Developmental Test and Evaluation (DT&E). ($6,284)
- Begin fabricating JPF Initial Operational Test and Evaluation (IOT&E) hardware. ($1,436)
- Conduct Conventional Air-Launched Cruise Missile demonstration of Anti-Armor Variant. ($8,000)

FY 1996 Plans ($ in Thousands):

- Complete JPF DT&E, ($1,125)
- Complete fabrication of JPF IOT&E hardware. ($6,168)
- Begin JPF IOT&E. ($642)

FY 1997 Plans ($ in Thousands):

- Complete JPF IOT&E. ($200)
- Complete JPF Functional Configuration Audit. Production Readiness Review, and Physical Configuration Audit. ($100)
- Start JPF/JDAM Integration Flight Test. ($3,375)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604602F - Armament/Ordnance Development

PROJECT NO.: 3133

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 7,517 | 8,820 | 7,976 | 3,693 | 28,006 |
| Appropriated Value | 7,517 | 16,820 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | | -100 | | | |
| b. Below Threshold Reprogramming | -46 | | | | |
| c. SBIR | -130 | | | | |
| d. Adjustments to Budget Years Since FY95 PB | | | -41 | -18 | |
| Current Budget Submit/President's Budget | 7,341 | 16,720 | 7,935 | 3,675 | 38,078 |

Change Summary Explanation:

Funding: FY95: Congressional add of $8Million for demonstration of Anti-Armor variant of Conventional Air-Launched Cruise Missile (CALCM). General Congressional Reductions in FY94/95 result from FFRDC, non-FFRDC, University, and Travel reductions. FY96/97 reduced for inflation adjustments.

Schedule: N/A

Technical: N/A

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation: Missile Procurement, AF: Budget Activity 6, Munitions and Related Equipment | | | | | | | | | | |
| PE: 0208030F Program Title: Joint Programmable Fuze WSC 276170 | | | | | | | | | | |
| | 0 | 0 | 0 | 4,125 | 6,240 | 8,830 | 8,890 | 9,158 | 230,536 | 259,529 |

Related Activities:

PE 0604618F and PE 0604618N, Joint Direct Attack Munition

There is no other unnecessary duplication of effort within the Air Force or Department of Defense.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604602F - Armament/Ordnance Development

PROJECT NO.: 3133

(U) D. Schedule Profile

Joint Programmable Fuze (JPF)

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| System Readiness Review (SRR) | X* | | | | | | | | | | | | | | | |
| Preliminary Design Review (PDR) | | | X* | | | | | | | | | | | | | |
| Start CT&E | | | | X* | | | | | | | | | | | | |
| Critical Design Review (CDR) | | | | | | | X | | | | | | | | | |
| Complete CT&E | | | | | | | X | | | | | | | | | |
| Start DT&E | | | | | | | | X | | | | | | | | |
| Production Readiness Review (PRR) #1 | | | | | | | | X | | | | | | | | |
| Final Deliver LRIP 1 | | | | | | | | | | X | | | | | | |
| Start IOT&E | | | | | | | | | | X | | | | | | |
| Complete DT&E | | | | | | | | | | | X | | | | | |
| Complete IOT&E | | | | | | | | | | | | | X | | | |
| FCA/PRR 2/PCA | | | | | | | | | | | | | X | | | |
| Start JPF/JDAM Integration Flight Test | | | | | | | | | | | | | | | | X |

X* = Actuals
X = Planned

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604602F - Armament/Ordnance Development

PROJECT NO.: 3133

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| a. Contractor | | | | |
| Hardware | 1,760 | 1,611 | 4,430 | 500 |
| Development | 3,189 | 745 | 200 | 200 |
| CT&E | 770 | 532 | 0 | 500 |
| Data | 60 | 30 | 30 | 50 |
| Contractor Total | 5,779 | 2,918 | 4,660 | 1,250 |
| b. Government | | | | |
| Testing | 485 | 3,941 | 1,380 | 523 |
| Contractor support | 67 | 507 | 520 | 540 |
| Management Support | 963 | 713 | 675 | 722 |
| ECO | 47 | 741 | 700 | 640 |
| Government Total | 1,562 | 5,902 | 3,275 | 2,425 |
| c. CALCM Anti-Armor Demonstration | 0 | 8,000 | 0 | 0 |
| Total | 7,341 | 16,720 | 7,935 | 3,675 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604602F - Armament/Ordnance Development

PROJECT NO.: 3133

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Motorola | | Jul 93 | 11,100 | 15,147 | 540 | 5,779 | 2,918 | 4,660 | 1,250 | 0 | 15,147 |
| Support and Management Organizations | | | | | | | | | | | |
| TEAS/TEAMS | | Oct 92 | 2,094 | 2,094 | 346 | 23 | 445 | 480 | 500 | 300 | 2,094 |
| ASC/YHP | | | 3,606 | 3,606 | | 919 | 751 | 660 | 700 | 400 | 3,430 |
| Other | | | 2,540 | 2,540 | | 172 | 739 | 795 | 742 | 92 | 2,540 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| 46th Test Wing | | Mar 94 | 6,876 | 6,876 | 0 | 448 | 3,867 | 1,340 | 483 | 729 | 6,867 |
| CALCM Anti-Armor Demo | | TBD | TBD | TBD | | | 8,000 | | | 0 | 8,000 |
| Subtotal Product Development | | | | | 540 | 5,779 | 2,918 | 4,660 | 1,250 | 0 | 15,147 |
| Subtotal Support and Management | | | | | 346 | 1,114 | 1,935 | 1,935 | 1,942 | 792 | 8,064 |
| Subtotal Test and Evaluation | | | | | 0 | 448 | 11,867 | 1,340 | 483 | 729 | 14,867 |
| Total Project | | | | | 886 | 7,341 | 16,720 | 7,935 | 3,675 | 1,521 | 38,078 |

**Government Furnished Property:** Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604602F - Armament/Ordnance Development

PROJECT NO.: 5613

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Container Design Retrieval System | 1,391 | 203 | 140 | 140 | 142 | 144 | 149 | 149 | Cont. | TBD |

(U) A. Mission Description and Budget Item Justification

Containers: This project funds the operation of the tri-service Container Design Retrieval System (CDRS). This system includes the maintenance of a container database to preclude proliferation and duplication of munitions containers. It also supports organic container design, prototyping, and testing capabilities. This project's efforts are limited to the study, design, and development of container systems. Any procurement will be performed and funded by the applicable weapons system project.

FY 1994 Accomplishments ($ in Thousands):

- Initiated/continued/completed design/development of various CDRS containers projects, including those for MILSTAR, GBU-15/AGM-130 all-up-round (AUR), Joint Stand-Off Weapon (JSOW), AGM-130 CCD Seeker, Advanced Medium Range Air-to-Air Missile (AMRAAM) Built-In Test (BIT) capability, and AGM-142 components (12 each). (not separately priced)
  Investigated problem of explosive gases outgassing from polyethylene foam and developed alternatives/solutions. ($641)
- Provided engineering management support for the delivery of MILSTAR Contingency Terminal Container Sets (CTCS). ($50)
- Operated and improved the CDRS data base and support service. ($700)

FY 1995 Plans ($ in Thousands):

- Initiate/continue/complete design/development of various CDRS projects including containers for the AGM-142 components, the Multi-Spectral Aircraft Decoy, the AMRAAM BIT modification, Special Projects, and the JSOW (AF). ($43)
- Provide container design expertise, management, and technical support to ongoing programs under contract development or production such as JDAM, JSOW (Navy), AGM-130, DSU-33 A/B, Joint Programmable Fuze, and MILSTAR. ($30)
- Manage and operate the CDRS and data base, ($130)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604602F - Armament/Ordnance Development

PROJECT NO.: 5613

(U) A. Mission Description and Budget Item Justification (cont)

FY 1996 Plans ($ in Thousands):

- Initiate/continue/complete design/development of various CDRS projects, including the Multi-Spectral Aircraft Decoy and Special Projects. ($5)
- Provide container design expertise, management, and technical support to ongoing programs under contract development or production, such as AMRAAM AGM-142, JDAM, JSOW (AF and Navy), AGM-130, DSU-33 A/B, JPF, and MILSTAR. ($5)
- Manage and operate the CDRS data base and support service. ($130)

FY 1997 Plans ($ in Thousands):

- Initiate/continue/complete design/development of various CDRS projects. ($5)
- Provide container design expertise, management, and technical support to ongoing programs under contract development or production. ($5)
- Manage and operate the CDRS data base and support service. ($130)

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,391 | 203 | 203 | 201 | 1,998 |
| Appropriated Value | 1,391 | 203 | | | |
| Adjustments to Appropriated Value -- None | | | | | |
| a. Adjustments to Budget Years Since FY95 PB | | | -63 | -61 | |
| Current Budget Submit/President's Budget | 1,391 | 203 | 140 | -140 | 1,874 |

Change Summary Explanation:

Funding: FY96/97 changes result from a 30% reduction without prejudice due to fiscal constraints and inflation adjustments.
Schedule: N/A
Technical: N/A

(U) C. Other Program Funding Summary ($ in Thousands): Not Applicable

Related Activities: There is no other unnecessary duplication of effort within the Air Force or Department of Defense.

(U) D. Schedule Profile: Not Applicable

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604602F - Armament/Ordnance Development

PROJECT NO.: 5613

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Travel/Transportation | 80 | 60 | 50 | 50 |
| Supplies Equipment | 153 | 60 | 60 | 60 |
| Contractor Support | 800 | | | |
| Mission Support | 283 | 35 | 10 | 10 |
| Test Support | 75 | 48 | 20 | 20 |
| Total | 1,391 | 203 | 140 | 140 |

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| N/A | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| Sverdrup (TEAS) | | Oct 93 | TBD | TBD | 700 | 800 | | | | | |
| ASC/YHS | | | TBD | TBD | 250 | 283 | 35 | 10 | 10 | CONT. | TBD |
| Other | | | TBD | TBD | 50 | 233 | 120 | 110 | 110 | CONT. | TBD |
| Test and Evaluation Organizations | | | | | | | | | | | |
| 46th Test Wing | | Oct 93 | TBD | TBD | 115 | 75 | 48 | 20 | 20 | CONT. | TBD |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604602F - Armament/Ordnance Development

PROJECT NO.: 5613

(U) B. Budget Acquisition History and Planning Information ($ in Thousands) (cont)

**Government Furnished Property:** Not Applicable

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | N/A | | | | | | | | | |
| Subtotal Support and Management | | | | 1,000 | 1,316 | 155 | 120 | 120 | CONT. | TBD |
| Subtotal Test and Evaluation | | | | 115 | 75 | 48 | 20 | 20 | CONT. | TBD |
| Total Project | | | | 1,115 | 1,391 | 203 | 140 | 140 | CONT. | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering & Manufacturing Development

PE NUMBER AND TITLE: PE 0604604F Submunitions

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 3,738 | 3,432 | 4,953 | 5,105 | 5,164 | 5,186 | 5,304 | 5,428 | Cont | TBD |
| 1015 WCMD Kit Development* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD | TBD |
| 1016 SFW Production Pgm Support** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD | TBD |
| 3166 Joint Smart Munitions T & E | 3,738 | 3,432 | 4,953 | 5,105 | 5,164 | 5,186 | 5,304 | 5,428 | Cont | TBD |

* This project is now funded in a stand-alone program element PE 0604600F, Munitions Dispenser Development (see Munitions Dispenser Development Descriptive Summary)

** This project is now funded in PE 0207320F, Sensor Fuzed Weapon

(U) A. Mission Description and Budget Item Justification

Project 3166 is a joint US Air Force/US Army program which evaluates developmental smart munitions and related emerging technology with applications against mobile ground vehicle targets and Theater Air Defense units by determining antiarmor/counter-battery munition performance against actual foreign targets in realistic environments and in the presence of countermeasures. Data gathered is used to meet developmental decision points requiring highly reliable, realistic performance data. The project is a major focal point for joint Air Force and Army target signature collection and dissemination for development and exploitation purposes. This PE provides support for smart munitions test and evaluation (T&E) activities including T&E support for programs in engineering and manufacturing development. This project is funded in EMD because it a continuing RDT&E activity supporting mostly acquisition programs in Engineering and Manufacturing Development.

(U) FY 1994

- (U) Continued Phase III of the weapon effectiveness evaluation program with focus on countermeasures ($1,400)
- (U) Conducted seeker/sensor evaluation and analysis with emphasis on product improvement. Selected the next generation of seeker/sensor and warheads for evaluation and captive flight tests ($1,000)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 Engineering & Manufacturing Development | PE NUMBER AND TITLE: 0604604F Submunitions — PROJECT NO.: 3166 |

- (U) Evaluated warhead effectiveness and provided support to AF and Army offices ($238)
  (U) Conducted advanced design warheads tests and advanced mortar tests ($300)
- (U) Continued vulnerability analysis of new targets including specific Suppression of Enemy Air Defenses (SEAD) and critical mobile targets for Sensor Fuzed Weapon (SFW) and Silent Hard Kill (SHARK) programs ($200)
- (U) Measured and documented signature of threat vehicles to support Theater Missile Defense (TMD) and SEAD targeting and identification analyses ($300)
- (U) Supported the Joint Tactical Coordinating Group (JTCG) and AF/Army program offices in signature collection/analysis and simulator validation ($100)
- (U) Provided modeling and analysis support for simulated battlefield conditions ($200)

(U) FY 1995

- (U) Complete Phase III of the weapon effectiveness evaluation and initiate planning for Phase IV of the program ($933)
- (U) Select next generation of seeker/sensors and warheads for evaluation and start captive flight tests evaluation and analyses ($749)
- (U) Develop smart weapons models and simulations for digitized battlefields ($300)
- (U) Continue test support of smart munitions test community, for weapon effectiveness and target signature ($650)
- (U) Conduct advanced warhead effectiveness tests and analysis ($500)
- (U) Maintain detailed signature and warhead/vulnerability databases ($300)

(U) FY 1996

- (U) Start Phase IV of the weapon effectiveness evaluation. Develop models and simulation tools to support electronic engagement simulations ($2,000)
- (U) Continue maintenance and expansion of vulnerability/lethality and signature databases ($600)
- (U) Plan and conduct Captive Flight Tests for signature collection and seeker/sensor evaluations ($1,000)
- (U) Conduct advanced warhead effectiveness evaluation ($753)
- (U) Continue vulnerability analysis of SEAD and TMD targets ($600)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering & Manufacturing Development | 0604604F Submunitions | 3166 |

(U) FY 1997

- (U) Continue Phase IV of the weapon effectiveness evaluation. Develop models and simulation tools to support electronic engagement simulations ($2,000)
- (U) Continue maintenance and expansion of vulnerability/lethality and signature databases ($631)
- (U) Plan and conduct Captive Flight Tests for signature collection and seeker/sensor evaluations ($1,100)
- (U) Conduct advanced warhead effectiveness evaluation ($774)
- (U) Continue vulnerability analysis of Enemy Air Defense (SEAD), and Theater Missile Defense (TMD) targets ($600).

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 3,835 | 3,612 | 6,979 | 6,232 | TBD |
| Appropriated Value | 3,835 | 3,612 | | | |
| Adjustments to Appropriated Value: | | | | | |
| a. Congressional Gen Reductions | -39 | -113 | | | |
| b. Below Threshold Reprogrammings | -14 | | | | |
| c. SBIR | -44 | -67 | | | |
| Adjustments to Budget Years since FY95 PB | | | -2,026 | -1,127 | |
| Current Budget Submit/President's Budget | 3,738 | 3,432 | 4,953 | 5,105 | TBD |

Change Summary Explanation:

Funding: The FY94 Congressional reductions were $39,000 and $44,000 for SBIR. The Air Force reprogrammed $14,000 (classified reprogramming). The FY95 Congressional reductions were $113,000 and $67,000 for SBIR.

Schedule: No change.
Technical: No change.

(U) C. Other Program Funding Summary ($ in Thousands):
Related RDT&E: PE 0604600F, Munitions Dispenser Development; PE 0207320F, Sensor Fuzed Weapon.

(U) D. Schedule Profile: Not Applicable (target/warhead evaluation/analysis, signature tests, captive flight tests, etc. are ongoing throughout the year).

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering & Manufacturing Development | 0604604F Submunitions | 3166 |

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Program Support | 1,300 | 960 | 1,510 | 1,655 |
| Target Support | 700 | 673 | 783 | 790 |
| Warhead Range Operations | 350 | 300 | 320 | 330 |
| Captive Flight Tests | 612 | 700 | 800 | 810 |
| Database Support (Inc TABLIS) | 200 | 200 | 540 | 460 |
| Vulnerability/Effectiveness Analysis | 126 | 112 | 250 | 300 |
| Warhead Evaluation | 300 | 400 | 500 | 500 |
| Target Signature Tests | 150 | 87 | 250 | 260 |
| Total | 3,738 | 3,432 | 4,953 | 5,105 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering & Manufacturing Development

PE NUMBER AND TITLE: 0604604F Submunitions

PROJECT NO.: 3166

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations: N/A | | | | | | | | | | | |
| Support and Management Organizations | | | | | | | | | | | |
| Sverdrup | C/CIF | 10/93 | | | 3,729 | 1,243 | 1,237 | 1,398 | 1,478 | cont | TBD |
| ISN | C/FFP | 10/93 | | | 390 | 189 | 191 | 211 | 245 | cont | TBD |
| 46 OG/OGML | | | | | 3,447 | 383 | 301 | 421 | 460 | cont | TBD |
| Test and Evaluation Organizations | | | | | | | | | | | |
| 46 0G/OGML | | | | | 57,534 | 1,923 | 1,703 | 2,923 | 2,922 | cont | TBD |
| Total Project | | | | | 65,100 | 3,738 | 3,432 | 4,953 | 5,105 | cont | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 95

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604617F Air Base Operability

| COST ($ In Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 10,739 | 5,413 | 9,692 | 3,064 | 1,482 | 2,699 | 2,778 | 2,861 | Cont | TBD |
| 2895 Air Base Operability | 6,258 | 2,562 | 9,692 | 3,064 | 1,482 | 2,699 | 2,778 | 2,861 | Cont | TBD |
| 2621 Rapid Runway Repair | 3,538 | 1,705 | 0 | 0 | 0 | 0 | 0 | 0 | Comp | 5,243 |
| 3141 Camouflage, Concealment, and Deception | 575 | 788 | 0 | 0 | 0 | 0 | 0 | 0 | Comp | 1,363 |
| 4057 Survivable Airbase Utility Systems | 310 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | Comp | 355 |
| 4058 Advanced Firefighting | 58 | 313 | 0 | 0 | 0 | 0 | 0 | 0 | Comp | 371 |

(U) A. Mission Description and Budget Item Justification

Air Base Operability (ABO) integrates capabilities to deploy rapidly, defend, and sustain air base operations, which is prerequisite to establishing air superiority. Air Base Systems (ABS) provide beddown for aircraft, support equipment, and forces at both main operating bases and contingency operating locations, which may have only a runway and a water source. The need for ABS was dramatically illustrated during DESERT SHIELD/DESERT STORM/PROVIDE COMFORT, and other global contingencies over the past 5 years. Lighter-weight rapidly deployable facilities and equipment have become essential in supporting contingencies for security, base defense, relief efforts, and special operations throughout the world. Air Base Survivability (ABS) capabilities being developed include joint Service (Army-led) test, evaluation and acquisition of protective vehicles to be used by Air Force security police, civil engineers, and explosive ordnance disposal technicians for air base defense and reconnaissance missions; a deployable system to repair/reinforce runways; a deployable fire protection system to detect and extinguish aircraft, Petroleum, Oil, and Lubricants, and structural fires at remote locations; and camouflage, concealment and deception systems to protect critical mission resources. This program is under the research and development category which supports Engineering and

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: 0604617F Air Base Operability |

(U) A. Mission Description and Budget Item Justification (Continued)
Manufacturing Development (EMD) of selected ABS. Because of reduced funding and support for ABO in FY97 and beyond, we have consolidated program efforts into one project, 2895.

(U) FY 1994 ($ in Thousands)
- (U) Supported Contingency Airfield Lighting System production contract. ($100) (4QFY94)
- (U) Completed DEM/VAL for Mobile Ordnance Disrupter. ($3,500) (4QFY94)
- (U) Initiated Pre-Planned Product Improvement (P3I) for Base Recovery Communication System (BRCS). ($635) (1QFY94)
- (U) Tested Commercial Off-The Shelf effort for the Explosive Ordnance Disposal (EOD) Mortuary Protective Shield. ($138) (2QFY94)
- (U) Continued EMD for Deployable Pavement Repair System. ($880) (4QFY94)
- (U) Supported production contract for Petroleum, Oil and Lubricants (POL) Rapid Utilities Rapir Kit (RURK) I. ($40) (4QFY94)
- (U) Supported production contract for POL RURK II. ($370) (4QFY94)
- (U) Completed EMD for Mat Anchoring. ($163) (4QFY94)
- (U) Supported EMD for Camouflage, Concealment and Deception. ($755) (4QFY94)
- (U) Initiated studies to support EMD activities for Repair Quality Criteria and Bare Base programs. ($3,259) (4QFY94)
- (U) Continued other technical support. ($899) (4QFY94)

(U) FY 1995 ($ in Thousands)
- (U) Provide technical support for the EOD Mortuary Shield program. ($31) (4QFY95)
- (U) Continue Rapid Runway Repair program. ($1,682) (4QFY95)
- (U) Continue CCD EMD program. ($1,113) (4QFY95)
- (U) Continue technical support for POL RURK I ($56) (4QFY95)
- (U) Award EMD contract for Deployable Fire Protection System (DFPS). ($455) (4QFY95)
- (U) Continue Other Technical Support. ($262) (4QFY95)
- (U) Integrate Base Recovery Communications System with the Wing Command and Control System. ($1,500) (4QFY95)
- (U) Update Worldwide ABO Threat Compendium. ($44) (3QFY95)
- (U) Monitor Army EMD contract for the Armored Multi-Role Vehicle (ARMRV). ($270) (1QFY95)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604617F - Air Base Operability

(U) A. Mission Description and Budget Item Justification (Continued):

(U) FY 1996 ($ in Thousands)
- (U) Monitor Army ARMRV production contract. ($25 ) (2QFY96)
- (U) Support Deployable Pavement Repair System (DPRS) production contract. ($25) (4QFY96)
- (U) Continue Deployable Fire Protection System (DFPS) Engineering and Manufacturing Development (EMD). ($326) (4QFY96)
- (U) Continue Repair Quality Criteria (RQC) for Rapid Runway Repair (RRR) program. ($1,000) (3QFY96)
- (U) Continue Camouflage, Concealment and Deception (CCD) program. ($4,725) (3QFY96)
- (U) Award EMD contract for Rapid Ordnance Removal (RORS) System. ($850) (3QFY96)
- (U) Initiate Bare Base EMD study. ($500) (2QFY96)
- (U) Continue Other Technical Support. ($2,241) (4QFY96)

(U) FY 1997 ($ in Thousands)
- (U) Continue to monitor Army Armored Multi-Role Vehicle production contract. ($25) (4QFY97)
- (U) Continue to support Deployable Pavement Repair System production contract. ($25) (4QFY97)
- (U) Support production contract for DFPS. ($13) (4QFY97)
- (U) Continue RQC program for RRR. ($500) (3QFY97)
- (U) Continue CCD program. ($1,000) (3QFY97)
- (U) Continue EMD of RORS. ($500) (3QFY97)
- (U) Continue Other Technical Support. ($1,001) (4QFY97)

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 10,912 | 9,580 | 14,908 | 8,755 | Cont |
| Appropriated Value | 10,912 | 5,580 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | | -62 | | | |
| b. Below Threshold Reprogrammings | -68 | | | | |
| c. SBIR | -105 | -105 | | | |
| Adjustments to Budget Years Since FY 95 PB | | | -5,216 | -5,691 | |
| Current Budget Submit/President's Budget | 10,739 | 5,413 | 9,692 | 3,064 | Cont |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604617F - Air Base Operability

(U) B. Program Change Summary ($ in Thousands) (Continued)

Change Summary Explanation: MODS has been cancelled; BRCS has been merged with the Air Force's WCCS program; ARMRV has been reduced to monitoring similar joint program.

Funding:

Schedule:

Technical: Not Applicable

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Other Procurement, AF, BA 62, Other Base Maintenance and Support Program, Vehicles | 3,217 | 0 | 4,974 | 4,974 | 7,851 | 10,282 | 0 | 0 | 0 | 31,298 |
| Other Procurement, AF, BA 63, Other Base Maintenance and Support Program, Communications | 7,339 | 7,423 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14,762 |
| Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Explosive Ordnance Disposal | 3,958 | 0 | 0 | 0 | 1,000 | 1,000 | 0 | 0 | 0 | 5,958 |
| Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Camouflage, Concealment and Deception | 4,475 | 1,690 | 0 | 0 | 0 | 7,427 | 15,338 | 1,552 | TBD | 30,482 |
| Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Rapid Runway Repair (Deployable Pavement Repair System, Mobile Aircraft Arresting System Upgrade, Minimum Operating Strip Marking) | 2,094 | 1,895 | 3,439 | 3,725 | 8,828 | 0 | 0 | 0 | 0 | 19,981 |
| Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Deployable Fire Protection System | 0 | 0 | 877 | 1,274 | 119 | 0 | 0 | 0 | 0 | 2,270 |
| Other Procurement, AF, BA 64, Other Base Maintenance and Support Program, Petroleum-Oil-Lubricants Rapid UtilitiesRepair Kit | 2320 | 1,475 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,795 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604617F - Air Base Operability

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Base Recovery Comm System (BRCS) | | | | | | | | | | | | | | | | |
| Integrate with CRISIS/WCCS | | | | | | | | X** | | | | | | | | |
| Armored Recon Vehicle (ARMRV) | | | | | | | | | | | | | | | | |
| EMD | | | | | X* | | | X** | | | | | | | | |
| IOT&E | | | | | | | X* | | | X** | | | | | | |
| IOC | | | | | | | | | | | X | | | | | |
| EOD Medical Protective Shield | | | | | | | | | | | | | | | | |
| Complete EMD | | | | | X** | | | | | | | | | | | |
| DPRS | | | | | | | | | | | | | | | | |
| EMD | | | | | | | | | | X** | | | | | | |
| IOT&E | | | | | | X* | | | | X** | | | | | | |
| Award Production Contract | | | | | | | | | | X* | | | | | | |
| Exercise Production Option | | | | | | | | | | | | | X* | | | |
| DFPS | | | | | | | | | | | | | | | | |
| EMD | | | | | | | X* | | | | | | | | | |
| IOT&E | | | | | | | | | | | | | | | | |
| CCD | | | | | | | | | | | | | | | | |
| Multi-Spectral Nets | | | | | | | | | | | | | | | | |
| Award EMD Contract | | | | | X* | | | | | | | | | | | |
| DT&E/IOT&E | | | | | X* | | | | | | | | | | | |
| Multi-Spectral Decoys | | | | | | | | | | | | | | | | |
| DT&E/IOT&E | | | | | X* | | | | | | | | | | | |

* = Start
** = Complete

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604617F - Air Base Operability

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Demonstration/Validation | 3,550 | 0 | 0 | 0 |
| Engineering and Manufacturing Development | 4,626 | 2,204 | 7,379 | 825 |
| Development Test And Evaluation/Initial Operational Test and Evaluation | 138 | 421 | 100 | 500 |
| Contractor Support | 1,066 | 692 | 350 | 375 |
| Miscellaneous | 460 | 1,834 | 522 | 363 |
| Other Technical Support | 899 | 262 | 1,341 | 1,001 |
| TOTAL | 10,739 | 5,413 | 9,692 | 3,064 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604617F - Air Base Operability

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| MODS | | | | | | | | | | | |
| Numerous | N/A | N/A | N/A | N/A | 3,051 | 3,500 | 0 | 0 | 0 | 0 | 6,551 |
| ARMRV | | | | | | | | | | | |
| Army TACOM | MIPR | TBD | TBD | TBD | 0 | 0 | 270 | 25 | 25 | 50 | 370 |
| Deployable Fire Protection System | | | | | | | | | | | |
| Unknown | C/FFP | Jun 95 | 891 | 891 | 94 | 0 | 458 | 326 | 13 | 0 | 891 |
| POL Rapid Utilities Repair Kit for POL Phase I | | | | | | | | | | | |
| Keko | C/FP | Sep 95 | 134 | 134 | 63 | 40 | 31 | 0 | 0 | 0 | 134 |
| POL Rapid Utilities Repair Kit for POL Phase II | | | | | | | | | | | |
| Unknown | C/FFP | Mar 95 | 1,265 | 1,265 | 870 | 370 | 25 | 0 | 0 | 0 | 1,265 |
| Deployable Pavement Repair System | | | | | | | | | | | |
| Entwhistle | Various | Jan 96 | 4,154 | 4,154 | 2,319 | 880 | 880 | 25 | 25 | 25 | 4,154 |
| Camouflage, Concealment, and Deception | | | | | | | | | | | |
| Various | Various | Various | 12,693 | 12,693 | 1,126 | 1,220 | 1,138 | 4,725 | 1,000 | TBD | 9,209 |
| Mat Anchoring | | | | | | | | | | | |
| ARA | C/FP | Unknown | 188 | 188 | 0 | 163 | 25 | 0 | 0 | 0 | 188 |
| Rapid Ordnance Removal System | | | | | | | | | | | |
| Unknown | Incomp | Incomp | 1,350 | 1,350 | 0 | 0 | 0 | 850 | 500 | 0 | 1,350 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604617F - Air Base Operability

(U) B. Budget Acquisition History and Planning Information ($ in Thousands). (Continued)

Performing Organizations:

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EMD Studies | | | | | | | | | | | |
| Various | Various | Various | 7,238 | 7,238 | 1,464 | 2,930 | 844 | 1,500 | 500 | 0 | 7,238 |
| EOD Mortuary Shield | | | | | | | | | | | |
| Unknown | Various | Various | 169 | 169 | 0 | 138 | 31 | 0 | 0 | 0 | 169 |
| CALS | | | | | | | | | | | |
| Multi-Electric | FFP | Unknown | Unknown | Unknown | Unknown | 100 | 0 | 0 | 0 | 0 | TBD |
| BRCS | | | | | | | | | | | |
| Sumaria | Various | Jun 94 | 2,535 | 2,535 | 400 | 635 | 1,500 | 0 | 0 | 0 | 2,535 |
| Support and Management Organizations | | | | | | | | | | | |
| Various | Various | Various | | | | 763 | 211 | 2,241 | 1,001 | TBD | TBD |
| Test and Evaluation Organizations | Not Applicable | | | | | | | | | | |
| Government Furnished Property: None | | | | | | | | | | | |
| Subtotal Product Development | | | TBD | TBD | TBD | 9,976 | 5,202 | 7,451 | 2,063 | 75 | |
| Subtotal Support and Management | | | | | | 763 | 211 | 2,241 | 1,001 | TBD | TBD |
| Total Project | | | | | | 10,739 | 5,413 | 9,692 | 3,064 | TBD | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604618 - Joint Direct Attack Munition (JDAM) 3890

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 61,892 | 65,570 | 92,161 | 85,907 | 47,327 | 31,177 | 5,249 | 4,936 | 281,942 | 697,519 |

A. Mission Description and Budget Item Justification

(U) Operation Desert Storm confirmed the need for a more accurate weapon delivery capability in adverse weather conditions and from medium/high altitudes. Failure to satisfy this requirement will allow the enemy to continue to take advantage of the sanctuary of weather and/or prevent US air power from prosecuting a conflict on its terms. JDAM is an Air Force and Navy munitions program to correct these shortfalls, with the Air Force as the executive service. JDAM will upgrade the existing inventory of general purpose bombs (MK 84, BLU-109/B, and MK 83) by integrating them with a guidance kit consisting of a global positioning system aided inertial navigation system (GPS/INS). JDAM will provide an accurate (13 meters) adverse weather capability. JDAM will initially be integrated with the B-2, B-1B and F/A-18C/D aircraft with follow-on integration on the F-16, F-15E, F-22 and other aircraft. The JDAM Product Improvement Program (PIP) will field improvements to the JDAM system, with emphasis on attaining precision (3 meters) accuracy through both non-seeker and seeker initiatives. JDAM development will proceed in a two-phased Engineering and Manufacturing Development (EMD) effort. EMD Phase 1 will emphasize competitive design and manufacturing processes. EMD Phase II will emphasize full scale hardware build and flight test to verify system performance and will also support OT&E. This program is funded in Engineering Manufacturing Development Budget Activity because of the focus on devising an affordable design and manufacturing process.

(U) FY 1994

- (U) Began competitive design and manufacturing processes phase of Engineering and Manufacturing Development (EMD Phase 1) with two contractors. ($45,697)
- (U) Completed precision guidance Concept Exploration studies. Began concept analysis/demonstration of Differential GPS (DGPS), Targeting Location Error/Mission Planning (TLE/MP) and Millimeter Wave (MMW) and Synthetic Aperture Radar (SAR) seekers for precision guidance. ($4,174)
- (U) Continue JDAM aircraft interface definition and development support activities. ($12,021)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: # 0604618 - Joint Direct Attack Munition (JDAM) 3890 |

A. Mission Description and Budget Item Justification (Cont'd)

(U) FY 1995
- (U) Conduct wind tunnel tests of both contractors hardware. ($11,300)
- (U) Continue Program Office Mission/Engineering Support tasks and EMD Phase 1 effort, including aircraft/weapon capability efforts, fabrication and testing EMD Phase I DT&E test hardware, such as engineering evaluation units, instrumented measurement vehicles, laboratory test guidance kits, separation test vehicles and guided test vehicles. ($42,670)
- (U) Continue the Differential GPS (DGPS), Mission Planning/Target Location Error (MP/TLE), and precision guidance concept demonstrations, and initiate concept exploration studies for anti-jam capabilities. ($11,600)

(U) FY 1996
- (U) Continue Program Office Mission Engineering Support tasks, begin EMD Phase 2 development efforts, and procure 150 EMD assets for the B-2 GPS Aided Targeting System (GATS). ($75,547).
- (U) Complete IMV testing and begin F/A-18, F-16 (AF MK84), B-2 and B-1 DT&E testing (Safe Separation) and Mission Planning efforts. ($7,714)
- (U) Continue DGPS, MP/TLE, and precision guidance concept demonstration efforts, continue concept exploration studies for anti-jam capabilities. ($8,900)

(U) FY 1997
- (U) Continue Program Office Mission/Engineering Support tasks, Phase 2 EMD and in-house effort. ($21,904)
- (U) Complete safe separation tests for F-16, B-2, and B-1. Conduct B-2 DT&E and continue DT&E (live launches) on F/A-18, F-16 (AF MK84) and B-1. ($50,703)
- (U) Continue DGPS, MP/TLE, and precision guidance concept demonstrations efforts, continue concept exploration studies for anti-jam capabilities. ($13,300)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: # 0604618 - Joint Direct Attack Munition (JDAM) 3890 |

A. Mission Description and Budget Item Justification (Cont.)

Acquisition Strategy:

Acquisition: Milestone I Review was held on 1 October 1993, which granted approval for JDAM to enter into an 18-month competitive design and manufacturing processes phase. During the Defense Acquisition Board (DAB) there was an agreement that the primary focus of this phase, referred to a EMD Phase 1, would be on devising an affordable design and manufacturing process for a system to meet the stated operational requirement. This approach involves a concurrently engineered design and Phase 1 emphasis on developing and validating the manufacturing processes for the system. This contrasts to a more conventional DEM/VAL where the emphasis is on reducing technical risk. JDAM's technical risk is already low. Phase 1 also includes both a Critical Design Review and an initial Production Readiness Review. Concurrent with the Phase 1 development activities, the Air Force will update the documentation required for the Milestone II Review planned for October 1995, following the 18-month Phase 1 effort. With Milestone II approval the Air Force will enter the next phase, referred to as EMD Phase 2, which involves building full scale hardware, integration and flight testing on the designated aircraft to carry JDAMs, and approval to enter Low Rate Initial Production.

Management: The Air Force Program Executive Officer for Conventional Strike Systems (AFPEO/TS) is responsible for executing the JDAM program as part of his overall portfolio of acquisition programs. The JDAM Program Director, located at Eglin AFB, FL, is responsible for contracting and managing the development efforts under the broad guidance of the PEO. The Air Force program office draws additional support from the Aeronautical Systems Center, the Air Force Development Test Center, the Naval Air Systems Command, the Naval Air Warfare Center, and other Government agencies. There are three noteworthy aspects to how the Air Force will manage the JDAM program: (1) The aircraft program offices have the responsibility to budget for incorporation of JDAM capability on their respective production aircraft. (2) JDAM is using the MIL-PRIME acquisition approach that the Advanced Tactical Fighter Program pioneered. MIL-PRIME allows the contractor to tailor the work effort using the tasks and schedules that he feels are most appropriate for him under the broad schedule provided by the program office. (3) The Air Force is using a small, streamlined program office and Integrated Product Teams to manage JDAM. Program office size is approximately 30 per cent less than comparable Air Force programs. Also, with statutory relief from the Congress, JDAM is able to apply commercial practices in the program.

Contracting: The Air Force selected two contractors for Phase 1 in a free and open competition among domestic sources. The primary purposes for competition during Phase 1 are to have an environment conducive to aggressive production cost reduction and to give the Government a contractor performance benchmark to help choose the best contractor for the program. After approximately 18 months the Air Force will downselect from two contractors to build hardware for developmental and operational test.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604618 - Joint Direct Attack Munition (JDAM) 3890

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 87,822 | 84,995 | 97,634 | 106,746 | TBD |
| Appropriated Value | 75,422 | 67,583 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Cong General Reductions | -757 | -744 | | | |
| b. FY 94 Omnibus Cong Rpgm | -4,083 | | | | |
| c. Cong Notification Rpgm | -3,400 | | | | |
| d. Below Threshold Rpgm | -4,432 | | | | |
| e. SBIR | -858 | -1,269 | | | |
| Adjustments to Budget Years Since FY 95 PB | | | -5,473 | -20,839 | |
| Current Budget Submit/President's Budget | 61,892 | 65,570 | 92,161 | 85,907 | 697,519 |

Change Summary Explanation:

Funding: FY95: General Reductions (FFRDC, Non-FFRDC, University Research and Travel Reductions) ($744)
FY96&FY97: Funding decreases due to realignment of JDAM Product Improvement Program (PIP) and decreases in B-1B integration funding in FY96. Funds were added in FY96 to buy an additional 150 EMD assets.

Schedule: None.
Technical: None.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604618 - Joint Direct Attack Munition (JDAM)

PROJECT NO.: 3890

C. Other Program Funding Summary ($ in Thousands)

Appropriation: Missile Procurement, Air Force, Budget Activity: 2 Other Missiles, Program Title: Joint Direct Attack Munition (JDAM)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 0 | 0 | 0 | 0 | 64,547 | 66,404 | 154,160 | 249,580 | 2,639,055 | 3,173,746 |
| QTY | 0 | 0 | 0 | 0 | 700 | 855 | 2,622 | 4,770 | 53,013 | 62,000 |

Appropriation: Weapons Procurement, Navy, Budget Activity: 5 GP Bombs, Program Title: Joint Direct Attack Munition (JDAM)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 0 | 0 | 0 | 0 | 41,227 | 47,771 | 39,442 | 33,172 | 869,488 | 1,031,100 |
| QTY | 0 | 0 | 0 | 0 | 300 | 450 | 410 | 430 | 10,410 | 12,000 |

Appropriation: RDT&E, Navy, Budget Activity: 5 Title: Joint Direct Attack Munition (JDAM)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| $ | 8,394 | 25,860 | 37,832 | 36,576 | 12,806 | 7,759 | 9,318 | 15,356 | 0 | 177,098 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604618F - Joint Direct Attack Munition (JDAM)

PROJECT NO.: 3890

D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Milestone I | X | | | | | | | | | | | | | | | |
| Dem/Val Contract Award | | | X | | | | | | | | | | | | | |
| System Reqmts Review | | | X | | | | | | | | | | | | | |
| Preliminary Design Reviews | | | | | X | X | | | | | | | | | | |
| Critical Design Review | | | | | | | | X | | | | | | | | |
| Production Readiness Review - 1 | | | | | | | | X | | | | | | | | |
| Milestone II | | | | | | | | | X | | | | | | | |
| EMD Phase II Contract Option | | | | | | | | | X | | | | | | | |
| Operational Assessment | | | | | | | | | | | | | | | | |
| Start | | | | | | | | | X | | | | | | | |
| Complete | | | | | | | | | | | | | | | X | |
| DT&E Flight Test Start | | | | | | | | | X | | | | | | | |
| IOT&E Start | | | | | | | | | | | | | | | X | |
| Production Readiness Review - 2 | | | | | | | | | | | | | | | | X |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604618 - Joint Direct Attack Munition (JDAM) 3890

PROJECT NO.: 3890

D. Schedule Profile (Cont.)

Additional Major Program Events:

| | |
|---|---|
| Exercise LRIP-1 Option | FY98/Q1 |
| Milestone I - JDAM PIP | FY98/Q3 |
| Organic Support Capability | FY98/Q3 |
| Complete DT&E | FY98/Q4 |
| LRIP-2 Contract Award | FY99/Q1 |
| LRIP-1 First Delivery | FY99/Q2 |
| IOT&E Complete (2,000 lb kit) | FY99/Q2 |
| AUR Depot Spt Capability | FY99/Q3 |
| Milestone III | FY99/Q4 |
| Required Assets Avail. | TBD |
| IOC | FY99/Q4 |
| Full Rate Prod Cont Award | FY00/Q1 |
| Component Depot Spt Cap | FY00/Q3 |
| OT&E Complete (1,000lb/F-22) | FY01/Q4 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

Date: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE / PROJECT NO.: #0604618 - Joint Direct Attack Munition (JDAM) 3890

A. Project Cost Breakdown ($ in Thousands)

| Project Cost Categories | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Primary Hardware Development | 46,049 | 21,006 | 67,542 | 14,171 |
| Test & Evaluaiton | 3,044 | 24,451 | 7,714 | 50,703 |
| Engineering and Prog Mgt Support | 8,625 | 8,513 | 8,005 | 7,733 |
| Precision Guidance Concept Demo | 4,174 | 11,600 | 8,900 | 13,300 |
| TOTAL | 61,892 | 65,570 | 92,161 | 85,907 |

B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Contractor Award | CPAF | Apr-94 | 49,508 | 49,508 | 6,950 | 42,558 | | | | | 49,508 |
| Contractor Options | CPAF | Various | 121,092 | 121,092 | | 723 | 5,576 | 67,542 | 14,171 | 33,080 | 121,092 |
| Contractor Mods | CPAF | Various | 17,641 | 17,641 | | 2,212 | 15,429 | | | | 17,641 |
| TEAS Contractor | CR | Oct-94 | 6,846 | 6,846 | 799 | 2,298 | 2,027 | 818 | 445 | 459 | 6,846 |
| NAWC Field Station | MIPR | Oct-94 | 7,222 | 7,222 | 864 | 1,200 | 1,200 | 1,300 | 1,309 | 1,349 | 7,222 |
| Concept Exploration Contracts | Various | Various | 359,704 | 359,704 | 5,530 | 4,174 | 11,600 | 8,900 | 13,300 | 316,200 | 359,704 |
| ACC COEA | UNK | Various | 1,951 | 1,951 | 897 | | 1,054 | | | | 1,951 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-3) EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604618F - Joint Direct Attack Munition (JDAM)

PROJECT NO.: 3890

B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management Organizations | | | | | | | | | | | |
| TEAMS Contractor | CR | Various | 3,916 | 3,916 | 628 | 824 | 958 | 626 | 438 | 442 | 3,916 |
| Program Office | Various | Various | 21,902 | 21,902 | 1,189 | 4,859 | 3,275 | 5,261 | 5,541 | 1,777 | 21,902 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| Aircraft SPO/PMA Support | | | | | | | | | | | |
| JDAM/F-16 OFP DT&E Tape | UNK | Jan-95 | 3,500 | 3,500 | | | 3,500 | | | | 3,500 |
| JDAM/F-16 Wpn Cpmpat | UNK | Jul-93 | 1,160 | 1,160 | 700 | 460 | | | | | 1,160 |
| JDAM/F-15 Wpn Cpmpat | UNK | Sep-94 | 1,340 | 1,340 | | 1,340 | | | | | 1,340 |
| AFMSS | UNK | Sep-93 | 3,116 | 3,116 | 200 | | 1,480 | 260 | 1,176 | | 3,116 |
| JDAM/B-1 OFP DT&E Tape | UNK | Jul-93 | 20,231 | 20,231 | 1,200 | | 2,000 | | 17,031 | | 20,231 |
| Group 2/3 A/C Testing | Various | Various | 12,921 | 12,921 | 67 | | | | 3,000 | 9,854 | 12,921 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| Flight Testing | | | | | | | | | | | |
| Test Wing Support | Various | Various | 13,500 | 13,500 | 30 | 172 | 3,279 | 3,025 | 6,000 | 994 | 13,500 |
| Systems Safety (AFDTC) | TBD | TBD | 143 | 143 | | | 30 | 56 | 57 | | 143 |
| ASC/SK Support | Various | Various | 431 | 431 | 26 | 33 | 150 | 222 | | | 431 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE / PROJECT NO.: #0604618 - Joint Direct Attack Munition (JDAM) 3890

B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DT/OT Test Ground Testing | Various | Various | 16,000 | 16,000 | | | | | 12,000 | 4,000 | 16,000 |
| AEDC Support | CR | Sep-94 | 17,571 | 17,571 | | 785 | 11,300 | | 5,486 | | 17,571 |
| Container Testing | TBD | TBD | 549 | 549 | | | | 216 | 333 | | 549 |
| CIGTF | TBD | Feb-95 | 862 | 862 | | | 862 | | | | 862 |
| EMI Testing | TBD | Feb-95 | 2,750 | 2,750 | | | 750 | 2,000 | 0 | | 2,750 |
| DT Targets | TBD | Mar-95 | 3,000 | 3,000 | | | | 1,000 | 2,000 | | 3,000 |
| Ground/Margin Testing | TBD | TBD | 5,856 | 5,856 | | | | | 3,500 | 2,356 | 5,856 |
| OPTEVFOR Support (Test) | TBD | TBD | 240 | 240 | | | | | 120 | 120 | 240 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604618 - Joint Direct Attack Munition (JDAM)

PROJECT NO.: 3890

B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Government Furnished Property:** | | | | | | | | | | | |
| Test and Evaluation Property | | | | | | | | | | | |
| Telemetry | FP | Oct-93 | 1,450 | 1,450 | 500 | 200 | 750 | | | | 1,450 |
| CFMRE | FP | Sep-93 | 94 | 94 | 94 | | | | | | 94 |
| BLU-109s & 100s | FP | Mar-93 | 1,509 | 1,509 | 1,385 | 24 | 100 | | | | 1,509 |
| KGV-68 | TBD | Feb-95 | 250 | 250 | | | 250 | | | | 250 |
| Encryption | FP | Aug-94 | 30 | 30 | | 30 | | | | | 30 |
| FMU-143 Fuze | FP | Jun-94 | 72 | 72 | 72 | | | | | | 72 |
| MK-84 F/A-18 STVs | FP | Mar-93 | 1,162 | 1,162 | 227 | | | 935 | | | 1,162 |
| Subtotal Product Development | | | | | 15,040 | 53,165 | 36,886 | 78,560 | 29,225 | 351,088 | 563,964 |
| Subtotal Support and Management | | | | | 1,817 | 5,683 | 4,233 | 5,887 | 5,979 | 2,219 | 25,818 |
| Subtotal Test and Evaluation | | | | | 4,501 | 3,044 | 24,451 | 7,714 | 50,703 | 17,324 | 107,737 |
| Total Project | | | | | 21,358 | 61,892 | 65,570 | 92,161 | 85,907 | 370,631 | 697,519 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 9,999 | 7902 | 6,235 | 6,193 | 4,583 | 2,183 | 617 | 106 | Cont | TBD |
| 2866 Aeromedical/Casualty Care Systems Development | 9,999 | 7,902 | 6,235 | 6,193 | 4,583 | 2,183 | 617 | 106 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

This program is under the research and development category which supports Engineering and Manufacturing Development (EMD) of systems for treatment, evacuation, and prediction of wartime casualties in a conventional or non-conventional warfare environment. Tactical, strategic, and covert aeromedical evacuation systems and medical treatment equipment are developed and fielded to meet unique Air Force medical readiness and operational requirements.

(U) FY 1994 ($ in Thousands)

- (U) Civil Reserve Air Fleet Aeromedical Evacuation Shipsets (CRAF AESS) - Re-packaged shipsets and rewrote technical manuals. ($21) (4QFY94)
- (U) Transportable Blood Transshipment Center (TBTC) - conducted system critical design review (1QFY94), Development Test and Evaluation (DT&E), and Government procedures evaluation (Jun 94). ($3,633) (3QFY94)
- (U) Chemically Hardened Air Transportable Hospital/Chemically Hardened Air Management Plant (CHATH/CHAMP) - awarded contract and conducted Functional Configuration Audit for CHAMP prototype. ($2,484) (1QFY94)
- (U) Threat Related Attrition (THREAT) - initiated system integration for Build 1 and design for ground attack module for Build 2. ($911) (3QFY94)
- (U) Alternating Current Interface Unit (ACIU) - conducted test and evaluation. ($45) (4QFY94)
- (U) Aeromedical Systems Analysis - Conducted foundation studies and analyses to support core aeromedical and casualty care requirement. ($260) (continuing)
- (U) Fund proportional efforts of Human Systems Center (HSC), System Program Office (SPO), and Technical Engineering and Management Support (TEAMS) contractor. ($2,645) (4QFY94)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development |

(U) A. Mission Description and Budget Item Justification (Continued)

(U) FY 1995 ($ in Thousands)

- (U) Transportable Blood Transshipment Center (TBTC) - conduct Functional Configuration Audit and Initial Production Readiness Review (1QFY95), complete Operational Test and Evaluation (OT&E) (2QFY95), make Milestone III decision, initiate production (3QFY95), meet Initial Operating Capability. ($352) (4QFY95)
- (U) Spinal Cord Injury Transport System (SCITS) - award EMD contract. ($414) (4QFY95)
- (U) Threat Related Attrition (THREAT) - complete integration testing for Build 1 (3QFY95), meet Initial Operating Capability (4QFY95), and test the ground attack module for Build 2. ($708) (4QFY95)
- (U) Wartime Medical Planning System (WAR-MED PS) - make Milestone II decision. ($51) (3 QFY 95)
- (U) Alternating Current Interface Unit (ACIU) - make Milestone III decision and award production contract. ($30) (3 QFY 95)
- (U) Continuous/Intermittent Suction Unit (CISU) - make Milestone II decision and release draft Request for Proposal. ($117) (2 QFY 95)
- (U) Civil Reserve Air Fleet Aeromedical Evacuation Shipset (CRAF AESS) - complete re-packaging of shipsets (1 QFY 95), meet FOC. ($11) (4QFY95)
- (U) Chemically/Biologically Hardened Air Transportable Hospital/Chemically/Biologically Hardened Air Management Plant (CHATH/CHAMP) - deliver 2 prototypes (1QFY95), down select best design, exercise EMD option. ($3,365) (3 QFY 95)
- (U) Aeromedical Systems Analyses - conduct foundation studies and analyses to support core aeromedical and casualty care requirement. ($1,452) (Continuing)
- (U) Fund proportional efforts of Human Systems Center (HSC), System Program Office (SPO), and Technical Engineering and Management Support (TEAMS) contractor. ($1,402)

(U) FY 1996 ($ in Thousands)

- (U) TBTC - deliver initial production units. (NSP) (4QFY96)
- (U) SCITS - complete Critical Design Review. ($854) (4QFY96)
- (U) THREAT - integrate ground attack model for Build 2 and complete integration testing (4QFY96), deliver Build 2 (4QFY96), develop Nuclear, Biological, and Chemical models. ($1,068) (4QFY96)
- (U) WAR-MED PS - award EMD contract (3QFY96), begin casualty care models integration. ($957) (4QFY96)
- (U) CISU - award EMD contract (1QFY96), test developmental prototype. ($1,542) (2QFY96)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development | PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development |

(U) A. Mission Description and Budget Item Justification (Continued)

(U) FY 1996 ($ in Thousands) (Continued)

- (U) Alternating Current Interface Unit (ACIU) - complete production. ($22) (4QFY96)
- (U) Chemically/Biologically Hardened Air Transportable Hospital/Chemically/Biologically Hardened Air Management Plant (CHATH/CHAMP) - complete CHAMP Development Test and Evaluation (3QFY96), complete CHAMP Operational Test and Evaluation, make Milestone III decision, and exercise production option. ($1,205) (4QFY96)
- (U) Aeromedical Systems Analyses - conduct foundation studies and analyses to support core aeromedical and casualty care requirements. ($191) (Continuing)
- (U) Fund proportional efforts of Human Systems Center (HSC), System Program Office (SPO), and Technical Engineering and Management Support (TEAMS) contractor. ($396) (4QFY96)

(U) FY 1997 ($ in Thousands)

- (U) Transportable Blood Transshipment Center (TBTC) - deliver final production units, meet Full Operational Capability. (NSP) (4QFY97)
- (U) CHATH/CHAMP - Initiate production of 30 CHATH/CHAMP systems, meet Initial Operational Capability (IOC). ($125) (1QFY97)
- (U) Spinal Cord Injury Transport System (SCITS) - complete Design Test and Evaluation (3 QFY 97), complete System Verification Review. ($1,494) (4QFY97)
- (U) Threat Related Attrition (THREAT) - integrate Nuclear, Biological, and Chemical models for Build 3 and complete integration testing (3 QFY 97), deliver Build 3. ($696) (4QFY97)
- (U) Wartime Medical Planning System (WAR-MED PS) - complete Critical Design Review (3 QFY 97), meet IOC and complete design of Fifth Echelon Model. ($1,771) (4QFY97)
- (U) Continuous/Intermittent Suction Unit (CISU) - conduct Operational Test and Evaluation meet IOC, complete EMD (2 QFY 97), make Milestone III decision (3QFY97), and exercise production option. ($960) (3 QFY 97)
- (U) Aeromedical Systems Analyses - conduct foundation studies and analyses to support core aeromedical and casualty care requirements. ($752) (Continuing)
- (U) Fund proportional efforts of HSC, SPO, and TEAMS contractor. ($395) (4QFY97)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 10,260 | 8,178 | 6,267 | 6,225 | Cont |
| Appropriated Value | 10,260 | | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions (GCR) | -103 | -123 | | | |
| b. Below Threshold Reprogramming (BTR) | -41 | | | | |
| c. SBIR | -117 | -153 | | | |
| Adjustments to Budget Years Since FY95 PB | | | -32 | -32 | |
| Current Budget Submit/President's Budget | 9,999 | 7,902 | 6,235 | 6,193 | Cont |

Change Summary Explanation:

Funding: FY95 GCR reductions were for FFRDC, NON-FFRDC, university research, and travel. Reductions in FY96 and FY97 are due to revised inflation estimates.

Schedule: None

Technical: None

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Compl | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation Other Procurement - AF, Budget Activity #4, Other Base and Maintenance Support, Program Title Medical/Dental Equipment | | | | | | | | | | |
| | 5,461 | 6,500 | 10,921 | 7,655 | 4,536 | 5,827 | 3,000 | 0 | Compl | 43,900 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development

PROJECT NO.: 2866

(U) D. Schedule Profile

| | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| TBTC | Critical Design Review (CDR) | X** | | | | | | | | | | | | | | | |
| | Development Test & Evaluation (DT&E) | | | X** | | | | | | | | | | | | | |
| | Functional Configuration Audit (FCA) | | | | | X** | | | | | | | | | | | |
| | Operational Test & Evaluation (OT & E) | | | | | | X** | | | | | | | | | | |
| | Initial Operational Capability (IOC) | | | | | | | | X | | | | | | | | |
| | Full Operational Capability (FOC) | | | | | | | | | | | | | | | | X |
| SCITS | Award Engineering Manufacturing & Development (EMD) Contract | | | | | | | | X | | | | | | | | |
| | CDR | | | | | | | | | | | | X** | | | | |
| | DT&E | | | | | | | | | | | | | | | X** | |
| THREAT | Initiate Build 1 & Design Build 2 | | | X* | | | | | | | | | | | | | |
| | Integrate & test Build 1 | | | | | | | X** | | | | | | | | | |
| | Integrate & test Build 2 | | | | | | | | | | | | X** | | | | |
| | IOC | | | | | | | | X | | | | | | | | |
| | Integrate Nuclear, Biological, and Chemical Modules for Build 3 | | | | | | | | | | | | X* | | | X** | |
| | Deliver Build 3 | | | | | | | | | | | | | | | | X** |
| WAR-MED PS | Award EMD Contract | | | | | | | | | | | X | | | | | |
| | CDR | | | | | | | | | | | | | | | X** | |
| | IOC | | | | | | | | | | | | | | | | X |
| ACIU | Conducted Test & Evaluation | | | | X** | | | | | | | | | | | | |

* START
** COMPLETE

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development

PROJECT NO.: 2866

(U) D. Schedule Profile (Continued)

| | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| CRAF | AESS Re-package shipsets & rewrite tech manuals | X* | | | | X** | | | | | | | | | | | |
| | Full Operational Capability | | | | | | | X** | | | | | | | | | |
| CHATH/CHAMP | Downselect/Start EMD | | | | | | | X* | | | | | | | | | |
| | Complete CHAMP Design Test and Evaluation | | | | | | | | | | | X** | | | | | |
| | Complete CHAMP OT&E | | | | | | | | | | | | X** | | | | |
| | Exercise Production Option | | | | | | | | | | | | | | X* | | |
| | IOC | | | | | | | | | | | | | | X | | |
| | Production contract | | | | | | | X* | | | | | X** | | | | |
| CISU | Engineering and Manufacturing Development (EMD) contract | | | | | | | | | X* | | | | | X** | | |
| | Conduct prototype testing | | | | | | | | | | X** | | | | | | |
| | Conduct Operational Test and Evaluation (OT&E) | | | | | | | | | | | | | | X* | | |
| | Initial Operational Capability (IOC) | | | | | | | | | | | | | | X | | |
| | Exercise production option | | | | | | | | | | | | | | | X | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development

PROJECT NO.: 2866

(U) A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Engineering and Manufacturing Development | 5,872 | 5,305 | 4,593 | 4,454 |
| Development/Operational Test and Evaluation | 869 | 574 | 0 | 98 |
| Contractor Engineering Support | 857 | 1,199 | 1,041 | 1,040 |
| Miscellaneous (System Program Office Operations) | 2,336 | 818 | 595 | 595 |
| Mission Support/Supplies | 65 | 6 | 6 | 6 |
| Total | 9,999 | 7,902 | 6,235 | 6,193 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development

PROJECT NO.: 2866

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

Performing Organizations

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| TBTC | CPAF/FFP | Mar 91 | 11,033 | | 11,527 | 2,808 | 0 | 0 | 0 | 0 | 14,335 |
| Arthur.D.Little (Terminated) | | | | | | | | | | | |
| CHATH Phase I | FPIF | Dec 94 | | | 0 | 1,684 | 0 | 0 | 0 | 0 | 1,684 |
| EASI | | | | | | 943 | | | | | 943 |
| Guild | | | | | | 741 | | | | | 741 |
| CHATH Phase II | | | | | | | 2512 | 951 | | | 3,463 |
| EASI or Guild | | | | | | | | | | | |
| CISU | C/CPIF | Jan 95 | | | 0 | 0 | 0 | 1,198 | 760 | 0 | 1,958 |
| Unknown | Unknown | | | | | | | | | | |
| WARMED | CPAF | Nov 95 | | | 0 | 0 | 0 | 807 | 1,616 | 3,736 | 6,159 |
| BDM | | | | | | | | | | | |
| THREAT | C/CPFF | Aug 94 | | | 0 | 758 | 550 | 906 | 528 | 42 | 2,784 |
| BDM | | | | | | | | | | | |
| New Business | | | | | 17,477 | 0 | 1,682 | 633 | 1,800 | 1,209 | 22,801 |
| Unknown | | | | | | | | | | | |
| Miscellaneous | | | | | 17,123 | 301 | 561 | 233 | 157 | 212 | 18,589 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development

PROJECT NO.: 2866

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

Performing Organizations (Continued)

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Support and Management Organizations | | | | | | | | | | | |
| TEAMS | | | | | 2,354 | 857 | 1,199 | 1,072 | 898 | 1,759 | 8,139 |
| ATJ | | | | | | 261 | 670 | 599 | 502 | 983 | 3,015 |
| OPTECH | | | | | | 199 | 529 | 473 | 396 | 776 | 2,374 |
| MTC | | | | | 2,354 | 397 | | | | | 2,751 |
| SPO Operations | | | | | 1,848 | 2,620 | 818 | 376 | 374 | 445 | 6,481 |
| Mission Support/Supplies | | | | | 361 | 65 | 6 | 6 | 6 | 18 | 462 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| White Sands Missile Range | | | | | | 114 | 495 | | | | 609 |
| Aberdeen Proving Ground | | | | | | 401 | 38 | | | | 439 |
| Edgewood Arsenal | | | | | | 114 | | | | | 114 |
| Natick Labs | | | | | | 138 | | | | | 138 |
| SA-ALC, Kelly AFB | | | | | | 41 | | | | | 41 |
| Armstrong Lab | | | | | | 8 | 8 | | | | 16 |
| Other/Unknown | | | | | 138 | 90 | 33 | 53 | 54 | | 368 |

Government Furnished Property: None.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604703F Aeromedical/Casualty Care Systems Development

PROJECT NO.: 2866

(U) B. Budget Acquisition History and Planning Information ($ in Thousands) (Continued)

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | | | | 46,127 | 5,551 | 5,305 | 4,728 | 4,861 | Cont | TBD |
| Subtotal Support and Management | | | | 4,563 | 3,542 | 2,023 | 1,454 | 1,278 | Cont | TBD |
| Subtotal Test and Evaluation | | | | 138 | 906 | 574 | 53 | 54 | Cont | TBD |
| Total Project | | | | 50,828 | 9,999 | 7,902 | 6,235 | 6,193 | Cont | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 4551 | 1558 | 1167 | 613 | 421 | 330 | 0 | 0 | 0 | 52821 |
| Common SE Development/2479 | 2311 | 298 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5601 |
| AF SE Management/3759 | 740 | 663 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3967 |
| 60,000 Pound Aircraft Loader/3852 | 1500 | 597 | 1167 | 613 | 421 | 330 | 0 | 0 | 0 | 43253 |

A. Mission Description and Budget Item Justification

This program element supports projects that develop, test, evaluate and field improved flight line support equipment (SE) to meet the operational needs of both Global Reach and Global Power forces which can not be met through non-developmental item (NDI) acquisitions. Its goal is to limit proliferation; increase standardization; reduce the deployment footprint; and improve performance, availability, and reliability and maintainability; thereby reducing life cycle costs. Common SE is needed to minimize the operational and support burden imposed by the proliferation of weapon systems unique SE. Common SE efforts reduce SE proliferation, assure maximum operational capability for the dollars invested, and reduce the SE burden for operational commands and supporting agencies. This program element supports the development of an air transportable, transporter-type loader with the capability to accommodate six pallets or a Type V airdrop platform carrying 60,000 pounds in a single load. It will be the backbone of the Global Reach airlift 463L system and improve mobility deployment times for the present military and Civil Reserve Air Fleet (CRAF) as well as the C-17 aircraft. This program element is assigned to the Engineering and Manufacturing Development (EMD) budget activity because the majority of the funded effort focuses on preparing for production.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 4766 | 1605 | 1874 | 1306 | 9551 |
| Appropriated Value | 4793 | 1605 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -27 | -17 | | | |
| b. SBIR | -55 | -30 | | | |
| c. Below Threshold Reprogramming | -160 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -707 | -693 | -1400 |
| Current Budget Submit/President's Budget | 4551 | 1558 | 1167 | 613 | 7889 |

Change Summary Explanation: FY94 funds reduced for Congressional Reduction, SBIR, and BTR. FY95 funds reduced by General Reduction and SBIR. The Advanced X-ray Equipment System (AXES), within project #2479, will be terminated in FY95 after completion of acquisition phase II. The Air Force Support Equipment Management (AFSEM) project #3759 transferred to PE 0708611 beginning in FY96. Also, the AFSEM project was restructured resulting in a 30% reduction in FY96 and FY97 funds.

C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation: Other Procurement, AF (Budget Activity: 82) | | | | | | | | | | |
| 60K A/C Loader | 27680 | 29475 | 35336 | 36901 | 29029 | 36530 | 36355 | 38238 | Cont | TBD |

D. Schedule Profile: See each project.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 2479

PROJECT NO.: 2479

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2311 | 298 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5601 |

A. Mission Description and Budget Item Justification

Project 652479, Common Support Equipment: This project develops and tests common SE to fill a continuing need for better combat effectiveness, lower life cycle costs, and increased SE standardization. The Advanced X-ray Equipment System (AXES) task will develop a rugged deployable, high resolution x-ray system. It integrates state-of-the-art x-ray technology for organizational level nondestructive inspection of structural flaws, foreign substances, and corrosion in inaccessible or otherwise undetected components of aircraft, engines, and missiles. This task will be terminated after completion of IOT&E and Acquisition Phase II.

(U) FY 1994
- (U) Completed design qualification part of Design Test and Evaluation (DT&E) on AXES - $40
- (U) Conducted Initial Operational Test and Evaluation (IOT&E) on AXES - $10
- (U) Conducted Functional Configuration Audit (FCA) on AXES - $10
- (U) Continued engineering, technical assistance, and program management support for AXES - $267
- (U) Supported development of SE software standards - $1836
- (U) Analytic Support Contract - $148

(U) FY 1995
- (U) Complete acquisition phase II and terminate the AXES program - $298

(U) FY 1996 Not Applicable

(U) FY 1997 Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 2479

PROJECT NO.: 2479

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2666 | 304 | 153 | 103 | 3226 |
| Appropriated Value | 2666 | 304 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -27 | | | | |
| b. SBIR | -55 | -6 | | | |
| c. Below Threshold Reprogramming | -273 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -153 | -103 | -256 |
| Current Budget Submit/President's Budget | 2311 | 298 | 0 | 0 | 2609 |

Change Summary Explanation: FY94 funds reduced for Congressional Reduction, SBIR, BTR, and realignment. FY 95 funds reduced for SBIR. FY96 and FY97 funds were realigned to the 60K A/C Loader project from the Advanced X-ray Equipment System (AXES) project. The AXES project will be terminated in FY95 after completion of acquisition phase II.

C. Other Program Funding Summary ($ in Thousands): Not Applicable.

D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| * Start/Complete IOT&E | | | | X | | | | | | | | | | | | |
| * Complete Acquisition Phase II | | | | | X | | | | | | | | | | | |
| Terminate the Acquisition Program | | | | | | X | | | | | | | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 2479

PROJECT NO. 2479

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Development Contract | 10 | | | |
| Development Test and Evaluation | 40 | | | |
| Initial Operational Test and Evaluation | 10 | | | |
| Engineering and Program Management Support | 267 | 298 | | |
| Support Equipment Software Standards Development | 1836 | | | |
| Analytic Support Contract | 148 | | | |
| Total | 2311 | 298 | | |

B. Budget Acquisition History and Planning Information: Not Applicable.

C. Funding Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 3759

PROJECT NO.: 3759

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| | 740 | 663 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3967 |

A. Mission Description and Budget Item Justification

Project 653759, Air Force Support Equipment Management: The Automatic Test Systems (ATS) Product Group Manager (PGM) Product Master Plan (PMP) and ATS Database development effort is designed to give the ATS PGM the tools to track and plan Air Force ATS direction. The PMP will support standardization and ATS PGM long-term planning by capturing essential data on all Air Force ATS. The Database will include all ATS identified in the PMP and be used to interface with Integrated Weapon System Master Plans. The ATS Database will also include the ATS Preferred Item List (PIL). It will provide ATS users and managers the capability to match new test requirements to existing test capabilities and ATS developments. This project will be transferred to PE 0708611F beginning in FY96.

(U) FY 1994
- (U) Continued development of Automatic Test Systems (ATS) Master Plans - $415
- (U) Develop the Air Force ATS Preferred Item List (PIL) - $40
- (U) Program the database and collect parametric data on the ATS PIL - $245
- (U) Program management support - $40

(U) FY 1995
- (U) Complete development of the ATS Master Plans - $430
- (U) Continue ATS Product Master Plan (PMP) data maintenance - $10
- (U) Program upgrades to the ATS Database - $30
- (U) Update and maintain ATS PIL Database - $147
- (U) Program management support - $46

(U) FY 1996 Not Applicable

(U) FY 1997 Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 3759

PROJECT NO.: 3759

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 700 | 693 | 701 | 689 | 2783 |
| Appropriated Value | 700 | 693 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | | -17 | | | |
| b. SBIR | | -13 | | | |
| c. Below Threshold Reprogramming | +40 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | -701 | -689 | -1390 |
| Current Budget Submit/President's Budget | 740 | 663 | 0 | 0 | 1403 |

Change Summary Explanation: FY94 funds increased, through a realignment, for program management support. FY95 funds reduced by a General Reduction and SBIR. The Air Force Support Equipment Management (AFSEM) project and funding transferred to PE 0708611F beginning in FY96. Also, the AFSEM project was restructured resulting in a 30% reduction in FY96 and FY97 funds.

C. Other Program Funding Summary ($ in Thousands): Not Applicable.

D. Schedule Profile: Not Applicable.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| 5, Engineering and Manufacturing Development | 0604704F, Common Support Equipment Development | 3759 |

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Development ATS Master Plan | 415 | 430 | | |
| Development ATS PIL database | 285 | 147 | | |
| Update ATS database | | 30 | | |
| ATS Product Line Master Plan data maintenance | | 10 | | |
| Program management support | 40 | 46 | | |
| Total | 740 | 663 | | |

B. Budget Acquisition History and Planning Information: Not Applicable.

C. Funding Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 3852

PROJECT NO.: 3852

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1500 | 597 | 1167 | 613 | 421 | 330 | 0 | 0 | 0 | 43253 |

A. Mission Description and Budget Item Justification

Project 653852, 60,000 (60K) Pound Capacity Aircraft Transporter Loader: This project completes the development of the 60,000 pound capacity aircraft transporter/loader to fulfill the requirement of Air Mobility Command's (AMC's) Operational Requirements Document (ORD) 002-89-1. The project provides a single, unique loader to on/off load various aircraft like the C-17, C-5, C-141, C-130, C-27, KC-10, and Civil Reserve Air Fleet (CRAF) aircraft while combining the capabilities of the 40K, wide-body elevator, and lower-lobe loaders. The 60K loader will be driven on/off of the C-17, C-5, and C-141 aircraft without shoring and will be the only loading vehicle capable of moving a type V airdrop platform carrying a full 60,000 pounds required by the US Army. The 60K loader will be significantly more reliable with a 100 hours mean time between failure (MTBF) versus the 40K loader's 18 hours MTBF. Major reductions from 30 man-hours to 3 man-hours in deployment preparation times will be made.

(U) FY 1994
- (U) Materials and labor for Engineering Change Order (ECO) testing on prototype loaders - $860
- (U) Researched Engineering Change Proposals (ECPs) - $80
- (U) Provided contracted advisory and assistance services and program management support - $560

(U) FY 1995
- (U) Materials and labor for ECO testing on prototype loaders - $60
- (U) Researched ECPs - $60
- (U) Continue contracted advisory and assistance services and program management support - $477

(U) FY 1996
- (U) Technical support for Initial Operational Test and Evaluation (IOT&E) - $540
- (U) Research ECPs - $80
- (U) Continue contracted advisory and assistance services and program management support - $547

(U) FY 1997
- (U) Research ECPs - $44
- (U) Continue contracted advisory and assistance services and program management support - $569

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 3852

PROJECT NO.:

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1400 | 608 | 1020 | 514 | 3542 |
| Appropriated Value | 1400 | 608 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. SBIR | | -11 | | | |
| b. Below Threshold Reprogramming | +100 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | +147 | +99 | +246 |
| Current Budget Submit/President's Budget | 1500 | 597 | 1167 | 613 | 3877 |

Change Summary Explanation: FY94 funds increased by a realignment for program management support. FY95 funds reduced for SBIR. FY96 and FY97 funds increased by a realignment for program management support and IOT&E.

C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation: Other Procurement, AF (Budget Activity: 82) | | | | | | | | | | |
| 60K A/C Loader | 27680 | 29475 | 35336 | 36901 | 29029 | 36530 | 36355 | 38238 | Cont | TBD |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 3852

PROJECT NO.: 3852

D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| * Completed combined DT&E/IOT&E | X | | | | | | | | | | | | | | | |
| * Completed Operational Assessment | | X | | | | | | | | | | | | | | |
| * LRIP Approval | | | X | | | | | | | | | | | | | |
| Start Dedicated IOT&E | | | | | | | | | | | | X | | | | |
| Complete Dedicated IOT&E | | | | | | | | | | | | | | | X | |
| Milestone III | | | | | | | | | | | | | | | X | |
| IOC | | | | | | | | | | | | | | | X | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: 5, Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604704F, Common Support Equipment Development, 3852

PROJECT NO.

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Materials and labor for ECO testing on prototype loaders | 860 | 60 | | |
| Research ECPs | 80 | 60 | 80 | 44 |
| Advisory and assistance services and program management support | 560 | 477 | 547 | 569 |
| IOT&E | | | 540 | |
| Total | 1500 | 597 | 1167 | 613 |

B. Budget Acquisition History and Planning Information: Not Applicable.

C. Funding Profile: Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604706 Life Support Systems

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 10,749 | 4,875 | 4,035 | 3,983 | 3,976 | 4,075 | 4,197 | 4,321 | Continuing | TBD |
| Proj 3111 Aircraft Mishap Prevention Program | 2,985 | 169 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD |
| Proj 3812 COMBAT EDGE | 649 | 762 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD |
| Proj 412A Life Support Systems | 7,115 | 3,944 | 4,035 | 3,983 | 3,976 | 4,075 | 4,197 | 4,321 | Continuing | TBD |

A. (U) Mission Description and Budget Item Justification

This program element is devoted to Engineering and Manufacturing Development (EMD) of aircrew life support equipment. This program element is managed from pre-concept to disposal under the Integrated Weapon System Management (IWSM) single manager concept. The Life Support program provides consolidated management for the development, acquisition, production, deployment and support of protective equipment and aircraft subsystems that enable aircrews, passengers, and ground support personnel to operate safely in combat and training environments. Equipment developed under this program is generally classified as Operational Environment life support systems, Escape and Descent systems, or Survival and Recovery systems. The majority of the equipment has been developed through the continuing core project, Project 412A, which provides centralized management of life support items and subsystems such as flight clothing, flight helmets, oxygen breathing equipment for aviators, anti-G coveralls, survival radios, night vision devices, active/passive noise reduction devices, parachute releases and aircraft ejection seats. Project 3111 develops a management information system to reduce loss of aircrew lives and aircraft due to human factors. Project 3812 develops a pressure breathing for G system for F-15 and F-16 crew members to help reduce the likelihood of G-induced loss of consciousness incidents and increase pilot endurance under high-G combat conditions. Acquisition strategy is incorporated at the project level.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604706 Life Support Systems

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 11,024 | 5,058 | 4,055 | 4,003 | TBD |
| Appropriated Value | 11,024 | 5,058 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Undistributed Reductions | -111 | -89 | | | |
| b. Below Threshold Reprogramming | -39 | 0 | | | |
| c. Small Buisness Innovative Research (SBIR) | -125 | -94 | | | |
| Adjustments to Budget Years since FY95 PB | | | -20 | -20 | |
| Current Budget Submit/PB | 10,749 | 4,875 | 4,035 | 3,983 | TBD |

Change Summary Explanation:

Funding: FY94 Non-FFRDC spread distributed across all three projects. FY94 Below Threshold Reprogramming to cover program priority requirements. FY95 reduced for Non-FFRDC, SBIR, FFRDC, university research, and travel. FY96 and FY97 reduced for non-pay purchases inflation.

Schedule: No Changes

Technical: No Changes

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604706 Life Support Systems

PROJECT NO.: 3111

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Proj 3111 Aircraft Mishap Prevention Program (AMPP) | 2,985 | 169 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15,617 |

A. (U) Mission Description and Budget Item Justification

Project 3111 develops a management information system to reduce loss of aircrew lives and aircraft due to human factors. This is a centralized system for the Air Force Safety Agency (AFSA) to analyze the human factor elements in aircraft mishaps. The results will assist the Air Force in the reduction of aircraft mishaps and the loss of human life. The systems was delivered to the AFSA at the end of FY94, completing the work under this project. The prime contractor for AMPP was ETA Technologies Corp. Acquisition was through Firm Fixed Price/Fixed Incentive contract.

(U) FY 1994
- (U) Conducted Test Readiness Review. ($200)
- (U) Complete Development Test And Evaluation. ($1,400)
- (U) Perform System configuration and physical configuration audits. ($28)
- (U) Conduct Analyst training. ($150)
- (U) Support AFSA system introduction. ($1,207)

(U) FY 1995
- (U) Program support to AFSA for initial AMPP operations. ($169)

(U) FY 1996 Not Applicable

(U) FY 1997 Not Applicable

Exhibit R-2

# BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 - Engineering and Manufacturing Development | PE: #0604706 Life Support Systems | 3111 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 764 | 0 | 0 | 0 | 16,380 |
| Appropriated Value | 764 | 0 | | | |
| Adjustments to Appropriated Value | | | | | |
| Below Threshold Reprogramming | 2221 | 169 | | | |
| Current Budget Submit/President's Budget | 2,985 | 169 | 0 | 0 | 15,617 |

Change Summary Explanation:

Funding: FY94 and FY95 RDT&E Below Threshold Reprogramming to complete the Aircraft Mishap Prevention Project.

Schedule: No Changes

Technical: No Changes

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| - Conducted Test and Readiness Review | | | | ✷ | | | | | | | | | | | | |
| - Delivered AMPP system to Air Force Safety Agency (AFSA) | | | | ✷ | | | | | | | | | | | | |

✷ = Completed Effort

X = Start of Effort

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604706 Life Support Systems

PROJECT NO.: 3812

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Proj 3812 COMBAT EDGE | 649 | 762 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14,988 |

A. (U) Mission Description and Budget Item Justification

This project develops and fields a positive pressure breathing G system for F-15 and F-16 crew members, called the Combined Advanced Technology Enhanced Design "G" Ensemble (COMBAT EDGE). This system is designed to reduce the cumulative effects of G-induced stress and fatigue and thus reduce the number of G-induced Loss Of Consciousness (G-LOC) incidents. The system supplements the current anti-G suit garment with an upper torso counter pressure vest, a tensioning bladder modification kit incorporated into the current HGU-55/P helmet, a new oxygen mask, a modified oxygen regulator and a modified high-flow anti-G valve. For COMBAT EDGE, Gentex Corporation and Carleton Technologies are the prime contractors.

(U) FY 1994 Program
- (U) Conducted manrating on mask improvements (field of view and valsalva). ($86)
- (U) Completed Follow-on Test and Evaluation (FOT&E) on the HGU-55/P helmet modification kit. ($130)
- (U) Conducted FOT&E on mask improvements (field of view and valsalva). (NSP)
- (U) Continued deployment of COMBAT EDGE to F-16 Air National Guard (ANG), Air Force Reserve (AFRES), and remaining active units. ($433)

(U) FY 1995 Program
- (U) Complete the deployment of COMBAT EDGE to ANG and Active F-16 units. ($162)
- (U) Conduct manrating on mask improvements (comfort and design). ($80)
- (U) Initiate FOT&E on mask improvements (comfort and design). ($120)
- (U) Initiate deployment of COMBAT EDGE system to F-15 units. ($400)

(U) FY 1996 Planned Program - N/A

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 - Engineering and Manufacturing Development | PE: #0604706 Life Support Systems | 3812 |

A. (U) Mission Description and Budget Item Justification (Cont.)

(U) FY 1997 Planned Program Not Applicable

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 249 | 80 | 0 | 0 | 13,906 |
| Appropriated Value | 249 | 80 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Below Threshold Reprogramming | 400 | 682 | | | |
| Current Budget Submit/President's Budget | 649 | 762 | 0 | 0 | 15,286 |

Change Summary Explanation:

Funding: FY94 and FY95 Below Threshold Reprogrammings for deloyment of COMBAT EDGE to F-15 units.

Schedule: No changes

Technical: No Changes

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 - Engineering and Manufacturing Development | PE: #0604706 Life Support Systems | 3812 |

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| - Complete HGU-53P/helmet mod Follow on Test and Evaluation (FOT&E) | | ✳ | | | | | | | | | | | | | | |
| - Conduct FOT&E on mask improvements | | | | ✳ | | | | | | | | | | | | |
| - Complete F-16 deployment | | | | | X | | | | | | | | | | | |
| - Manrating tests on mask improvements (comfort and hang) | | | | | | X | | | | | | | | | | |
| - Initiate F-15 deployment | | | | | | | X | | | | | | | | | |

✳ = Completed Effort
X = Start of Effort

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604706 Life Support Systems

PROJECT NO.: 412A

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Proj 412A Life Support Systems | 7,115 | 3,944 | 4,035 | 3,983 | 3,976 | 4,075 | 4,197 | 4,321 | Continuing | TBD |

A. (U) Mission Description and Budget Item Justification

Provides for Engineering, Manufacturing and Development (EMD) of life support equipment and subsystems to satisfy operational command requirements for improved life support equipment to maximize life support items and subsystems such as flight clothing, flight helmets, oxygen breathing equipment for aviators, anti-G coveralls, survival radios, night vision devices, active/passive noise reduction devices, parachute releases, and aircraft ejection seats. Program management support includes tasks to assess deficiencies of currently fielded equipment, to aid in transitioning new technology into EMD, and to support all current life support projects. Life Support Systems top three major contractors are: ITT Electro-Optical Products Division, Bose Corporation, and Conax Florida Corp. Life Support efforts result from full and open competion among qualified vendors to select a single primary source for EMD and folllow-on production.

(U) FY 1994 Program

- (U) Completed Night Vision System (NVS) preliminary design phase. ($2,440)
- (U) Provided technical support to F-22 EMD program for life support equipment design and testing. (NSP)
- (U) Completed NVS prototype development. ($1,424)
- (U) Completed NVS critical design phase. ($2,786)
- (U) Completed government assessment of prototype NVS systems. ($114)
- (U) Completed Active Noise Reduction (ANR) requirements definition for Air Force Special Operations Command (AFSOC). ($168, AFSOC funded)
- (U) Program Management Support. ($351)

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 - Engineering and Manufacturing Development | PE: #0604706 Life Support Systems | 412A |

A. (U) Mission Description and Budget Item Justification (Cont.)

(U) FY 1995 Program

- (U) Receive Night Vision System (NVS) Developmental Testing and Evaluation (DT&E) units. ($3,231)
- (U) Initiate NVS government conducted DT&E ($521)
- (U) Provide technical support for Universal Water Activated Release System (UWARS) production contract. (NSP)
- (U) Initiate Active Noise Reduction (ANR) government DT&E. ($643 Air Force Special Operations Command (AFSOC) funded)
- (U) Complete UWARS government DT&E. (NSP)
- (U) Complete UWARS Initial Operational Test & Evaluation (IOT&E). (Funded by PE64609F, R&M Maturation/Tech Insertion Program)
- (U) Program Management Support. ($192)

(U) FY 1996 Planned Program

- (U) Complete NVS contractor conducted qualification testing. ($1,099)
- (U) Start fabrication of NVS Initial Operational Testing and Evaluation (IOT&E) units. ($1,886)
- (U) Complete NVS government conducted Developmental Testing and Evaluation (DT&E). ($834)
- (U) Complete ANR government DT&E and IOT&E. ($200, AFSOC funded)
- (U) Deliver ANR production units. ($1,386, AFSOC funded)
- (U) Start UWARS production deliveries. (Funded under PE 27224F, Combat Rescue and Recovery)
- (U) Program Management Support. ($216)

(U) FY 1997 Planned Program

- (U) Receive NVS IOT&E units. ($1,980)
- (U) Complete government conducted NVS IOT&E. ($1,842)
- (U) Complete ANR production deliveries. ($100, AFSOC funded)
- (U) Complete UWARS production deliveries. (NSP)
- (U) Program Management Support. ($161)

Exhibit R-2 **DT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)**

DATE: **February 1995**

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| **#5 - Engineering and Manufacturing Development** | **PE: #0604706 Life Support Systems** | **412A** |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 9,900 | 4,978 | 4,055 | 4,003 | TBD |
| Appropriated Value | 9,900 | 4,978 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | | -89 | | | |
| b. Below Threshold Reprogramming | -2,783 | -851 | | | |
| c. Small Buisness Innovative Research (SBIR) | | -94 | | | |
| Adjustments to Budget Years since FY95PB | | | -20 | -20 | |
| Current Budget Submit/President's Budget | 7,115 | 3,944 | 4,035 | 3,983 | TBD |

Change Summary Explanation:

Funding: FY94 and FY95 Below Threshold Reprogramming to cover program priority requirements. FY95 Reduction for FFRDC, NON-FFRDC, travel, SBIR and university research. FY96 - FY97 RDT&E reduced for non-pay purchases inflation.

Schedule: No Changes

Technical: No Changes

C. (U) Other Program Funding Summary ($ in Thousands) Not Applicable

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: PE: #0604706 Life Support Systems

PROJECT NO.: 412A

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| - Preliminary design phase Night Vision System (NVS) | | ✳ | | | | | | | | | | | | | | |
| - Prototype development (NVS) | | | | ✳ | | | | | | | | | | | | |
| - Completed Active Noise Reduction (ANR) Requirements Definitions | | | | | ✳ | | | | | | | | | | | |
| - NVS Critical design phase | | | | | ✳ | | | | | | | | | | | |
| - Government assessment of NVS prototype | | | | | ✳ | | | | | | | | | | | |
| - Completed Universal Water Activated Release System (UWARS) Contractor Qual Test | | | | | ✳ | | | | | | | | | | | |
| - Complete UWARS Government Developmental Testing and Evaluation (DT&E) | | | | | | X | | | | | | | | | | |
| - Complete UWARS Initial Operational Testing and Evaluation (IOT&E) | | | | | | | X | | | | | | | | | |
| - Receive NVS DT&E units | | | | | | | | X | | | | | | | | |
| - Complete NVS contractor Qualification testing. | | | | | | | | X | | | | | | | | |
| - Complete NVS DT&E | | | | | | | | | | X | | | | | | |
| - Complete ANR DT&E and IOT&E | | | | | | | | | | X | | | | | | |
| - Start UWARS Production Deliveries | | | | | | | | | | | | X | | | | |
| - Receive NVS IOT&E units | | | | | | | | | | | | | X | | | |
| - Complete ANR deliveries | | | | | | | | | | | | | X | | | |
| - Complete government conducted NVS IOT&E | | | | | | | | | | | | | | | X | |
| - Complete UWARS Production Deliveries | | | | | | | | | | | | | | | | X |

✳ = Completed Effort

X = Start of Effort

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering Manufacturing & Development

PE NUMBER AND TITLE: PE: #0604706 Life Support Systems

PROJECT NO.: 412A

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Total | 7,115 | 3,944 | 4,035 | 3,983 |
| - Contract (Including Management Reserve) | 6,289 | 3,231 | 2,442 | 3,251 |
| - Technical engineering support | 428 | 461 | 497 | 286 |
| - Travel | 168 | 151 | 177 | 132 |
| - Government testing | 47 | 60 | 880 | 285 |
| - Program Management Support | 183 | 41 | 39 | 29 |

Exhibit R-3

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering Manufacturing & Development

PE NUMBER AND TITLE: PE: #0604706 Life Support Systems

PROJECT NO.: 412A

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Kaiser Electronics | C,CPAF | 18 Jan 93 | | 4,831 | 2,308 | 2,523 | 0 | 0 | 0 | 0 | 4,831 |
| ITT | C,CPAF | 18 Jan 93 | | 15,397 | 2,628 | 3,766 | 3,231 | 2,442 | 3,251 | 79 | 15,397 |
| Other previous contracts | | | | 7,623 | 7,623 | | | | | | 7,623 |
| Support and Management Organizations | | | | | | | | | | | |
| Program Management Support | | | | 1,137 | 845 | 183 | 41 | 39 | 29 | Continuing | TBD |
| Travel | | | | 929 | 301 | 168 | 151 | 177 | 132 | Continuing | TBD |
| System Engeneering Technical Asst (SETA) | | | | 3,239 | 1,567 | 428 | 461 | 497 | 286 | Continuing | TBD |
| Test and Evaluation Organizations | | | | | | | | | | | |
| Air Force Flight Test Center | | | | 4,082 | 2,810 | 47 | 60 | 880 | 285 | Continuing | TBD |
| Subtotal Product Development | | | | 27,851 | 12,559 | 6,289 | 3,231 | 2,442 | 3,251 | 79 | 27,851 |
| Subtotal Support and Management | | | | 5,305 | 2,713 | 779 | 653 | 713 | 447 | Continuing | TBD |
| Subtotal Test and Evaluation | | | | 4,082 | 2,810 | 47 | 60 | 880 | 285 | Continuing | TBD |
| Total Project | | | | 37,238 | 18,082 | 7,115 | 3,944 | 4,035 | 3,983 | Continuing | TBD |

**Government Furnished Property:** Not Applicable

Exhibit R-3

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604708F Civil, Fire, Environment & Shelter Engrg

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 4,382 | 3,146 | 2,737 | 2,835 | 2,962 | 3,064 | 3,150 | 3,249 | Continuing | Continuing |
| 2054 Aerospace Facilities Engineering Development | 739 | 665 | 663 | 739 | 768 | 797 | 821 | 845 | Continuing | Continuing |
| 2505 Aircraft Firefighting Suppression & Rescue | 1,365 | 1,225 | 1,189 | 1,165 | 1,214 | 1,267 | 1,307 | 1,349 | Continuing | Continuing |
| 2674 Tactical Shelters | 1,526 | 591 | 223 | 192 | 212 | 202 | 200 | 209 | Continuing | Continuing |
| 3788 Environmental Quality | 752 | 665 | 662 | 739 | 768 | 798 | 822 | 846 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification**

This program funds the development, testing and evaluation of materials, equipment and procedures in four separate areas: a) Facilities Engineering improves the operational effectiveness, survivability, durability, and longevity of air base pavements, buildings and utilities; the overall objective is to provide an infrastructure that effectively supports the Air Force mission, contributes to high sortie rates, supports forward projection of air power, is less susceptible to damage from enemy actions or natural disasters, and is more rapidly returned to service if damaged. b) Fire Fighting Suppression and Rescue develops new concepts and technology applications to increase fire fighting support of combat operations, to improve base recovery after attack capabilities, and to reduce fire risks to personnel and resources. c) Tactical Shelters is the USAF portion of a tri service effort to develop standardized, low maintenance, survivable shelters and shelter accessories that are easily mobilized and compatible with air, sea and land transport systems. These products will effectively support high mobility aircraft support, command and control, communications, medical, and data processing units for the tactical and strategic forces. d) Environmental Quality ensures Air Force compliance with existing laws, executive orders, and Air Force policies by developing technologies to identify, reduce, and eliminate pollutant sources, identify and dispose of hazardous waste, conduct remediation, and mitigate the effects wastes and pollutants. This project develops equipment, materials, and processes in support of the Air Force environmental program. Environmental work performed under this program element is Engineering and Manufacturing Development because it takes basic technologies and develops them for Air Force use.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 4,433 | 3,214 | 2,950 | 3,030 | Cont |
| (U) Appropriated Value | 4,433 | 3,214 | | | |
| (U) Adjustment to Budget Years Since FY 95 PB | | | (213) | (195) | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Undistributed Congressional Reductions | (51) | (68) | | | |
| (U) Current Budget Submit/President's Budget | 4,382 | 3,146 | 2,737 | 2,835 | Cont |

(U) Change Summary Explanation:

Funding: FY 96 and FY 97 programs adjusted for inflation and to cover higher priority requirements.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary ($ in Thousands):** Not Applicable.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE: February, 1995 |
|---|---|---|
| BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE: 0604708F Civil, Fire, Environment & Shelter Engrg | PROJECT: 2054 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2054 Aerospace Facilities Engineering Development | 739 | 665 | 663 | 739 | 768 | 797 | 821 | 845 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification**

Develops equipment, materials, and procedures to improve the operational effectiveness of aerospace facilities.

- (U) FY 1994
- (U) Continued development of new family of environmental control units, $739,000.

(U) FY 1995
- (U) Complete development of new family of environmental control units, $120,000.
- (U) Begin Bare Base Systems requirements analysis, $295,000.
- (U) Begin development of new family of Bare Base shelters, $160,000.
- (U) Begin development of light weight deployable power generation/distribution systems, $90,000.

(U) FY 1996
- (U) Complete Bare Base Systems requirements analysis, $235,000.
- (U) Continue development of new family of Bare Base shelters, $233,000.
- (U) Continue development of light weight deployable power generation/distribution systems, $195,000.

(U) FY 1997
- (U) Continue development of new family of Bare Base shelters, $405,000.
- (U) Continue development of light weight deployable power generation/distribution systems, $334,000.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |
| | PROJECT<br>2054 |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 739 | 665 | 666 | 743 | Cont |
| (U) Appropriated Value | 739 | 665 | | | |
| (U) Adjustments to Budget Years Since FY 95 PB | | | (3) | (4) | |
| (U) Adjustments to Appropriated Value | | | | | |
| (U) Current Budget Submit/President's Budget | 739 | 665 | 663 | 739 | Cont |

(U) Change Summary Explanation:

Funding: FY 96 and FY 97 programs adjusted for inflation.

Schedule: Not Applicable

Technical: Not Applicable.

(U) C. **Other Program Funding Summary ($ in Thousands):** Not Applicable.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg<br>PROJECT 2054 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) New Family of Environmental Control Units | 739 | 120 | | |
| (U) Bare Base Systems Analysis | | 295 | 235 | |
| (U) New Family of Portable Shelters | | 160 | 233 | 405 |
| (U) Light Weight Deployable Generator | | 90 | 195 | 334 |
| (U) Total | 739 | 665 | 663 | 739 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands):** Not Applicable.

(U) C. **Funding Profile ($ in Thousands):** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |
| | PROJECT<br>2505 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2505 Aircraft Firefighting Suppression & Rescue | 1,365 | 1,225 | 1,189 | 1,165 | 1,214 | 1,267 | 1,307 | 1,349 | Continuing | Continuing |

(U) A. **Mission Description and Budget Item Justification**

Develops improved fire fighting, suppression and rescue equipment, materials, and methods to increase fire protection readiness, mobility, and effectiveness.

(U) FY 1994

- (U) Prepared for award of EMD contract for development of Deployable Fire Protection System (DFPS), $265,000.
- (U) Continued development of Self Contained Breathing Apparatus (SCBA), $178,000.
- (U) Continued courseware development of Firefighter Multimedia Training System (FMTS). Completes F-15, F-16, C-141, C-5, B-1. Began courseware development of firefighter physical fitness program, SCBA training, and procedures on CRAF aircraft, $482,000.
- (U) Completed commercial technology exploitation for the nightscan telescoping fireground lighting system, hydrochem nozzle, Aqueous Film Forming Foam (AFFF)/dry chemical, compressed air foam system, and positive pressure ventilation on large frame aircraft, $440,000.

(U) FY 1995

- (U) Award EMD contract for DFPS and begin support of production contract, $550,000.
- (U) Continue courseware development for FMTS. Develop FMTS for structural, C-747, C-17 aircraft and HAZMAT I and II, $250,000.
- (U) Continue commercial technology exploitation, $350,000.
- (U) Begin development of fire fighter emergency response ensemble with body cooling system, $45,000.
- (U) Complete development of SCBA, $30,000.

(U) FY 1996

- (U) Continue courseware development of FMTS. Completes courseware for HAZMAT III, IV, and V, $350,000.
- (U) Continue commercial technology exploitation, $344,000.
- (U) Continue development of fire fighter emergency response ensemble with body cooling system, $345,000.
- (U) Begin development of environmentally acceptable AFFF/Halon replacement, $50,000.
- (U) Begin follow-on improvement of DFPS $100,000.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |
| | PROJECT<br>2505 |

(U) A. Mission Description and Budget Item Justification Continued

(U) FY 1997
- (U) Continue courseware development of FMTS, $340,000.
- (U) Continue commercial technology exploitation, $270,000.
- (U) Continue development of fire fighter emergency response ensemble with body cooling system, $255,000.
- (U) Continue development of environmentally acceptable AFFF/Halon replacement, $200,000.
- (U) Continue follow-on improvement of DFPS $100,000.

(U) B. Program Change Summary ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1,365 | 1,293 | 1,295 | 1,271 | Cont |
| (U) Appropriated Value | 1,365 | 1,293 | | | |
| (U) Adjustments to Budget Years Since FY 95 PB | | | (106) | (106) | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Undistributed Congressional Reductions | | (68) | | | |
| (U) Current Budget Submit/President's Budget | 1,365 | 1,225 | 1,189 | 1,165 | Cont |

(U) Change Summary Explanation:
Funding: FY 96 and FY 97 programs adjusted for inflation and to cover higher priority requirements.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. Other Program Funding Summary ($ in Thousands): Not Applicable.

(U) D. Schedule Profile: Not Applicable.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg | PROJECT<br>2505 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Deployable Fire Protection System | 265 | 550 | 100 | 100 |
| (U) Self Contained Breathing Apparatus | 178 | 30 | | |
| (U) Firefighter Multimedia Training System | 482 | 250 | 350 | 340 |
| (U) Commercial Technology Exploitation | 440 | 350 | 344 | 269 |
| (U) Emergency Response Ensemble | | 45 | 345 | 256 |
| (U) Halon/AFFF Agent Replacement | | | 50 | 200 |
| (U) Total | 1,365 | 1,225 | 1,189 | 1,165 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands):** Not Applicable.

(U) C. **Funding Profile ($ in Thousands):** Not Applicable.

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604708F Civil, Fire, Environment & Shelter Engrg

PROJECT: 2674

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2674 Tactical Shelters | 1,526 | 591 | 223 | 192 | 212 | 202 | 200 | 209 | Continuing | Continuing |

(U) **A. Mission Description and Budget Item Justification**

Provides reliable, cost effective tactical shelters required to ensure the success of Air Force missions, provides Air Force membership in the DOD Tactical Shelter Program, and provides technology insertion for shelter development.

(U) FY 1994

- (U) Continued product improvement study for EMI on shelters, $35,000.
- (U) Continued the chemical and biological development program for shelters that use environmental control units, $50,000.
- (U) Continued the stylus electroplating control and materials selection protocol program for field application of EMI coatings, $35,000.
- (U) Began EMD phase of R-134a environmental control unit upgrade to non-ozone depleting chemicals, $200,000.
- (U) Developed new or modified shelter systems in conjunction with ASC/VXO to support the bare base development program, $140,000.
- (U) Continued Shelters 2000 program to develop new technologies for tactical shelters by the year 2000, $275,000.
- (U) Attended meetings of the Joint Committee for Tactical Shelters (JOCOTAS) and American Society for Testing and Materials (ASTM). Coordinate with other Air Force agencies. Fund ESC personnel, contractor support, MITRE support, travel, equipment, supplies, and overhead, $791,000.

(U) FY 1995

- (U) Complete EMD phase of R-134a environmental control unit upgrade to non-ozone depleting chemicals, $200,000.
- (U) Attend JOCOTAS and ASTM meetings. Coordinate with other Air Force agencies. Fund ESC personnel, contractor support, MITRE support, travel, equipment, supplies, and overhead, $391,000.

(U) FY 1996

- (U) Attend JOCOTAS and ASTM meetings. Coordinate with other Air Force agencies. Fund ESC personnel, contractor support travel, equipment, supplies, and overhead, $223,000.

(U) FY 1997

- (U) Attend JOCOTAS and ASTM meetings. Coordinate with other Air Force agencies . Fund ESC personnel, contractor support travel, equipment, supplies, and overhead, $192,000.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |
| | PROJECT<br>2674 |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1,577 | 591 | 324 | 273 | Cont |
| (U) Appropriated Value | 1,577 | 591 | | | |
| (U) Adjustments to Budget Years Since FY 95 PB | | | (101) | (81) | |
| (U) Adjustments to Appropriated Value | (51) | | | | |
| a. Undistributed Congressional Reductions | | | | | |
| (U) Current Budget Submit/President's Budget | 1,526 | 591 | 223 | 192 | Cont |

(U) Change Summary Explanation:

Funding: FY 96 and FY 97 programs adjusted for inflation and to cover higher priority requirements.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary ($ in Thousands):** Not Applicable.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg<br>PROJECT 2674 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Study Electromagnetic Interference (EMI) | 35 | | | |
| (U) Shelter Chemical/Biological Development Program | 50 | | | |
| (U) Field Application of EMI Coatings | 35 | | | |
| (U) Environmental Control Unit R-134a Upgrade | 200 | 200 | | |
| (U) New Shelter Systems | 140 | | | |
| (U) Shelters 2000 Program | 275 | | | |
| (U) Engineering Support | 791 | 391 | 223 | 192 |
| (U) Total | 1,526 | 591 | 223 | 192 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands):** Not Applicable.

(U) C. **Funding Profile ($ in Thousands):** Not Applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg<br>PROJECT 3788 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3788 Environmental Quality | 752 | 665 | 662 | 739 | 768 | 798 | 822 | 846 | Continuing | Continuing |

(U) A. Mission Description and Budget Item Justification

Develops equipment, materials, and processes in support of the Air Force environmental program including pollution prevention, compliance, restoration, and conservation. The focus is on technologies to reduce and eliminate pollutant sources, provide cost effective waste disposal, conduct remediation, and mitigate the effects of wastes and pollutants.

(U) FY 1994

- (U) Compliance - Highly Energetic Materials, $162,000.
- (U) Defined scope of program.
- (U) Investigated international application of technology.
- (U) Participated in lab program to build a pilot scale reactor.
- (U) Developed and submitted program proposals to National Defense Center for Environmental Excellence (NDCEE), Strategic Environmental Research and Development Program (SERDP), and Environmental Security Technology Certification Program (ESTCP).
- (U) Site Remediation, $120,000.
- (U) Defined scope of program.
- (U) Performed technical cost evaluation on completion of current field study.
- (U) Developed and submitted integrated program to rapidly clean-up fuel spills.
- (U) Site Characterization and Analysis Penetrometer System (SCAPS), $220,000.
- (U) Defined scope of program.
- (U) Participated in Environmental Protection Agency site demonstration.
- (U) Developed and submitted program to finish SCAPS under current contract vehicle.
- (U) Pollution Prevention, $250,000.
- (U) Defined scope and effort involved in supporting Air Force effort to reduce the use of ODCs and HAZMATS.
- (U) Developed and submitted program proposals to NDCEE, SERDP, ETI, and ESTCP.
- (U) Started execution of replacement identification program for engines at NDCEE.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |

(U) A. Mission Description and Budget Item Justification Continued

(U) FY 1995
- (U) Compliance - Highly Energetic Material Program, $200,000.
- (U) Review and comment on documentation to provide at completion of Lab transition.
- (U) Participate in pilot demonstration.
- (U) Prepare to execute program pending full funding of effort.
- (U) Review and develop program proposals to meet Air Force needs identified in the Air Force ESOH Technology Needs Survey.
- (U) Prepare for technology transition and program execution.
- (U) Remediation - SCAPS, $132,000.
- (U) Continue to manage ARPA program.
- (U) Represent AF at Tri-Service meetings.
- (U) Inform AF users of availability of services and capabilities.
- (U) Pollution Prevention, $333,000.
- (U) Define scope and effort involved in supporting AF effort to reduce the use of ODCs and HAZMATS.
- (U) Develop and submit program proposals to NDCEE and ESTCP.
- (U) Continue execution of replacement identification program for engines at NDCEE.
- (U) Review and develop program proposals to meet AF needs identified in AF ESOH Technical Needs Survey.
- (U) Prepare for technology transition and program execution.

(U) FY 1996
- (U) Compliance - Highly Energetic Material Program, $200,000.
- (U) Review and comment on documentation to provide at completion of lab effort.
- (U) Prepare to execute program pending full funding of effort.
- (U) Review and develop program proposals to meet AF needs identified in AF ESOH Technology Needs Survey.
- (U) Prepare for technology transition and program execution.
- (U) Remediation - SCAPS, $130,000.
- (U) Continue to manage ARPA program.
- (U) Represent AF at Tri-Service meetings.
- (U) Inform AF users of availability of services and capabilities.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |

(U) A. Mission Description and Budget Item Justification Continued

(U) FY 1996 Continued
- (U) Pollution Prevention, $332,000.
- (U) Define scope and effort involved in supporting AF effort to reduce the use of ODCs and HAZMATS.
- (U) Develop and submit program proposals to NDCEE and ESTCP.
- (U) Continue execution of replacement identification program for engines at NDCEE.
- (U) Review and develop program proposals to meet AF needs identified in AF ESOH Technical Needs Survey.
- (U) Prepare for technology transition and program execution.

(U) FY 1997
- (U) Compliance - Highly Energetic Material Program, $223,000.
- (U) Continue to review and comment on documentation to provide at completion of lab efforts.
- (U) Execute program pending full funding of effort.
- (U) Continue to review and develop program proposals to meet AF needs identified in AF ESOH Technology Needs Survey.
- (U) Prepare for technology transition and program execution.
- (U) Remediation - SCAPS, $148,000.
- (U) Continue to manage ARPA program.
- (U) Inform AF users of availability of services and capabilities.
- (U) Represent AF at Tri-Service meetings.
- (U) RF Heating; work a full scale solvent remediation systems at realistic depths.
- (U) RF Heating; work a full scale solvent remediation systems at realistic depths.
- (U) Pollution Prevention $368,000.
- (U) Define scope and effort involved in supporting AF effort to reduce the use of EPA 17, NESHAPS and other HAZMATS.
- (U) Develop and submit program proposals for DOD Environmental initiatives (funding sources).
- (U) Continue execution of material/process substitution program for engines at NDCEE.
- (U) Review and develop program proposals to meet AF needs identified in AF ESOH Technical Needs Survey.
- (U) Prepare for technology transition and program execution.
- (U) Define scope and effort involved in supporting AF effort to reduce the use of ODCs and HAZMATS.
- (U) Develop and submit program proposals for DOD Environmental initiatives (funding sources).
- (U) Continue execution of material/process substitution program for engines at NDCEE.
- (U) Review and develop program proposals to meet AF needs identified in AF ESOH Technical Needs Survey.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |
| | PROJECT<br>3788 |

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 752 | 665 | 665 | 743 | Cont |
| (U) Appropriated Value | 752 | 665 | | | |
| (U) Adjustments to Budget Years Since FY 95 PB | | | (3) | (4) | |
| (U) Adjustments to Appropriated Value | | | | | |
| (U) Current Budget Submit/President's Budget | 752 | 665 | 662 | 739 | Cont |

(U) Change Summary Explanation:

Funding: FY 96 and FY 97 programs adjusted for inflation.

Schedule: Not Applicable.

Technical: Not Applicable.

(U) C. **Other Program Funding Summary ($ in Thousands):** Not Applicable.

(U) D. **Schedule Profile:** Not Applicable.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604708F Civil, Fire, Environment & Shelter Engrg |
| | PROJECT<br>3788 |

(U) A. Project Cost Breakdown ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Compliance | 162 | 200 | 200 | 223 |
| (U) Site Remediation | 120 | 132 | 130 | 148 |
| (U) Site Characterization and Analysis Penetrometer System | 220 | | | |
| (U) Pollution Prevention | 250 | 333 | 332 | 368 |
| (U) Total | 752 | 665 | 662 | 739 |

(U) B. Budget Acquisition History and Planning Information ($ in Thousands): Not Applicable.

(U) C. Funding Profile ($ in Thousands): Not Applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604727F Joint Standoff Weapons

PROJECT NO.: 1000

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 23,143 | 54,304 | 44,025 | 19,562 | 11,961 | 10,374 | 8,595 | 0 | 0 | 177,376 |

(U) A. Mission Description and Budget Item

The Joint Standoff Weapon (JSOW) is an air-to-ground weapon designed to attack a variety of targets during day, night, and adverse weather conditions. JSOW will enhance aircraft survivability as compared to current interdiction weapon systems by providing the capability for launch aircraft to standoff outside the range of point defenses. The JSOW launch-and-leave capability will allow several target kills per aircraft sortie. The program provides for development and test of a dispenser design for the JSOW/BLU-108 variant which employs a BLU-108/B submunition payload. Integration of the JSOW Baseline weapon (BLU-97 Combined Effects Munition variant) and the JSOW/BLU-108 with the F-16C/D aircraft is also included. Future integration is planned with the B-1B and the F-15E. The RDT&E Research Category/Budget Activity is Engineering and Manufacturing Development because the June 1992 JSOW Acquisition Decision Memorandum directs the services to begin development of the JSOW/BLU-108 variant to support an Engineering and Manufacturing Development decision.

FY 1994 Accomplishments ($ in Thousands):

- Define aircraft/weapons environment ($2,800)
- Conduct simulations and continue wind tunnel testing ($700)
- Conduct System Design Review ($2,400)
- Conduct test planning and conduct flight certification for F-16 ($3,100)
- Design dispensing system, define mission planning and operational flight program requirements ($7,433)
- Demonstrate dispenser design and weapon pattern ($5,800)
- Complete Cost and Operational Effectiveness Analysis ($910)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #5 Engineering and Manufacturing Development | PE NUMBER AND TITLE: # 0604727F Joint Standoff Weapons — PROJECT NO.: 1000 |

(U) A. Mission Description and Budget Item Justification (continued)

FY 1995 Plans ($ in Thousands):

- Plan, design and produce test vehicles ($10,168)
- Plan, design and initiate flight testing ($932)
- Start development of the Operational Flight Program (OFP) tape and program office flight test support for F-16 ($8,900)
- Design, develop, and test Air Force Mission Support System (AFMSS) module; perform ILS tasks; participate in Critical Design Review (CDR) ($13,376)
- Engineering support, program office support ($4,804)
- Plan, design and produce MIL-STD-1760 carriage store ($5,000)
- Design BLU-108 dispenser; perform weapon pattern optimization; conduct Preliminary Design Review ($11,124)

FY 1996 Plans ($ in Thousands):

- Plan, design and produce test vehicles ($16,459)
- Plan, design and conduct flight testing ($5,521)
- Finish development of the OFP tape for F-16 ($500)
- Design, develop, and test AFMSS module; perform ILS tasks ($3,048)
- Engineering support, program office support ($7,567)
- Conduct JSOW/BLU-108 CDR; plan, design and conduct flight testing to qualify the BLU-108 dispenser ($10,930)

FY 1997 Plans ($ in Thousands):

- Plan, design and produce Initial Operational Test & Evaluation (IOT&E) test vehicles ($4,449)
- Plan and conduct Developmental Test & Evaluation flight testing ($6,978)
- Program office support and other direct cites ($2,943)
- Plan, design and conduct flight testing to qualify BLU-108 dispenser ($4,913)
- Perform Integrated Logistics Support (ILS) tasks ($279)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604727F Joint Standoff Weapons

PROJECT NO.: 1000

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 24,614 | 48,966 | 44,251 | 9,662 | 174,021 |
| Appropriated Value | 24,614 | 55,966 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | -247 | -611 | | | |
| b. Below Threshold Reprogramming | -944 | | | | |
| c. SBIR | -280 | -1051 | | | |
| d. Adjustments to Budget Years Since FY95 PB | | | -226 | 9,900 | |
| Current Budget Submit/President's Budget | 23,143 | 54,304 | 44,025 | 19,562 | 177,376 |

Change Summary Explanation:

Funding: FY 95 funding increased for development of BRU-55 (Smart Rack) hardware and alternate interface for MIL-STD-1760A. implementation. There were reductions for FFRDC, non-FFRDC, University research, and a general travel reduction. FY96/97 reductions from inflation adjustments. FY97 increase to satisfy RDT&E requirement for BLU-108 dispenser development. JSOW restructured with added requirement for JSOW Baseline weapon and reinforced USAF commitment to the JSOW BLU-108 variant. Other changes due to refinement of cost estimate.

Schedule: Air Force Development Test & Evaluation flight testing will begin 4th quarter FY95 with Initial Operational Test & Evaluation beginning 2nd quarter. Air Force will procure its first JSOW Baseline units 2nd year of Low Rate Initial Procurement (1st quarter 1998). Air Force procurement of JSOW/BLU-108 units deferred until FY02.

Technical: Aircraft integration, Air Force Mission Support System tasks, Air Force Integrated Logistics Support tasks, and environmental work to qualify the missile for the Air Force aircraft are common for the JSOW Baseline and JSOW/BLU-108 variants because of their physical similarities.

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Total Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Weapon Procurement, AF | 0 | 0 | 0 | 0 | 8,453 | 13,074 | 12,470 | 20,083 | TBD | TBD |
| Related RDT&E | | | | | | | | | | |
| SEEK EAGLE | | | | 12,065 | 14,489 | | 3,671 | | | |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | # 0604727F Joint Standoff Weapons | 1000 |

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **Acquisition Milestones** | | | | | | | | | | | | | | | | |
| JSOW/BLU-108 Pre-EMD | | | X | ---------- | ---------- | ---------- | X | | | | | | | | | |
| JSOW BLU-108 System Design Review | | | X | | | | | | | | | | | | | |
| Air Force Aircraft Integration Tasks Contract | | | | | | X | ---------- | ---------- | X | | | | | | | |
| Smart Rack Development | | | | | X | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | X |
| JSOW Baseline Critical Design Review | | | | | | | X | | | | | | | | | |
| Air Force Incorporation into Baseline Contract, JSOW/BLU-108 Dispenser Development | | | | | X | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | thru 4th Qtr FY98 | | | |
| JSOW/BLU-108 Preliminary Design Review | | | | | | | | X | | | | | | | | |
| JSOW/BLU-108 Critical Design Review | | | | | | | | | | | | X | | | | |
| JSOW Baseline Production Readiness Reviews | | | | | | | | | | | X | | | | X | |
| JSOW/BLU-108 LRIP Decision | 4th Qtr FY 99 | | | | | | | | | | | | | | | |
| JSOW/BLU-108 Milestone III | 4th Qtr FY 01 | | | | | | | | | | | | | | | |
| JSOW/BLU-108 Production Contract (AF) | 1st Qtr FY 02 | | | | | | | | | | | | | | | |
| JSOW/BLU-108 IOC (AF) | FY 03 | | | | | | | | | | | | | | | |
| **T&E Milestones** | | | | | | | | | | | | | | | | |
| Environmental Determination Test Vehicle Captive Flights | X | ---------- | ---------- | X | | | | | | | | | | | | |
| Dispenser Demonstration Tests | | | X | ------ | X | | | | | | | | | | | |
| JSOW/BLU-108 DT&E | | | | | | | | X | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | ---------- | X |
| Complete OFP Development (F-16) | | | | | | | | | | X | | | | | | |
| JSOW/BLU-108 IOT&E | | | | | | | | | | | | 2nd Qtr 97 thru 4th Qtr FY98 | | | | |
| JSOW/BLU-108 System Qualification Test | | | | | | | | | | | | 4th Qtr 97 thru 3rd Qtr FY98 | | | | |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604727F Joint Standoff Weapons

PROJECT NO.: 1000

(U) A. Program Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Primary Hardware Development | 5,338 | 12,595 | 15,515 | 2,643 |
| Ancillary Hardware Development | 210 | 122 | 135 | 139 |
| Development Support Equipment | 347 | 7,465 | 2,491 | |
| Software Development | 475 | 11,648 | 2,651 | |
| Systems Engineering | 2,860 | 15,202 | 6,741 | 4,964 |
| Training Development | | 29 | 30 | 43 |
| Technical Data | 3,678 | 442 | 3,686 | 2,519 |
| Developmental Test and Evaluation | 4,891 | 946 | 5,212 | 3,180 |
| Operational Test and Evaluation | | | | 2,131 |
| Contractor Engineering Support | 1,758 | 1,761 | 1,704 | 1,454 |
| Government Engineering Support | 1,517 | 1,021 | 935 | 963 |
| Program Management Support/ Other Direct Cite | 2,069 | 3,073 | 4,925 | 1,526 |
| Total | 23,143 | 54,304 | 44,025 | 19,562 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: # 0604727F Joint Standoff Weapons

PROJECT NO.: 1000

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Texas Instruments | SS/CPIF | various | TBD | TBD | 3,755 | 16,533 | 32,412 | 31,408 | 13,115 | 18,425 | 115,648 |
| Lockheed | MIPR to ASC/YP | various | TBD | TBD | | | 8,900 | 500 | | | 9,400 |
| M Tech | SS/SBIR Phase 3, FP/CPIF | various | TBD | TBD | | 510 | 5,000 | | | | 5,510 |
| Textron | TBD | TBD | TBD | TBD | | 60 | 2,884 | 2,140 | 874 | | 5,958 |
| Support and Management Organizations | | | | | | | | | | | |
| China Lake NWC | MIPR | various | TBD | TBD | 52 | 850 | 1,021 | 935 | 963 | 3,067 | 6,888 |
| Miscellaneous | Misc | various | TBD | TBD | 1,573 | 3,981 | 3,866 | 6,629 | 1,979 | 9,438 | 27,466 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| AFDTC, Eglin AFB | PO | various | TBD | TBD | 32 | 1,209 | 221 | 2,413 | 2,631 | | 6,506 |
| **Grand Total** | | | | | 5,412 | 23,143 | 54,304 | 44,025 | 19,562 | 30,930 | 177,376 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604735F Combat Training Ranges (CTR)

PROJECT NO.: 2286

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Combat Training Ranges/2286 | 15,846 | 13,682 | 10,418 | 16,098 | 24,020 | 14,085 | 14,505 | 14,935 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

The Combat Training Ranges (CTR) Program directly contributes to the effectiveness and survivability of US combat forces by developing range instrumentation and training systems to increase the effectiveness of the training spectrum from individual aircrew skill training to large-scale exercises. Develops the electronic, telecommunications, and instrumentation equipment/systems for the operational test and training ranges worldwide. These systems provide real-time monitoring and control of aircrew air-to-air, air-to-ground, and electronic warfare training along with the ability to record events for crew debriefing and analysis. The primary developmental effort is the Nellis Air Combat Training System (NACTS) at Nellis AFB. NACTS is a Global Positioning System (GPS) based system to replace the current Red Flag Measurement and Debriefing System (RFMDS) increasing to 100 the number of instrumented participants, improving aircraft position tracking accuracy, expanding range coverage, multiplying weapons simulations and adding electronic warfare threat/aircrew interaction. The development effort involves software development to increase the number of high activity players as well as the integration and test of the training system comprised of ground equipment and aircraft pods purchased by procurement funding. NACTS will be compatible with advanced avionics equipment being integrated throughout the Armed Services and the Distributed Interactive Simulation (DIS), as a minimum, at the system level. This project also provides the capability to evaluate effectiveness of aircrew tactics and countermeasures operating against hostile electronic combat threats. Other continuing efforts support interoperability of Air Force instrumented ranges with other services and System Program Office (SPO) basic operating support.

The AF has also joined the Navy-led Joint Tactical Combat Training System (JTCTS) development effort for the next generation of range upgrades for all AF ranges. This is a change from the earlier planned Joint Air Combat Training System (JACTS) program and was a result of the FY94 SASC directed review by OSD of the AF range modernization program. JTCTS is a GPS based system able to track aircraft, surface vessels, and submarines. Future effort will incorporate ground participants as well. Procurement funding will be used for ground equipment and aircraft pods. Contract award 2 QTR FY95. AF first article delivery scheduled for FY99 to the Yukon range. The acquisition strategy is competitive, cost plus contracts.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604735F Combat Training Ranges (CTR)

PROJECT NO.: 2286

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Combat Training Ranges/2286 | 15,846 | 13,682 | 10,418 | 16,098 | 24,020 | 14,085 | 14,505 | 14,935 | Cont | TBD |

(U) FY 1994

- (U) Continued CTR basic operating support, system software acquisition, and systems engineering support ($2.8M)
- (U) Continued to develop (with Navy) interoperability improvements and aircraft interface with range instrumentation pods and software upgrades ($2.4M)
- (U) Continued development of Advanced Message Oriented Data Security Module (AMODSM) ($0.5M)
- (U) Begin Engineering Manufacturing and Development (EMD) of the Nellis Air Combat Training System (NACTS) ($9.9M)
  - -- (U) Design/analysis of system requirements and allocation to the subsystem level (NSP)
  - -- (U) Software design/development (NSP)
  - -- (U) Develop interface for existing government weapon simulations (NSP)
  - -- (U) Site surveys (NSP)
  - -- (U) Redesign of Government Furnished Equipment and software (NSP)
  - -- (U) Design activities related to aircraft interface (NSP)
  - -- (U) Initiate development of prototype pod (NSP)
- (U) Demodification Bomber Airborne Instrumentation System (BAIS) aircraft (Program canceled by user) ($0.2M)

(U) FY 1995

- (U) Continue CTR basic operating support, system software acquisition, and systems engineering support ($2.9M)
- (U) Continue of EMD of NACTS ($8.5M)
  - -- (U) Conduct software design and development through Preliminary Design Review (PDR) (NSP)
  - -- (U) Develop and test prototype pod (NSP)
  - -- (U) Initiate support equipment development (NSP)
  - -- (U) Finalize hardware design (NSP)
  - -- (U) Initiate the unit level hardware/software testing (NSP)
- (U) Continue interoperability improvements with Navy and development of aircraft interface with range instrumentation pods and software upgrades ($2.0M)
- (U) Other technical support ($0.2M)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604735F Combat Training Ranges (CTR)

PROJECT NO.: 2286

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Combat Training Ranges/2286 | 15,846 | 13,682 | 10,418 | 16,098 | 24,020 | 14,085 | 14,505 | 14,935 | Cont | TBD |

(U) FY 1996
- (U) Continue CTR basic operating support, system software acquisition, and systems engineering support ($3.2M)
- (U) Continue Engineering Manufacturing and Development (EMD) of the Nellis Air Combat Training System (NACTS) ($6.0M)
  - -- (U) Continue NACTS software design through Critical Design Review and incorporate into hardware (NSP)
  - -- (U) Continue prototype pod flight test development program (NSP)
  - -- (U) Finalize support equipment design (NSP)
  - -- (U) Initiate hardware qualification tests (NSP)
  - -- (U) Initiate SEEK EAGLE certifications program (NSP)
  - -- (U) Initiate software qualification testing (NSP)
- (U) Continue interoperability improvements with the Navy and development of aircraft interface with range instrumentation pods and software upgrades ($0.1M)
- (U) Continue Advanced Message Oriented Data Security Module (AMODSM) development with the Navy ($1.0M)
- (U) Begin participation in Joint Tactical Combat Training System (JTCTS) - AF unique requirements ($0.1M)

(U) FY 1997
- (U) Continue CTR basic operating support, system software acquisition, and systems engineering support ($3.5M)
- (U) Complete EMD of NACTS ($12.1M)
  - -- (U) Finalize NACTS software design (NSP)
  - -- (U) Complete EMD design and development activities (NSP)
  - -- (U) Complete hardware and software qualification testing (NSP)
  - -- (U) Complete prototype flight testing and continue SEEK EAGLE as required (NSP)
  - -- (U) Finalize weapons simulation development efforts and aircraft interface activities (NSP)
- (U) Continue interoperability improvements with the Navy and aircraft interface with range instrumentation pods and software upgrades ($0.2M)
- (U) Continue support for JTCTS ($0.3M)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604735F Combat Training Ranges (CTR)

PROJECT NO.: 2286

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 15,714 | 18,301 | 22,171 | 15,080 | TBD |
| Appropriated Value | 15,714 | 18,301 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -268 | -4,354 | | | |
| b. Below Threshold Reprogramming (BTR) | 400 | | | | |
| c. Small Business Innovative Research (SBIR) | | -265* | | | |
| d. Adjustment to Budget Years Since FY95 Budget | | | -11,753 | 1,018 | |
| Current Budget Submit/President's Budget | 15,846 | 13,682 | 10,418 | 16,098 | TBD |

* SBIR adjustments not reflected in ABIDES database.

Change Summary Explanation:

Funding: Rephased program in FY96 as a result of the Nellis delay due to the OSD review. Result was a year delay in the AF participation in Joint Tactical Combat Training System (JTCTS) and no funding for Software Interoperability. FY97 JTCTS shortfall effort to be funded from within Combat Training Ranges procurement funding.

Schedule: Nellis Air Combat Training System (NACTS)/Nellis Upgrade delayed one year due to SASC directed OSD review of Air Force range improvement program. OSD authorized release of Nellis Upgrade request for proposal 3 Jun 94.

Technical: On 9 Sep 94 OSD Review directed the services to participate in a joint combat training system using the Navy's TCTS architecture. This program will incorporate mobile at-sea, fixed land-based and transportable requirements. Initial schedule is for the AF IOC at Yukon in FY99. There is no unnecessary duplication of effort in the Air Force or the Department of Defense.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604735F Combat Training Ranges (CTR)

PROJECT NO.: 2286

(U) C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| PE 27429F: Appropriation: Other Procurement, AF, Budget Activity: OPAF/Electronics & Telecommunications Equipment, Program Title: Combat Training Ranges | 23,903 | 11,607 | 2,079 | 31,832 | 20,094 | 21,447 | 21,581 | 22,232 | N/A | Cont |
| PE 27429F: Appropriation: Aircraft Procurement, AF, Budget Activity: A/C Procurement/Other Production Charges, Program Title: Combat Training Ranges | 8,115 | 26,406 | 3,795 | 29,354 | 17,096 | 17,794 | 18,329 | 18,880 | N/A | Cont |

(U) D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **Nellis Air Combat Training System (NACTS)** | | | | | | | | | | | | | | | | |
| Request for Proposal Release | | | X | | | | | | | | | | | | | |
| Contract Award | | | | | | X | | | | | | | | | | |
| Preliminary Design Review* | | | | | | | | X | | | | | | | | |
| Phase 1 Ground Equipment Production Review | | | | | | | | X | | | | | | | | |
| Critical Design Review* | | | | | | | | | | | | X | | | | |
| Phase 2 Ground Equipment Production Review | | | | | | | | | | | | X | | | | |
| Aircraft Pod Production Readiness Review* | | | | | | | | | | | | | | | X | |

*Program schedule milestones will be submitted by prime contractor under an integrated master plan/schedule.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: #0604735F Combat Training Ranges (CTR)

PROJECT NO.: 2286

(U) D. Schedule Profile Continued

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **Joint Tactical Combat Training System (JTCTS)** | | | | | | | | | | | | | | | | |
| Contract Award | | | | | | X | | | | | | | | | | |
| PDR | | | | | | | | X | | | | | | | | |
| Phased CDR | | | | | | | | | X* | | | X** | | | | |
| Development Test/Operational Test | | | | | | | | | | | | | | X* | | |
| IOC (1999) | | | | | | | | | | | | | | | | |
| **Software Interoperability** | | | | | | | | | | | | | | | | |
| Yearly Block 5 Upgrade | | | | | | | X | | | | | | | | | |
| Yearly Block 6 Upgrade | | | | | | | | | X | | | | | | | |
| Yearly Block 7 Upgrade | | | | | | | | | | | | | | X | | |
| **Advanced Message Oriented Data Security Module (AMODSM)** | | | | | | | | | | | | | | | | |
| RFP Release | | | | | X | | | | | | | | | | | |
| Contract Award | | | | | | | X | | | | | | | | | |
| Deliver Engineering Development Models (EDMs) | | | | | | | | | | | | | | X | | |
| Production (1998) | | | | | | | | | | | | | | | | |
| **Bomber Airborne Instrumentation System (BAIS)** | | | | | | | | | | | | | | | | |
| PRR | X | | | | | | | | | | | | | | | |
| Functional Configuration Audit/ Physical Configuration Audit | X | | | | | | | | | | | | | | | |
| Production Decision - Program Canceled | X | | | | | | | | | | | | | | | |

Note: X* = Milestone Beginning X** = Milestone Completion

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604740F, Computer Resource Technology Transition

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost* | 13,672 | 20,620 | 2,166 | 2,048 | 2,177 | 2,240 | 2,414 | 2,593 | Cont | TBD |
| 2522, Advanced Computer Tech Transistion | 2,662 | 8,259 | 1,458 | 1,353 | 1,412 | 1,409 | 1,558 | 1,712 | Cont | TBD |
| 2523, Architectual Implementation | 1,918 | 1,392 | 708 | 695 | 765 | 831 | 856 | 881 | Cont | TBD |
| 2524, Reuse and Component Support | 6,652 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Cont | CTBD |
| 3315, Digital Info Technology Transition | 2,440 | 2,469 | ** | ** | ** | ** | ** | ** | Cont | TBD |

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: Specifically, the Computer Resource Technology Transition (CRTT) program addresses problems of acquiring, developing, and supporting emerging computer resources. The goal of this program is to reduce software lifecycle costs and to improve the quality of computer systems development and support. This is the only Air Force program for transitioning software technology across the board into the USAF (rather than into a specific acquisition program). The program consists of five major projects. Project 2522 will establish the foundational elements of an effective methodology to support technology transition efforts program-wide and will provide for implementation of technology receptor groups and development of methodology to support transitioned capability. Project 2523 will initially address a particular instantiation, namely command and control architectures, of reusable technology which are available or can be developed in the near term. Project 2524 is a Congressional special interest item and will address the technologies/processes inherent in operating and maintaining a domain central repository of software, software algorithms, and reusable technologies. Project 3315 will provide a totally integrated capability to create, accept, retrieve and store digital (paperless) technical information for life cycle support for Air Force logistics. All projects are now in actual development.

***FY95 includes $8.5M for the Integrated Data System which will be budgeted & executed in a new PE 63108F, Integrated Data System.**

****Funds were transferred into PE 0708611F starting in FY96 from PE 060740F**

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: **5 Engineering and Manufacturing Development**

PE NUMBER AND TITLE: **060740F, Computer Resource Technology Transistion**

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 13,831 | 6,621 | 6,760 | 6,613 | TBD |
| Appropriated Value | 14,137 | 21,121 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -306 | -266 | | | |
| b. SBIR | -159 | -235 | | | |
| Current Budget Submit/President's Budget | 13,672 | 20,620 | 2,166 | 2,048 | TBD |

Change Summary Explanation:

Funding: FY95 & FY96 increases to fund Congressional special interest programs
Air Force reduced FY96 and beyond to fund other higher priority items

Schedule: Project start-ups delayed until funds are available

Technical: None

C. Other Program Funding Summary ($ in Thousands)

Not Applicable

D. Schedule Profile

Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 060740F, Computer Resource Technology Transistion

PROJECT NO.: 2522

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Advanced Computer Technology Transistion | 2,662 | 8,259 | 1,458 | 1,353 | 1,412 | 1,409 | 1,558 | 1,712 | Cont | TBD |

A. Mission Description and Budget Item Justification

(U):Project 2522, Advanced Computer Technology Transistion: Develop, through interaction with AF MAJCOMs, tools and technologies for improving the software development environment and processes and accelerating transition of software technology to the users. Emphasis will be placed on identifying software technology items which provide the best return on investment and setting up receptor groups at the user organizations that support transition and productization.

(U) FY 1994 Accomplishments:

- (U) - Continued to develop technology transition infrastructure within the Air Force (1,112K).
- (U) - Continued funding JLC activities in software re engineering and modernization of obsolescent, expensive software (300K).
- (U) - Transitioned technology transition management courses to AF users (100K).
- (U) - Continued transitioning software process improvement methods into Air Force software Central Design Activities (CDAs) (150K).
- (U) - Began development and implementation of Air Force-wide metrics repository (1,000K).

(U) FY 1995 Plans:

- (U) - Continue to develop technology transition infrastructure within the Air Force (3,059K).
- (U) - Continue funding JLC activities in software re engineering and modernization of obsolescent, expensive software (300K).
- (U) - Complete development and continue to implement Air Force-wide metrics repository (950K).
- (U) - Continue implementation of software reuse (3,950K)
- (U) - Transfer funds for Congressional special interest program located in PE 0603108F (8,500K)

(U) FY 1996 Plans:

- (U) - Continue to develop technology transition infrastructure within the Air Force (396K).
- (U) - Continue funding JLC activities in software re engineering and modernization of obsolescent, expensive software (155K).
- (U) - Transition technology tools and methods to Air Force users (753K)
- (U) - Continue to implement Air Force-wide metrics repository (154K).

(U) FY 1997 Plans:

- (U) - Continue to develop technology transition infrastructure within the Air Force (396K).
- (U) - Continue funding JLC activities in software re engineering and modernization of obsolescent, expensive software (155K).
- (U) - Transition technology tools and methods to Air Force users (648K)
- (U) - Continue to implement Air Force-wide metrics repository (154K).

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 060740F, Computer Resource Technology Transistion

PROJECT NO.: 2522

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,702 | 2,625 | 2,770 | 2,707 | TBD |
| Appropriated Value | 2,702 | 16,959 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -40 | -100 | | | |
| b. SBIR | | -100 | | | |
| c. Realignment | | -8,500 | | | |
| Current Budget Submit/President's Budget | 2,662 | 8,2559 | 1,458 | 1,353 | TBD |

Change Summary Explanation:

Funding: FY96 increase to fund Congressional special interest programs
Air Force reduced FY96 and beyond to fund other higher priority items.
$8.5M is for the Integrated Data System and will be budgeted & executed in a new PE 63108F, Integrated Data Systems

Schedule: None

Technical: None

C. Other Program Funding Summary ($ in Thousands)

Not Applicable

D. Schedule Profile

Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 060740F, Computer Resource Technology Transistion

PROJECT NO.: 2523

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2523, Architectural Implementation | 1,918 | 1,392 | 708 | 695 | 765 | 831 | 856 | 881 | Cont | TBD |

A. Mission Description and Budget Item Justification

(U) This project develops, through rapid prototyping and interaction with Air Force users, a tailorable architecture for support of command and control applications. The architecture will address the components common to most command centers (e.g., message processing, display processing, user interfaces) and will focus on the migration of multilevel computer security applications/technologies into AF operations. This project is needed to mitigate development time associated with command center acquisitions so that the system is not obsolete when delivered.

(U) FY 1994 Accomplishments:
- (U) - Defined tailorable command center architecture and continue to qualify software components (1,018K).
- (U) - Continued development of Command Center Concept of Operations (100K).
- (U) - Continued identifying multilevel security issues/solutions and STAF testing, analysis and technology transition (800K).

(U) FY 1995 Plans:
- (U) - Update tailorable command center architecture and continue to qualify software components (800K).
- (U) - Continue development of Command Center Concept of Operations (100K).
- (U) - Continue identifying multilevel security issues/solutions and STAF testing, analysis and technology transition (492K).

(U) FY 1996 Plans:
- (U) - Update tailorable command center architecture and continue to qualify software components (500K).
- (U) - Continue identifying multilevel security issues/solutions and STAF testing, analysis and technology transition (208K).

(U) FY 1997 Plans:
- (U) - Update tailorable command center architecture and continue to qualify software components (493K).
- (U) - Continue identifying multilevel security issues/solutions and STAF testing, analysis and technology transition (203K).

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 060740F, Computer Resource Technology Transistion

PROJECT NO.: 2523

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,955 | 1,493 | 1,424 | 1,395 | TBD |
| Appropriated Value | 1,955 | 1,493 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General reduction | -37 | -66 | | | |
| b. SBIR | | -35 | | | |
| Current Budget Submit/President's Budget | 1,918 | 1,392 | 708 | 695 | TBD |

Change Summary Explanation:

Funding: Air Force reduced FY96 and beyond to fund other higher priority items.

Schedule: None

Technical: None

C. Other Program Funding Summary ($ in Thousands)

Not Applicable

D. Schedule Profile

Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 060740F, Computer Resource Technology Transistion

PROJECT NO.: 2524

| COST ($ In Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2524, Reuse and Reusable Component Support | 6,652 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Cont | TBD |

A. Mission Description and Budget Item Justification

(U) Congress appropriated $7.0 M in FY94 for this special interest item to develop a documented knowledge for establishing software reuse libraries that support specific application domains. These libraries will support system engineers through the reuse of large scale software components. This program is needed so that the Air Force can reuse software that it has already purchased by developing a central repository of software and software algorithms. Reusing software will result in lower software development costs, faster software development schedules, and lower software development risks.

(U) FY 1994 Accomplishments:

(U) - Provide knowledge to others on establishing domain-based reuse (300K).
(U) - Supported Domain Specific Prototyping (300K).
(U) - Initial transition of blueprint to DoD (100K).
(U) - Populated command and control library with software artifacts(500K).
(U) - Continued refinement of blueprint (5,611K).

(U) FY 1995 Plans: (not applicable)

(U) FY 1996 Plans: (not applicable)

(U) FY 1997 Plans: (not applicable)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| 5 Engineering and Manufacturing Development | 060740F, Computer Resource Technology Transistion | 2524 |

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 0 | 0 | 0 | 0 | TBD |
| Appropriated Value | 7,000 | | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -189 | | | | |
| b. SBIR | -159 | | | | |
| Current Budget Submit/President's Budget | 6,652 | 0 | 0 | 0 | TBD |

Change Summary Explanation:

Funding: Congress added $7.0M in FY94 to continue development of the Central Archive for Reusable Defense Software (CARDS) program to develop a reuse blueprint for DoD and establish a reuse library.

Schedule: Project start-ups delayed until funds are available.

Technical: None

C. Other Program Funding Summary ($ in Thousands)

Not Applicable

D. Schedule Profile

Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 060740F Computer Resource Technology Transistion

PROJECT NO.: 3315

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3315, Digital Information Technology Transistion | 2,440 | 2,469 | * | * | * | * | * | * | Cont | TBD |

A. Mission Description and Budget Item Justification

(U) DOD Defense Guidance and Office of the Secretary of Defense (OSD) funding initiatives have emphasized the need to improve the preparation, delivery, use and updating of digital technical information used in the design, manufacture, maintenance, and operation of DOD weapon systems. This project is needed to transition from a paper-intensive weapon system acquisition and support process to a largely automated and integrated mode of operations. This will allow the Air Force to create data once and use it many times.

(U) FY 1994 Accomplishments:

(U) - Continued to manage the development and implementation of an AF digital product data infrastructure (1,195K).

(U) - Planned for AF CPO participation in CALS EXPO 94 (85K), (2nd - 4th Qtr).

(U) - Developed test cases for AF infrastructure to implement CALS (485K), (2nd - 4th Qtr).

(U) - Developed and coordinated digital data strategy (450K), (2nd - 4th Qtr).

(U) - Transitioned Air Force CALS Strategic Plan/Roadmap into electronic document (225K).

(U) FY 1995 Plans:

(U) - Continue to manage the development and implementation of the Air Force digital product data infrastructure (1,410K).

(U) - Manage the deployment of digital technical and engineering product data systems such as Joint Computer-aided Acquistion and Logistics Support (JCALS) and Joint Engineering Data Management and Information Control System (JEDMICS) (760K), (1st Qtr).

(U) - Plan and implement the conversion of AF legacy data for use by future systems such as JCALS and JEDMICS (70K), (3rd Qtr).

(U) - Coordinate transition from AF legacy data systems to digital technical and engineering product data systems such as JCALS and JEDMICS (109K), (3rd Qtr).

(U) - Develop and present CALS orientation materials and instruction to AF users of digital product data systems such as JCALS and JEDMICS (120K), (1st Qtr).

***Funds were transferred into PE 0708611F starting in FY96 from PE 060740F**

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 060740F, Computer Resource Technology Transistion

PROJECT NO.: 3315

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 2,480 | 2,669 | 2,566 | 2,511 | TBD |
| Appropriated Value | 2,480 | 2,669 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reduction | -40 | -100 | | | |
| b. SBIR | | -100 | | | |
| Current Budget Submit/President's Budget | 2,440 | 2,469 | * | * | TBD |

Change Summary Explanation:

Funding: During the last RDT&E review the Air Force reduced FY96 and beyond monies by half to fund other high priority items.

*Funds were transferred into PE 0708611F starting in FY96 from PE 060740F

Schedule: Implementation delayed by funding cut.

Technical: None

C. Other Program Funding Summary ($ in Thousands)

Not Applicable

D. Schedule Profile

Not Applicable

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604750F Intelligence Equipment

PROJECT: 2053

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2053 National Air Intel Center | 2,753 | 2,554 | 1,294 | 1,268 | 1,341 | 1,401 | 1,484 | 1,476 | Continuing | TBD |

**(U) A. Mission Description and Budget Item Justification**

(U) This project provides continuing development and upgrade of National Air Intelligence Center (NAIC) (formerly FASTC) threat analysis capabilities through development/integration of Analysis System Software and through refinement/improvement of Analysis Methodologies and Individual Analysis Tools. NAIC is tasked with providing detailed foreign technology intelligence information to a variety of both DOD and Non DOD customers. In the past few years, customer's requirements have been more sophisticated, dictating more detailed and timely intelligence not only in the technology regime but also in the economic, world crisis, and political arenas. The Rome Laboratory must develop new intelligence analysis technology to provide the capability to NAIC dictated by world events. This program is in Engineering and Manufacturing Development.

(U) FY 1994

- (U) Completed Communications Network Model Full Operational Capability. ($70)
- (U) Completed Low Observable Design Synthesis Tool. ($90)
- (U) Completed Expert Tutor. ($450)
- (U) Continued Model Synthesis Interface. ($250)
- (U) Continued RF Weapons Modeling. ($870)
- (U) Continued Flexible IF Signature Techniques - FIST. ($643)
- (U) Initiated Man-In-The-Loop Engagement Simulation. ($380)

(U) FY 1995

- (U) Continue Model Synthesis Interface. ($330)
- (U) Complete RF Weapons Modeling. ($250)
- (U) Continue Flexible IR Signature Techniques - FIST. ($540)
- (U) Continue Air Surveillance C3. ($500)
- (U) Continue Man-In-The-Loop Engagement Simulation. ($250)
- (U) Initiate Electronic Counter Measures (ECM) Reference Model. ($564)
- (U) Complete Threat Assessment Support Equipment (TASE) Verification. ($120)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE: 0604750F Intelligence Equipment / PROJECT: 2053 |

(U) FY 1996
- (U) Continue Model Synthesis Interface. ($500)
- (U) Complete flexible IR Signature Techniques - FIT. ($130)
- (U) Complete Air Surveillance C3. ($325)
- (U) Complete Man-In-The-Loop Engagement Simulation. ($294)
- (U) Complete ECM Reference Model. ($45)

(U) FY 1997
- (U) Continue Model Synthesis Interface. ($680)
- (U) Complete Electromagnetic Antenna Modeling. ($214)
- (U) Initiate Automated Electro-Optic Tools. ($190)
- (U) Initiate IPIDS/Reference threat Packages. ($184)

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 2,859 | 2,633 | 2,650 | 2,574 | TBD |
| (U) Appropriated Value | 2,859 | 2,633 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | -54 | -30 | | | |
| b. Below Threshold Reprogramming | -52 | | | | |
| c. SBIR | | -49 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -1,356 | -1,306 | |
| (U) Current Budget Submit/President's Budget | 2,753 | 2,554 | 1,294 | 1,268 | TBD |

(U) Change Summary Explanation:
Funding: Planned activities for FY96 cannot be started until FY98.
Schedule:
Technical:

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604750F Intelligence Equipment<br>PROJECT 2053 |

**(U) C. Other Program Funding Summary ($ in Thousands)**

(U) Not Applicable

**(U) D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Communications Network Model Full Operational Capability | | | X | | | | | | | | | | | | | |
| (U) Complete Low Observable Design Synthesis Tool | | | | X | | | | | | | | | | | | |
| (U) Complete Expert Tutor | | | | X | | | | | | | | | | | | |
| (U) Complete Model Synthesis Interface | | X | | | | | | | | | | | | | | |
| (U) Complete RF Weapons Modeling | | | | | | X | | | | | | | | | | |
| (U) Complete Flexible IR Signature Techniques | | | | | | | | | | X | | | | | | |
| (U) Initiate Air Surveillance C3 | | | X | | | | | | | | | | | | | |
| (U) Complete Air Surveillance C3 | | | | | | | | | X | | | | | | | |
| (U) Begin Man-In-The-Loop Engagement Simulation | | X | | | | | | | | | | | | | | |
| (U) Complete Man-In-The-Loop Engagement Simulation | | | | | | | | | | X | | | | | | |
| (U) Begin ECM Reference Model | | | | | X | | | | | | | | | | | |
| (U) Complete ECM Reference Model | | | | | | | | | | X | | | | | | |
| (U) Begin TASE Verification | | | | | X | | | | | | | | | | | |
| (U) Complete TASE Verification | | | | | | | | X | | | | | | | | |
| (U) Begin Electomagnetic Antenna Modeling | | | | | | | | | | | | | X | | | |
| (U) Complete Electromagnetic Antenna Modeling | | | | | | | | | | | | | | | | X |
| (U) Begin Automated Electro-Optic Tools | | | | | | | | | | | | | | | | X |
| (U) Begin IPIDS/Reference Threat Packages | | | | | | | | | | | | | | | | X |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604750F Intelligence Equipment | PROJECT<br>2053 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Communications Network Model Fully Operational Capability (FOC) | $70 | | | |
| (U) Low Observable Design Synthesis Tool | $90 | | | |
| (U) Expert Tutor | $450 | | | |
| (U) Model Synthesis Interface | $250 | $330 | $500 | $680 |
| (U) RF Weapons Modeling | $870 | $250 | | |
| (U) Flexible IR Signatures Techniques | $643 | $540 | $130 | |
| (U) Air Surveillance C3 | $0 | $500 | $325 | |
| (U) Man-In-The-Loop Engagement Simulation | $380 | $250 | $294 | |
| (U) EMCM Reference Model | | $564 | $45 | |
| (U) TASE Verification | | $120 | | |
| (U) Electromagnetic Antenna Modeling | | | | $214 |
| (U) Automated Electro-Optics Tools | | | | $190 |
| (U) IPIDS/Reference Treat Packages | | | | $184 |
| (U) Total | $2,753 | $2,554 | $1,294 | $1,268 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604750F Intelligence Equipment

PROJECT: 2053

(U) B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| (U) Rome Laboratory | | | | | | 462 | 317 | 238 | 213 | Cont | TBD |
| Adroit Systems | 93-C-098 | 6 Sep 91 | 705 | 705 | 694 | 11 | | | | | 705 |
| McDonnel Doug | 92-C-0015 | 6 Jan 92 | 741 | 741 | 705 | 36 | | | | | 741 |
| Gen Rsch Corp | 91-D-0042 | 3 Aug 93 | 642 | 642 | 276 | 366 | | | | | 642 |
| Gen Rsch Corp | 93-C-0261 | 30 Sep 93 | 2256 | 2256 | 55 | 197 | 286 | 472 | 655 | 591 | 2256 |
| Rockwell | | 1 Apr 93 | 1511 | 1511 | 495 | 797 | 219 | | | | 1511 |
| Photon Rsch | 93-C-0182 | 30 Sep 93 | 1182 | 1182 | 2 | 584 | 482 | 114 | | | 1182 |
| Gen Rsch Corp | 93-C-0261 | 24 Apr 93 | 770 | 770 | 0 | 300 | 200 | 270 | | | 770 |
| Contractor TBD | | | | | | | 1050 | 200 | 400 | Cont | TBD |
| Total Project | | | | | | 2,753 | 2,554 | 1,264 | 1,268 | Cont | TBD |

**Government Furnished Property:**

(U) Not Applicable

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Subtotal Product Development | | | | | | 2,753 | 2,554 | 1,294 | 1,268 | Cont | TBD |
| Subtotal Support and Management | | | | | | | | | | | |
| Subtotal Test and Evaluation | | | | | | | | | | | |
| Total Project | | | | | | 2,753 | 2,554 | 1,294 | 1,268 | Cont | TBD |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE: 0604754F Jt Tac Info Dist Sys — PROJECT: P771 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| P771 JTIDS | 13,066 | 10,978 | 10,146 | 9,594 | 9,763 | 9,983 | 10,401 | 10,829 | 41,194 | 265,814 |

(U) A. **Mission Description and Budget Item Justification**

JTIDS Budget Activity, Engineering and Manufacturing Development effort provide Army, Navy, Air Force, and Marine Theater Command and Control (C2) elements with a secure, jam-resistant, high capacity data link communications system for use in a tactical combat environment. The Joint Tactical Information Distribution System (JTIDS) family of terminals (Class 2 and 2H for the Air Force, Navy and Marine Corps; and 2M for Army) is a joint development program which employs Time Division Multiple Access (TDMA), and spread spectrum techniques. JTIDS will permit rapid and secure exchange of essential command control, and status information among all terminals in the tactical theater. Host platform (i.e. E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE) program and budget for JTIDS production terminals.

(U) FY 1994
- (U) Development Planning and Execution. ($6,400)
  - -- (U) Continue terminal hardware/software updates, including converting from a propietary Central Processing Unit (CPU) to a commercial off the shelf processor.
  - -- (U) Continue system integration and software development for E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE platforms.
- (U) Production Planning and Execution. ($500)
  - -- (U) Prepare MS III Defense Acquisition Board (DAB) materials and procurement package for contract award.
- (U) Logistics. ($2,166)
  - -- (U) Continue efforts to establish Interface Software Support Activity (ISSA).
  - -- (U) Provided pre-operational support to terminal assets pending platform initial operational capability.
- (U) Test/Demonstrations ($700)
  - -- (U) Verify Material Improvement Program (MIP) corrections and support E-8, ABCCC, and MCE development efforts.
  - -- (U) Support Air Force host platform participation in joint exercises in Ballistic Missile Defense demonstrations.
- (U) Integration/Interoperability. ($3,300)
  - -- (U) Continue to provide support and on-site Enhanced JTIDS System Exerciser (EJSE) operators for host platform developers and integrators.
  - -- (U) Continue Affordability/Manufacturing Technology Demonstration (AMTD).

(U) FY 1995
- (U) Development Planning and Execution. ($2,200)
  - -- (U) Continue system integration and software development for E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE platforms.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604754F Jt Tac Info Dist Sys |

- (U) Production Planning and Execution. ($1,500)
  - -- (U) Prepare DAB materials and procurement package for contract award.
- (U) Logistics. ($3,578)
  - -- (U) Continue efforts to establish ISSA.
  - -- (U) Continue pre-operational support to terminal assets pending platform initial operational capability.
- (U) Test/Demonstrations. ($1,600)
  - -- (U) Verify MIP corrections and support E-8, ABCCC, and MCE development efforts.
  - -- (U) Support Air Force host platform participation in joint exercises in Ballistic Missile Defense demonstrations.
- (U) Integration/Interoperability. ($2,100)
  - -- (U) Continue to provide support and on-site EJSE operators for host platform developers and integrators.
  - -- (U) Continue AMTD with bench tests at Eglin AFB.

(U) FY 1996

- (U) Development Planning and Execution. ($2,200)
  - -- (U) Continue system integration and software development for E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE platforms.
- (U) Production Planning and Execution. ($1,300)
  - -- (U) Review and establish second sources for obsolete parts and vanishing vendors.
  - -- (U) Engineering change activities associated with produceability and functional performance.
- (U) Logistics. ($2,246)
  - -- (U) Continue efforts to establish ISSA.
  - -- (U) Continue pre-operational support to terminal assets pending platform initial operational capability.
- (U) Test/Demonstrations. ($1,900)
  - -- (U) Verify MIP corrections and support E-8, ABCCC, and MCE development efforts.
  - -- (U) Support Air Force host platform participation in joint exercises in Ballistic Missile Defense demonstrations.
- (U) Integration/Interoperability. ($2,500)
  - -- (U) Continue to provide support and on-site EJSE operators for host platform developers and integrators.
  - -- (U) Investigate the impact of changes in operational concepts on the JTIDS network design process and the resulting interoperability of member platforms of a JTIDS network.

(U) FY 1997

- (U) Development Planning and Execution. ($2,200)
  - -- (U) Continue system integration and software development for E-3, E-8, F-15, RIVET JOINT, ABCCC, MAOC, and MCE platforms.
- (U) Production Planning and Execution. ($1,700)
  - -- (U) Review and establish second sources for obsolete parts and vanishing vendors.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604754F Jt Tac Info Dist Sys<br>PROJECT<br>P771 |

-- (U) Engineering change activities associated with produceability and functional performance.

- (U) Logistics. ($2,394)
  - -- (U) Complete efforts to establish ISSA.
  - -- (U) Continue pre-operational support to terminal assets pending platform initial operational capability.
- (U) Test/Demonstrations. ($1,600)
  - -- (U) Verify MIP corrections and support E-8, ABCCC, and MCE development efforts.
  - -- (U) Support Air Force host platform participation in joint exercises in Ballistic Missile Defense demonstrations.
- (U) Integration/Interoperability. ($1,700)
  - -- (U) Continue to provide support and on-site EJSE operators for host platform developers and integrators.
  - -- (U) Continue to investigate the impact of changes in operational concepts on the JTIDS network design process and the resulting interoperability of member platforms of a JTIDS network.

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 16,113 | 11,634 | 14,198 | 13,643 | 265,814 |
| (U) Appropriated Value | 11,513 | 11,634 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | -154 | -444 | | | |
| b. Below Threshold Reprogramming | 1,838 | | | | |
| c. Small Business Innovative Research | -131 | -212 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -4,052 | -4,049 | |
| (U) Current Budget Submit/President's Budget | 13,066 | 10,978 | 10,146 | 9,594 | 265,814 |

(U) Change Summary Explanation:

Funding: FY 94 was increased for Affordability/Manufacturing Technology Demonstration (AMTD). The FY 96-00 reductions of $4 million per year, taken for higher priority Air Force requirements, delayed planned JTIDS demonstration and testing and implementation of network design.

(U) Schedule: Milestone III slipped from Feb 94 to Feb 95 due to the delay in Navy OPEVAL.

(U) Technical: None

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604754F Jt Tac Info Dist Sys

PROJECT: P771

(U) C. **Other Program Funding Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Other Proc AF, PE 27419F | 1,900 | 4,100 | 4,900 | 0 | 0 | 0 | 0 | 0 | 0 | 10,900 |
| (U) Other Proc AF, PE 27417F | 3,400 | 11,600 | 12,700 | 21,600 | 0 | 0 | 0 | 0 | 0 | 49,300 |
| (U) Other Proc AF, PE 27581F | 6,300 | 5,200 | 4,700 | 4,300 | 3,200 | 3,300 | 3,400 | 0 | 1,700 | 32,100 |
| (U) Other Proc AF, PE 27412F | 0 | 16,200 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16,200 |
| (U) Other Proc AF, PE 35154F | 0 | 0 | 1,500 | 4,800 | 3,600 | 5,100 | 5,100 | 5,200 | 0 | 25,300 |

Related RDT&E:

(U)- Program Element #27130F F-15
(U)- Program Element #64770F E-8 (Joint STARS)
(U)- Program Element #27417F, E-3 (AWACS)
(U)- Program Element #27412F Modular Control Equipment (MCE)
(U)- Program Element #27412F Modular Air Operations Center (MAOC)
(U)- Program Element #27419F Airborne Battlefield Command and Control Center (ABCCC)
(U)- Program Element #35154F DARO.

(U) D. **Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) Acquisition Milestones | | | | | | | | | | | | | | | | |
| - Milestone III FRP Class 2/2H | | | | | | X | | | | | | | | | | |
| - LRIP Decision Class 2M | | | | | | X | | | | | | | | | | |

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604754F Jt Tac Info Dist Sys

PROJECT: P771

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) T&E Milestones | | | | | | | | | | | | | | | | |
| - OT-IID | X | | | | | | | | | | | | | | | |
| - MS OT-II | | | | | | X | | | | | | | | | | |
| - F-15 OSP Complete* | | | | | | | X | | | | | | | | | |
| - MCE IOT&E | | | | | | | | | X | | | | | | | |
| - JSTARS IOT&E | | | | | | | | | | X | | | | | | |
| * Operational Special Project | | | | | | | | | | | | | | | | |
| (U) Contract Milestones | | | | | | | | | | | | | | | | |
| - LOT 5 LRIP Class 2/2H | | | | X | | | | | | | | | | | | |
| - FRP Class 2/2H | | | | | | X | | | | | | | | | | |
| - LRIP Class 2M | | | | | | | | | X | | | | | | | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604754F Jt Tac Info Dist Sys<br>PROJECT<br>P771 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Develop Planning/Execution | 6,400 | 2,200 | 2,200 | 2,200 |
| (U) Production Planning/Execution | 500 | 1,500 | 1,300 | 1,700 |
| (U) Logistics | 2,166 | 3,578 | 2,246 | 2,394 |
| (U) Integration/Interoperability | 3,300 | 2,100 | 2,500 | 1,700 |
| (U) Test/Demo | 700 | 1,600 | 1,900 | 1,600 |
| (U) Total | 13,066 | 10,978 | 10,146 | 9,594 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| GEC-MARCONI | FFP | DEC 85 | 80,727 | 80,727 | 57,312 | 1,831 | 1,027 | 0 | 507 | 10,159 | 70,836 |
| LOCKEED | FFP | JUN 93 | 3,373 | 3,373 | 2,085 | 1,288 | 0 | 0 | 0 | 0 | 3,373 |
| GEC-MARCONI | FFP | JUN 93 | 850 | 850 | 698 | 152 | 0 | 0 | 0 | 0 | 850 |
| CACD | FFP | JUN 93 | 1,072 | 1,072 | 720 | 352 | 0 | 0 | 0 | 0 | 1,072 |
| MCAIR | CPFF | MAR 94 | 2,434 | 2,434 | 0 | 2,434 | 0 | 0 | 0 | 0 | 2,434 |
| RADC | PO/616 | VARIOUS | VARIOUS | VARIOUS | 0 | 1,913 | 757 | 0 | 0 | 0 | 2,670 |
| WR-ALC | PO/616 | VARIOUS | VARIOUS | VARIOUS | 512 | 893 | 1,104 | 927 | 635 | 0 | 4,071 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604754F Jt Tac Info Dist Sys

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NADEP | MIPR | VARIOUS | VARIOUS | VARIOUS | 0 | 413 | 382 | 0 | 0 | 0 | 795 |
| ACSI | FFP | SEP 94 | 445 | 445 | 0 | 445 | 0 | 0 | 0 | 0 | 445 |
| Support and Management Organizations | | | | | | | | | | | |
| ESC | VARIOUS | VARIOUS | 26,600 | 26,600 | 15,259 | 1,131 | 1,122 | 1,388 | 1,666 | 5,785 | 26,351 |
| CONTRACTOR SUPPORT | VARIOUS | VARIOUS | 52,457 | 52,457 | 35,375 | 366 | 1,649 | 3,031 | 2,686 | 9,350 | 52,457 |
| MITRE | FPLOE | VARIOUS | 89,854 | 89,854 | 68,875 | 1,715 | 4,604 | 4,800 | 4,100 | 15,900 | 99,994 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| MT HOME AFB | PO/616 | VARIOUS | VARIOUS | VARIOUS | 0 | 83 | 333 | 0 | 0 | 0 | 416 |
| EGLIN AFB | PO/616 | VARIOUS | VARIOUS | VARIOUS | 0 | 50 | 0 | 0 | 0 | 0 | 50 |

**(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)**

**Government Furnished Property:** NOT APPLICABLE

| | | | | | | |
|---|---|---|---|---|---|---|
| Subtotal Product Development | 61,327 | 9,721 | 3,270 | 927 | 1,142 | 10,159 | 86,546 |
| Subtotal Support and Management | 119,509 | 3,212 | 7,375 | 9,219 | 8,452 | 31,035 | 178,802 |
| Subtotal Test and Evaluation | | 133 | 333 | 0 | 0 | 0 | 466 |
| Total Project | 180,836 | 13,066 | 10,978 | 10,146 | 9,594 | 41,194 | 265,814 |

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604759F Major Test And Evaluation Investment

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 47,234 | 51,056 | 37,879 | 36,229 | 39,472 | 39,580 | 40,755 | 41,963 | Continuing | TBD |
| 3120 Air Force Development Test Center | 14,142 | 15,883 | 11,546 | 10,161 | 16,317 | 17,218 | 19,675 | 17,627 | Continuing | TBD |
| 3285 Arnold Engineering Development Center | 10,020 | 10,499 | 5,522 | 6,205 | 5,305 | 3,302 | 2,921 | 4,875 | Continuing | TBD |
| 3323 Cruise Missile Mission Control Aircraft | 1,400 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Continuing | 10,600 |
| 3620 Air Force Flight Test Center | 20,678 | 24,674 | 20,811 | 19,863 | 17,850 | 19,060 | 18,159 | 19,461 | Continuing | TBD |
| 4282 Developmental Manu. & Mod Facility | 994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD | TBD |

(U) A. **Mission Description and Budget Item Justification:** This Program Element (PE) provides planning, improvements, and modernization for test capabilities at three Air Force Test Centers: Arnold Engineering Development Center (AEDC), Air Force Development Test Center (AFDTC), and Air Force Flight Test Center (AFFTC). The purpose is to help test centers keep pace with emerging weapon system technologies. The fluctuations in the funding at these locations are due to changing priorities in the improvement and modernization requirements as defined through the AF Test Investment Planning & Programming Process and documented in the AF Test Investment Strategic Plan. Also, all projects have been reviewed through the Tri-Service Reliance effort (to communicate AF efforts to the other services and avoid unwarranted duplication of effort) and are documented in the Test Capability Master Plans. Further, each specific project has its own planning, development, equipment acquisition/facility construction, equipment installation, and checkout phases which often requires significant differences in funding from one year to the next. As such, the changes in funding from year to year do not necessarily indicate program growth but rather a planned phasing of improvement and modernization efforts. (For FY 96 only 17 or 124 validated projects are funded, which reflects the mandated downsizing of the DoD budget, not a change in requirements.) The test capabilities at these centers enable testing through all phases of weapon system acquisition from system concept exploration through component and full scale integrated weapon system testing to operational testing. These three test centers have over $10B worth of unique test facilities/capabilities. They are a national asset operated and maintained by the Air Force for DoD test and evaluation missions, but they are available to others having a requirement for their unique capabilities.

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | | 53,544 | 61,009 | 58,670 | Cont |
| (U) Appropriated Value | 50,798 | 52,530 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -1474 | | | |
| b. SBIR | | -969 | | | |
| c. Below Threshold Reprogramming | -3,564 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -23,130 | -22,371 | |
| (U) Current Budget Submit/President's Budget | 47,234 | 51,056 | 37,879 | 36,299 | Cont |

(U) Change Summary Explanation:

Funding: For Air Force Development Test Center (3120), the following efforts have been zeroed in FY 96: PRIMES, Seeker T&E, Armament Systems Test Environment (ASTE), Range Data System, Mission Control/Data Analysis, and Climatic Test Facility. For Arnold Engineering Development Center (3285), the following efforts were canceled in FY 96: Weather erosion testing and J-4 Rocket Test Stand. For Developmental Manufacturing and Modification Facility (4282), FY 96/97 funding for this project has been zeroed.

Schedule: For Air Force Flight Test Center (AFFTC) (Proj 3620), Computer Aided Engineering/Computer Aided Manufacturing (CAE/CAM), Test Instrumentation, Concurrent Engineering, Digital Switch, Ground Time Space and Positioning Information (TSPI) upgrades, Advanced Test Data Management System (ATDMS), Scientific and Engineering Computer Acquisition Project (SECAP), and Advanced Test Bay System (ATBS) will be completed in FY 95 with reduced capability. Concurrent Engineering, Composite Aircraft Structures, Testbed Instrumentation, Airborne Sensor Upgrades, and Range Operational Control and Monitoring System (ROCMS) are unfunded and deferred. Advanced Radar Testbed (ARTB) was canceled due to funding cuts during FY 94 execution. Advanced Radar Instrumentation Aircraft (ARIA) Recording and Timing, and Local Range Network are not funded in FY 96 to 98. These projects are scheduled to resume activity in FY 99. For Developmental Manufacturing and Modification Facility (DMMF) (Proj 4282), efforts in FY 95 and out are on hold.

Technical: None.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment |

(U) C. **Other Program Funding Summary ($ in Thousands):**

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Compl | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation: Military Construction,<br>Budget Activity: Defense-Wide Mission Support,<br>Program Title: McKinley Lab Upgrade | 37,000 | 20,000 | | | | | | | N/A | 62,000 |
| Appropriation: Military Construction,<br>Budget Activity: Defense-Wide Mission Support,<br>Program Title: Hi-Temp Facility Upgrade | | | 19,000 | 19,000 | | | | | 0 | 38,000 |
| Appropriation: Military Construction,<br>Budget Activity: Defense-Wide Mission Support,<br>Program Title: Weather Erosion Imp | | | 4,000 | | | | | | 0 | 4,000 |

Related RDT&E:
(U) PE 0604940D, Central Test & Evaluation Improvement Program
(U) PE 0604256F, Threat Simulator Development
(U) PE 0604735F, Combat Training Ranges

(U) D. **Schedule Profile:** Not applicable.

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment<br>PROJECT 3120 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3120 Air Force Development Test Center | 14,142 | 15,883 | 11,546 | 10,161 | 16,317 | 17,218 | 19,675 | 17,627 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** The Air Force Development Test Center (AFDTC), located at Eglin AFB, FL, conducts and supports developmental test and evaluation and operational test and evaluation of non-nuclear air armaments, electronic warfare systems, and target acquisition and weapon delivery systems; provides a climatic simulation capability; and determines target/test item electronic signatures. The Guided Weapon Evaluation Facility (GWEF) provides a full spectrum, multifunctional seeker/sensor laboratory test capability for all guided weapons. Common Airborne Instrumentation System (CAIS) Integration provides standardized airborne test to enhance interoperability and commonality. Global Positioning System (GPS) Range Systems will provide a major improvement for Time-Space-Position-Information (TSPI) at all MRTFBs and specifically at the Eglin Ranges for munitions testing. These projects ensure test center technology is compatible with weapon systems to be tested such as the Advanced Medium Range Air-to-Air Missile (AMRAAM), Joint Direct Attack Munition ( JDAM), AGM-130, Advanced Short Range Air-to-Air Missile (ASRAAM), Joint Tactical Information Distribution System (JTIDS), Joint Surveillance and Target Attack Radar System (Joint STARS), Combat Talon, etc.

(U) FY 1994 Program:

- (U) The Preflight Integration of Munitions and Electronic Systems (PRIMES) provides the instrumentation to conduct preflight checkout of total integrated weapon systems in a secure anechoic chamber. PRIMES completed the second phase of the GWEF/PRIMES link to provide interoperability between PRIMES and GWEF to allow the aircraft to "fly" in PRIMES and "launch" its munitions in GWEF to simulate an open air flight test. ($2,403)
- (U) GWEF began procuring equipment to support GPS simulation. Software development began to utilize the distribution network to support dual mode seeker testing. Continued acquisition of the Infrared Target Generator (IRTG). ($1,100)
- (U) Seeker T&E provides ground and airborne test instrumentation support for infrared (IR), millimeter wave (MMW), and laser weapon RDT&E programs. Seeker T&E continued development of MMW radar, consolidation of IR pods, and complete procurement of a second ground/airborne IR pod. This pod provides signature measurement data capabilities to support tri-service test requirements. ($1,120)
- (U) The Armament Systems Test Environment (ASTE) Range Systems effort upgrades instrumentation of the major data collection systems supporting munitions test requirements. ASTE Range Systems continued to provide test support with upgrades and modernization of Cine-T, range telemetry, and photo-optics and ultra high-speed video. ($2,405)
- (U) CAIS integration procured bench instrumentation and continue upgrades to preflight support equipment. ($1,000)
- (U) GPS Range Systems began data link acquisition and equipment integration, and initiated integrated TSPI range efforts to incorporate Range Applications Joint Program Office (RAJPO) equipment. ($4,036)
- (U) Continued work on the following projects (less than $1,000 each): Range Data Systems instrumentation, Mission Control/Data Analysis, and Climatic Test Facility equipment. ($2,078)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment<br>PROJECT 3120 |

(U) FY 1995 Planned Program:
- (U) PRIMES will complete the third phase of the GWEF/PRIMES link, (advanced scenario simulators) and complete the procurement of data analysis and complete the radio frequency (RF) Spectrum Monitor/Verification System and initiate efforts Reactive Loop. ($1,375)
- (U) GWEF will continue acquisition of the IR Target Generator, begin software development to utilize the distribution network to support multimode seeker testing, start procurement of a multi-mode test capability to simultaneously control two test area scene generators and real-time simulations, and begin procurement/installation of a wide band, digital RF memory to support MMW simulation. ($1,940)
- (U) Seeker T&E will complete IR Pod Consolidation. This effort combines the capabilities of two instrumentation pods into one, allowing it to support all test scenarios. Continue procurement of MMW Instrumentation and Electro-Optical (EO)/Infrared (IR)/Laser Support Systems. ($1,205)
- (U) ASTE Range Systems will continue Cine-T Encoder Upgrades, Central Timing Upgrades to replace Loran C Time Code Generators (TCGs), provide six sites with high speed/ultra high speed video, begin replacement of four transportable microwave antenna towers, and upgrade Range telemetry. ($3,094)
- (U) Mission Control/Data Analysis will continue procurement of data display equipment for the classified mission control rooms to provide full mission capability, complete acquisition of the video data analysis system and procure a computer for real-time network upgrade. ($1,123)
- (U) GPS Range Integration will continue data link acquisition and equipment integration, and integrated TSPI range efforts to incorporate RAJPO equipment. ($3,676)
- (U) Common Airborne Instrumentation System (CAIS) will continue procurement and installation of Standard Aircraft Instrumentation kits to promote compatibility and range interoperability, and shorten test preparation time. Will continue acquisition of support equipment to upgrade ground stations, purchase portable TIMS units, and update Computer Aided Design (CAD) systems. Will acquire pre-production CAIS units for bench mock-ups. ($2,305)
- (U) Continued work on the following projects (less than $1,000 each): Climatic Test Facility upgrades and Range Data System upgrades. ($1,165)

(U) FY 1996 Planned Program:
- (U) CAIS integration will procure CAIS production units to provide commonality and interoperability to aircraft instrumentation. Continue acquisition of support equipment for ground stations, portable Test Instrumentation Management System (TIMS) equipment, and CAD system upgrades. ($5,745)
- (U) GWEF will develop software and hardware to control and generate multimode targets for real-time Hardware-in-the-loop (HITL), continue acquisition of the Radio Frequency Interference (RFI) MMW simulation capability, complete the IR target generator and begin development of a multispectral man-in-the-loop test capability. ($3,627)
- (U) GPS Range integration will continue data link acquisition and integration of RAJPO equipment to fully implement GPS architecture on Eglin Test Ranges. ($2,174)

(U) FY 1997 Planned Program:
- (U) Continue procurement of CAIS equipment. ($5,045)
- (U) GWEF will complete the multimode and MMW/RF simulator programs and continue the multispectral man-in-the-loop development. ($3,096)
- (U) Continue procurement of GPS instrumentation for surface and aerial targets. ($2,020)

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment<br>PROJECT 3120 |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 15,457 | 16,604 | 20,624 | 18,291 | Cont |
| (U) Appropriated Value | | 16,604 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -721 | | | |
| b. SBIR | | -306 | | | |
| c. Below Threshold Reprogramming | -1,315 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -9,078 | -8,130 | |
| (U) Current Budget Submit/President's Budget | 14,142 | 15,883 | 11,546 | 10,161 | Cont |

(U) Change Summary Explanation:

Funding: The following efforts were zeroed in FY 96: PRIMES, Seeker T&E, ASTE, Range Data System, Mission Control/Data Analysis, and Climatic Test Facility.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):**

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | Compl | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation: Military Construction, | 37,000 | 20,000 | | | | | | | N/A | 62,000 |
| Budget Activity: Defense-Wide Mission Support, | | | | | | | | | | |
| Program Title: McKinley Lab Upgrade | | | | | | | | | | |

Related RDT&E:

(U) PE 0604940D, Central Test & Evaluation Improvement Program

(U) PE 0604256F, Threat Simulator Development

(U) PE 0604735F, Combat Training Ranges

(U) **D. Schedule Profile:** Not applicable

Exhibit R-2

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604759F Major Test And Evaluation Investment

PROJECT: 3285

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3285 Arnold Engineering Development Center | 10,020 | 10,499 | 5,522 | 6,205 | 5,305 | 3,302 | 2,921 | 4,875 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification**: The Arnold Engineering Development Center (AEDC), Arnold AFB, TN, provides ground environmental test support for DoD aeronautical, missile, and space programs. The center has 53 test facilities providing: aerodynamic testing of scale model aircraft, missile, and space systems; testing of large and full-scale satellites, sensors, and space vehicles in a simulated space environment; altitude environmental testing for aircraft, missile, and spacecraft propulsion systems; and testing of large-scale models such as space boosters together with their propulsion systems. The AEDC Data Acquisition and Processing System provides processing capability for advanced turbine engine testing on programs like the F-22. This effort also upgrades data systems for the arc heaters and hypervelocity gun facility for Theater High Altitude Air Defense (THAAD) testing. Inefficiencies in these current data systems result in increased program costs and schedule delays. The Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) project will provide increased capability for data processing and storage and provide wider availability of workstations. The Fighter Engine Test Capability will upgrade engine test cells to accommodate higher thrust engines with axisymmetric vectored exhaust nozzles.

(U) FY 1994 Program:

- (U) Continued J-6 project support in technical and management oversight of construction, technical support to construction contractor, base support services, and operations and maintenance. Continued site activation/validation. ($3,150)
- (U) Continued AEDC Data Acquisition and Processing System (DAPS) with installation of additional work stations/processors. The capability will support all tri-Service large turbine engine development testing as agreed to by the OSD Test Reliance effort. ($3,852)
- (U) Continued work on the following projects (less than $1,000 each): Computer Aided Design/Computer Aided Manufacturing upgrades (CAD/CAM), Engine Test Facility upgrades, weather/erosion testing upgrades, J-4 liquid rocket testing, Range-G Flyer Plate upgrade, and ballistic range upgrades. ($3,018)

(U) FY 1995 Planned Program:

- (U) Complete IOC of J-6 project. ($1,065)
- (U) Continue AEDC DAPS with acquisition and installation of additional work stations/processors. ($4,657)
- (U) Continue purchase of additional CAD/CAM work stations. ($2,033)
- (U) Fabricate and continue upgrade of the J-4 Cryogenic Liquid Rocket Test Capability. (This project will be completed using customer funds.) ($1,724)
- (U) Continued work on the following projects (less than $1,000 each): T-7 Control System, increased thrust rating of the T-Cells for the ongoing Fighter Engine Test capability upgrade, and continued studies of existing test capabilities used for weather erosion testing. ($1,020)

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment |
| | PROJECT<br>3285 |

(U) FY 1996 Planned Program:

- (U) Complete installation of the Engine Test Facility portion of the DAPS. Complete design and procure system equipment for the engine test cells. Complete upgrades to all Engine Test Facility data analysis areas. ($3,789)
- (U) Complete IOC of Phase I of CAD/CAM (replacement of current system). ($1,733)

(U) FY 1997 Planned Program:

- (U) Continue AEDC DAPS with acquisition and installation of additional work stations/processors in the engine test cells. ($3,669)
- (U) Continue purchase of additional CAD/CAM work stations. ($1,508)
- (U) Provide exhaust gas management capability improvements in the Engine Test Facility J-cells, directed toward simulated altitude testing of higher thrust turbine engines with axisymmetric vectoring nozzles. IOC of the entire fighter engine test cells will be achieved for both T- and J-cells. ($1,028)

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 10,924 | 10,499 | 7,690 | 8,106 | Cont |
| (U) Appropriated Value | | 10,499 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. SBIR | | -194 | | | |
| b. Below Threshold Reprogramming | -904 | | | | |
| (U) Adjustment to budget years since FY 95 PB | | | -2,170 | -1,901 | |
| (U) Current Budget Submit/President's Budget | 10,020 | 10,499 | 5,522 | 6,205 | Cont |

(U) Change Summary Explanation:

Funding: The following efforts were canceled in FY 96: Weather erosion testing, and J-4 Rocket Test Stand.

Schedule: None.

Technical: None.

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment<br>PROJECT 3285 |

(U) C. **Other Program Funding Summary ($ in Thousands):**

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation: Military Construction,<br>Budget Activity: Defense-Wide Mission Support,<br>Program Title: Hi-Temp Facility Upgrade | | | 19,000 | 19,000 | | | | | 0 | 38,000 |
| Appropriation: Military Construction,<br>Budget Activity: Defense-Wide Mission Support,<br>Program Title: Weather Erosion Imp | | | 4,000 | | | | | | 0 | 4,000 |

Related RDT&E:
(U) PE 0604940D, Central Test & Evaluation Improvement Program

(U) D. **Schedule Profile:** Not applicable.

Exhibit R-2

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604759F Major Test And Evaluation Investment

PROJECT: 3323

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3323 Cruise Missile Mission Control Aircraft | 1,400 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Continuing | 10,600 |

(U) **A. Mission Description and Budget Item Justification:** The Cruise Missile Mission Control Aircraft (CMMCA) will consolidate telemetry support, mission control functions, radar safety chase, and flight following capabilities into a single airborne platform. As such, CMMCA will replace visual safety chase for most cruise missile test missions resulting in significant savings.

(U) FY 1994 Program:
- (U) Conducted final systems flight testing and deliver a/c #893 (IOC) and a/c #895 (FOC). Program completed in FY 94. ($1,400)

(U) FY 1995 Planned Program:
- (U) Not applicable.

(U) FY 1996 Planned Program:
- (U) Not applicable.

(U) FY 1997 Planned Program:
- (U) Not applicable.

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1,400 | 0 | 0 | 0 | N/A |
| (U) Appropriated Value | | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| (U) Current Budget Submit/President's Budget | 1,400 | 0 | 0 | 0 | N/A |

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment |
| | PROJECT<br>3323 |

(U) Change Summary Explanation:

Funding: None.

Schedule: None.

Technical: None.

(U) C. **Other Program Funding Summary ($ in Thousands):** Not applicable.

(U) D. **Schedule Profile:** Not applicable.

Exhibit R-2

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604759F Major Test And Evaluation Investment

PROJECT: 3620

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3620 Air Force Flight Test Center | 20,678 | 24,674 | 20,811 | 19,863 | 17,850 | 19,060 | 18,159 | 19,461 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** The Air Force Flight Test Center (AFFTC), located at Edwards AFB, conducts and supports developmental test and evaluation and operational test and evaluation of aircraft and aircraft systems, aerospace research vehicles, unmanned miniature vehicles, cruise missiles, parachutes delivery/recovery systems, and cargo-handling systems. The AF Common Airborne Instrumentation System Integration & Support (CAIS I&S), a joint effort by the Air Force Development Test Center (AFDTC) and AFFTC, supports DoD objectives for interoperability/commonality. The goal of CAIS I&S is to integrate CAIS equipment and supporting instrumentation equipment and systems to provide a full airborne instrumentation operational capability. The Advanced Data Acquisition and Processing Systems (ADAPS) project provides an integrated capability to satisfy real-time first generation post-test data processing, archival, and display requirements through the 1990s. The developmental approach is directed towards providing a high degree of interoperability between systems and components by adherence to Air Force and DoD guidelines. The technologies being developed under ADAPS have the potential to satisfy data processing and display needs at various multi-service test ranges. The AF Global Positioning System (GPS) Range Applications Joint Program Office (RAJPO) Equipment project provides funding for the purchase of production GPS equipment developed by the RAJPO (OSD funded) for tri-service application. The Space Based Data Relay (SBDR) project provides the capability for Advanced Radar (Instrumentation Aircraft (ARIA) to fulfill customer needs for real time, high-speed data, and greatly improve the overall range data relay capability. The ARIA Extended S-Band Telemetry upgrade ensures the compatibility of the ARIA with the Expendable Launch Vehicles (ELV) and major DoD ranges.

(U) FY 1994 Program:

- (U) Commenced GPS RAJPO full-rate production equipment procurement (contract award 2nd quarter). Conducted operational testing and integration for first GPS RAJPO production units. All three services will be purchasing this Time Space and Positioning Information TSPI) system. ($6,782)
- (U) Continued development of an ADAPS real-time/post flight processing (RT/PFP) capability. This will provide a high rate, high throughput, graphical display capability to support the initial real-time requirements of the F-22 and other AFFTC test programs. The following are planned accomplishments for FY 94: System Requirements Review, System Design Review, Preliminary Review, Milestone II approval, and Critical Design Review. ($5,542)
- (U) Conducted the Automated Test Data Management System (ATDMS) final development and testing of an automated set-up prototype for the ADAPS systems. ATDMS provides an automated way of setting up ADAPS, and also track, with a data base, all setup information. It integrates test planning together with automated setup. The following are planned accomplishments for FY 94: Milestone I approval, System Requirements Review, and Milestone II approval. ATDMS provides an automated capability to manage the vast amount of test information required to plan and conduct a test. (1,294)
- (U) Continued CAIS I&S development by integrating the initial CAIS data acquisition units with TIMS as CAIS units become available. (This system has been endorsed by the CAIS JPO as the high and ground support system for CAIS.) IOC of TIMS for initial CAIS support is planned for 4Q FY 94. Completed development of a transportable (box) version of TIMS. Began setting up a logistics support structure, and procurement of quick reaction kits. ($2,576)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment |
| | PROJECT<br>3620 |

– (U) Continued upgrades to several projects (less than $1,000 each): Digital switch, Advanced Tracker System, Edwards Local Range Network, Test and Evaluation Mission Simulator, CAE/CAM hardware/software, Test Instrumentation project, Avionics Test Bay Systems, Utah Test and Training Range Time-Space Position Indicator system, Advanced Range Instrumentation Aircraft, and Command directed efforts ($4,484)

(U) FY 1995 Planned Program:
– (U) Continue procurement of RAJPO GPS equipment. ($2,770)
– (U) Continue Edwards Local Range Network development with further expansion of base fiber optic backbone. Begin development of the ATM Network and the Network Operations Center. ($1,226)
– (U) Finish the development, installation, and IOC of the first ADAPS RT/PFP system. This system is critical for supporting the real-time requirements of the F-22. Begin development of a mass storage and data base capability. This system will eventually replace the 65,000 nine-track tapes currently being stored at the AFFTC. The following are planned accomplishments for FY 95: ADAPS system installation, Test Readiness Review, and IOC of first system. ($5,161)
– (U) Under the ATDMS project, complete development of the first automated data setup in support of the ADAPS RT/PFP system. Provide an interface to the TIMS. The following are planned accomplishments for FY 95: Preliminary Design Review, Critical Design Review, and IOC of first system for data setup. ($1,440)
– (U) Continue CAIS I&S development. Release version 3.0 of the TIMS software to support CAIS (depending on the availability of CAIS). Award requirements contract for data recorder, and continue procurement of quick reaction kits. Award requirements contract for TIMS ground support equipment. ($4,326)
– (U) Begin equipment purchase and T-2 Mod Design for the ARIA Space Based Data Relay System program. ($5,806)
– (U) Continue the ARIA Extended S-Band program with purchase of equipment and modification first aircraft. ($1,200)
– (U) Continued upgrades to several projects (less than $1,000 each): Digital Switch, Scientific and Computer Acquisition Project, Test Instrumentation Project, CAE/CAM, and ATBS. ($2,745)

(U) FY 1996 Planned Program:
– (U) Continue CAIS I&S development. Complete CAIS diagnostic bench integration. Purchase CAIS low rate data recorder initial spares. Complete TIMS integration with CAIS (assumes availability of CAIS units). ($6,533)
– (U) Install and integrate the second ADAPS RT/PFP system. This system is critical for supporting F-22 test requirements. Procure the first mass storage archive system to replace nine track tapes currently being used. ($5,935)
– (U) Continue purchase of RAJPO GPS equipment. Conduct acceptance testing of GPS equipment purchased in FY 95. ($3,921)
– (U) Continue ARIA Space Based Data Relay System program. Complete non-recurring engineering work on system design and T-2 aircraft modification. Commence equipment installation and aircraft modification. ($2,812)
– (U) Continue the ARIA Extended S-Band program equipment installation and aircraft #1 modification. ($1,610)

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment<br>PROJECT 3620 |

(U) FY 1997 Planned Program:

- (U) Continue ARIA Space Based Data Relay program. Continue equipment installation/fabrication and #2 aircraft modification. ($6,835)
- (U) Continue CAIS I&S development. Purchase CAIS components for AFFTC use. Continue TIMS development with automated setup of systems, automated diagnostics, and simulation capability. Begin development of a CAIS optical bus interface unit. ($5,447)
- (U) FOC of ADAPS RT/PFP. Procure second mass storage archive system. Begin integration of ADAPS with ground test simulation capabilities. ($4,943)
- (U) Continue the ARIA Extended S-Band equipment installation and modification on second aircraft. ($1,758)
- (U) Complete the purchase of integration of RAJPO GPS equipment. ($880)

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 21,658 | 25,427 | 31,595 | 31,166 | Cont |
| (U) Appropriated Value | | 25,427 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -753 | | | |
| b. SBIR | | -469 | | | |
| c. Below Threshold Reprogramming | -980 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -10,784 | -11,183 | |
| (U) Current Budget Submit/President's Budget | 20,678 | 24,674 | 20,811 | 19,983 | Cont |

(U) Change Summary Explanation:

Funding: Reductions taken during FY 96 POM build ($10,874 - FY 96; $11,183 - FY 97).

Schedule: Computer Aided Engineering/Computer Aided Manufacturing (CAE/CAM), Test Instrumentation, Concurrent Engineering, Digital Switch, Ground Time Space and Positioning Information (TSPI) upgrades, Advanced Test Data Management System (ATDMS), Scientific and Engineering Computer Acquisition Project (SECAP), and Advanced Test Bay System (ATBS) will be completed in FY 95 with reduced capability. Concurrent Engineering, Composite Aircraft Structures, Testbed Instrumentation, Airborne Sensor Upgrades, and Range Operational Control and Monitoring System (ROCMS) are unfunded and deferred. Advanced Radar Testbed (ARTB) was canceled due to funding cuts during FY 94 execution. Advanced Range Instrumentation Aircraft (ARIA) Recording and Timing, and Local Range Network are not funded in FY 96 to 98. These projects are scheduled to resume activity in FY 99.

Technical: None.

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment |
| | PROJECT<br>3620 |

(U) **C. Other Program Funding Summary ($ in Thousands):**
(U) Related RDT&E:
(U) PE 0604940D, Central Test & Evaluation Improvement Program
(U) PE 0604256F, Threat Simulator Development
(U) PE 0604735F, Combat Training Ranges

(U) **D. Schedule Profile:** Not applicable.

Exhibit R-2

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0604759F Major Test And Evaluation Investment

PROJECT: 4282

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4282 Developmental Manu. & Mod Facility | 994 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | TBD | TBD |

(U) **A. Mission Description and Budget Item Justification:** This project provides for engineering design and analysis, fabrication, and aircraft modification support to the AF MRTFB. The DMMF accomplishes structural, electrical, and/or aerodynamic aircraft modifications to support the installation of systems and components for flight test; fabrication and installation of flight test instrumentation; installation, support, and upgrade of aircraft test bed projects; and engineered demodifications of test projects.

(U) FY 1994 Program:
- (U) Continued upgrade of T&E aircraft modification and manufacturing equipment. ($400)
- (U) Continued upgrade of computer aided engineering equipment. ($400)
- (U) Continued upgrade of computer integrated manufacturing equipment. ($194)

(U) FY 1995 Planned Program:
- (U) None. Funds denied by Congress.

(U) FY 1996 Planned Program:
- (U) None.

(U) FY 1997 Planned Program:
- (U) None.

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1,076 | 1,014 | 1,100 | 1,107 | N/A |
| (U) Appropriated Value | | 0 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| (U) Adjustment to budget years since FY 95 PB | | | -1,100 | -1,107 | |
| (U) Current Budget Submit/President's Budget | 994 | 0 | 0 | 0 | N/A |

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0604759F Major Test And Evaluation Investment<br>PROJECT 4282 |

(U) Change Summary Explanation:

Funding: The FY 95 funds were denied by Congress. The FY 96/97 funding for this project has been zeroed.

Schedule: Because of above cuts, efforts in FY 95 and out are on hold.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

(U) **D. Schedule Profile:** Not applicable.

Exhibit R-2

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE: 0604770F Joint STARS / PROJECT: 3551 |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3551 JSTARS | 278,807 | 168,989 | 169,702 | 200,382 | 194,822 | 47,986 | 49,416 | 50,885 | Continuing | TBD |

(U) A. Mission Description and Budget Item Justification

There is an Air Force and Army need to provide, from airborne platforms, near-real-time surveillance and targeting information on moving and stationary ground targets (growth to maritime operations), slow moving rotary and fixed-wing aircraft, and rotating antennas. This information would enable operational and tactical commanders to make and execute battle decisions. To meet these needs, the Air Force and Army initiated the Joint Surveillance Target Attack Radar System (Joint STARS) program with the Air Force as lead service. Joint STARS will be capable of providing target information for pairing direct attack aircraft and standoff weapons against selected targets. The system will be capable of being cued by other reconnaissance, surveillance, and target acquisition systems; able to respond rapidly to worldwide contingencies; and provide surveillance and attack information in all light and near-all-weather conditions. The operational utility of the system was effectively demonstrated by the outstanding performance of the two developmental aircraft in support of combat operations during Desert Storm. The program is in the Budget Activity/Research Category of Engineering and Manufacturing Development. A Defense Acquisition Board (DAB) Milestone III (Full Rate Production) is planned for 4Q FY96.

(U) FY 1994
- (U) Completed residual test activities and award fees on E-8A development. (7,318)
- (U) Continued E-8C follow-on development. (101,631)
- (U) Continued Ground Support Systems (GSS) and Self Defense Suite (SDS) Development (67,920)
- (U) Started Crew Trainers development (9,622)
- (U) Started Post Development Test Support (PDTS) Contract Effort (28,595)
- (U) Continued Government Furnished Equipment (GFE), program support, test, and other miscellaneous efforts (63,721)

(U) FY 1995
- (U) Continue E-8C follow-on development and testing program (41,004)
- (U) Continue GSS, SDS, PDTS and Crew Trainers Development (79,110)
- (U) Continue GFE, program support, test, and other miscellaneous efforts (48,875)

(U) FY 1996
- (U) Continue E-8C follow-on development and testing program (26,762)
- (U) Continue GSS and SDS Development (89,858)
- (U) Continue Crew Trainers Development (5,928)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE: 0604770F Joint STARS / PROJECT: 3551 |

- (U) Complete Post Development Test Support (PDTS) contract (10,370)
- (U) Continue Government Furnished Equipment (GFE), program support, test, and other miscellaneous efforts (36,784)

(U) FY 1997
- (U) Continue E-8C follow-on development and testing program (30,526)
- (U) Continue Ground Support Systems (GSS) and development (127,190)
- (U) Complete Crew Trainer Development (5,316)
- (U) Complete PDTS Residual efforts (1,460)
- (U) Continue GFE, program support, test, and other miscellaneous efforts (35,890)

(U) B. **Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 295,228 | 190,408 | 170,573 | 201,407 | TBD |
| (U) Appropriated Value | 288,728 | 175,408 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reductions | (5,657) | (3,148) | | | |
| b. Small Business Innovation Research | (3,255) | (3,271) | | | |
| c. Below Threshold Reprogrammings | (1,009) | | | | |
| (U) Adjustments to Budget Years Since FY95 | | | (871) | (1,025) | |
| (U) Current Budget Submit/President's Budget | 278,807 | 168,989 | 169,702 | 200,382 | TBD |

(U) Change Summary Explanation:

Funding: Reductions to FY96 (871) and FY97 (1,025) were to Non-Pay Purchases Inflation.

Schedule:

Technical:

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604770F Joint STARS | PROJECT<br>3551 |

(U) C. **Other Program Funding Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Aircraft Procurement AF, BA 04, 06; PE 0207581F | 558,705 | 687,762 | 556,264 | 585,937 | 554,065 | 536,679 | 513,738 | 484,433 | 70,900 | 4,548,483 |
| Quantities | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | | 17 |
| (U) Military Construction; PE 0604770F | 24,400 | 14,300 | 6,900 | 25,850 | 24,280 | | | | | 95,730 |

**Related RDT&E:**

(U) The Army Joint STARS Ground Station Module (GSM) program is funded under the Army Joint STARS Program (PE 0604770A).

(U) D. **Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) MCTC Start | X* | | | | | | | | | | | | | | | |
| (U) TADIL-J Award | | | X* | | | | | | | | | | | | | |
| (U) PDTS Contract Award | | | X* | | | | | | | | | | | | | |
| (U) Flight Crew Training Award | | | X* | | | | | | | | | | | | | |
| (U) Software Support Facility Delivery | | | | | | | | | | | X | | | | | |
| (U) Flight/Mission Simulator Delivery | | | | | | | | | | | | X | | | | |
| (U) FSD Development Test Complete | | | | | | X | | | | | | | | | | |
| (U) DT&E Complete (FOFSD) | | | | | | | | X | | | | | | | | |
| (U) OT&E Begins (FOFSD) | | | | | | | | X | | | | | | | | |
| (U) MOT&E Start | | | | | | | | | X | | | | | | | |
| (U) MOT&E Complete | | | | | | | | | | | X | | | | | |
| (U) Milestone III | | | | | | | | | | | | X | | | | |
| (U) Full Rate Production Contract Awd | | | | | | | | | | | | X | | | | |
| (U) 1st A/C Delivery to ACC | | | | | | | | | | X | | | | | | |

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604770F Joint STARS

PROJECT: 3551

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) 1st Training Squad Ready for Trng | | | | | | | | | | X | | | | | | |
| (U) Depot Support Date | | | | | | | | | | X | | | | | | |
| (U) 1st SDS Installation (Group A) | | | | | | | | | | X | | | | | | |
| (U) Required Assets Availab. (RAA) | | | | | | | | | | | X | | | | | |
| (U) Organic Support Capability | | | | | | | | | | | | | | X | | |
| (U) IOC | | | | | | | | | | | | | | X | | |
| (U) PDTS Complete | | | | | | | | | | | | | | | X | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604770F Joint STARS | PROJECT<br>3551 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Product Development | 191,376 | 107,284 | 123,202 | 163,502 |
| (U) Support and Management | 45,176 | 37,153 | 27,105 | 26,734 |
| (U) Test and Evaluation | 42,255 | 24,552 | 19,395 | 10,146 |
| (U) Total | 278,807 | 168,989 | 169,702 | 200,382 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)**

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Perform Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| GMSD<br>F19628-85-C-0053 | C/FPI | Sep 85 | 1,156,200 | 1,156,200 | 955,497 | 7,318 | | | | | 962,815 |
| GMSD<br>F19628-90-C-0197 | SS/CPIF | Nov 90 | 898,428 | 898,428 | 620,260 | 125,014 | 54,419 | 44,842 | 19,456 | 34,437 | 898,428 |
| GMSD<br>F19628-91-C-0034 | SS/CPIF | Oct 93 | 25,662 | 25,662 | 25,662 | | | | | | 25,662 |
| Boeing<br>N0001983C0176 | SS/FP | Jan 83 | 95,617 | 95,617 | 95,583 | 34 | | | | | 95,617 |
| GMSD<br>F19628-93-C-0067 | SS/CPIF | Oct 93 | 163,639 | 163,639 | 6,510 | 38,953 | 28,514 | 23,113 | 40,445 | 26,104 | 163,639 |
| SDS Studies<br>Various Contracts | | Ongoing | | | 1,797 | 3,493 | 211 | | | | 5,501 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604770F Joint STARS

PROJECT: 3551

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Perform Activity EAC | Project Office EAC | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant Source | TBD | TBD | TBD | TBD | | 1,909 | 11,123 | 23,962 | 15,216 | | 52,210 |
| Computer Res Spt | TBD | TBD | TBD | TBD | | | | 24,703 | 64,099 | 40,396 | 129,198 |
| Dual and Assoc F33657-93-C-0046 | SS/CPAF/FFP | May 94 | 10,512 | 10,512 | 204 | 5,535 | 2,778 | 1,784 | 211 | | 10,512 |
| Maint Trainers | VARIOUS | | 21,946 | 21,946 | 191 | 4,003 | 8,713 | 4,039 | 5,000 | | 21,946 |
| Product Improve | TBD | TBD | TBD | TBD | | | | | 18,500 | 146,362 | 164,862 |
| Support and Management | | | | | | | | | | | |
| MITRE F19628-85-C-0001 | | Ongoing | | | 114,205 | 14,375 | 10,904 | 9,700 | 9,000 | 27,880 | 186,064 |
| TEMS - Various | | Ongoing | | | 59,970 | 7,520 | 7,570 | 7,820 | 8,078 | 30,333 | 121,291 |
| INFOTEC F19628-85-C-0022 | C/FP | Apr 85 | Ongoing | | 32,110 | 3,461 | 2,587 | | | | 38,158 |
| Other Spt & Mgmt | | | | | 95,220 | 19,820 | 16,092 | 9,585 | 9,656 | 20,998 | 171,371 |
| Test and Evaluation Property | | | | | | | | | | | |
| 3246 TESTW, Eglin AFB-Range Spt - PO | PO | | | | 17,318 | 3,510 | 1,080 | 1,040 | 1,040 | 3,845 | 27,833 |
| Elect Technical Lab - RVAN | MIPR | | | | 9,961 | 443 | | | | | 10,404 |
| PDTS F19628-94-C-0040 | SS/FFP | Jun 94 | 52,965 | 52,965 | 78 | 28,595 | 13,422 | 9,900 | 970 | | 52,965 |
| Flight Test Spt | TBD | TBD | TBD | TBD | | | 420 | 470 | 490 | 1,460 | 2,840 |
| JTF Spt | Allotment | | | | 26,039 | 7,844 | 9,074 | 7,915 | 7,576 | 10,718 | 69,166 |
| Other Test Spt | | Ongoing | | | 19,085 | 1,863 | 556 | 70 | 70 | 140 | 21,784 |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604770F Joint STARS | PROJECT<br>3551 |

(U) B. Budget Acquisition History and Planning Information Continued ($ in Thousands)

**Government Furnished Property:**

| Item Description | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Delivery Date | Total Prior to FY 1994 | Budget FY 1994 | Budget FY 1995 | Budget FY 1996 | Budget FY 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Property | | | | | | | | | | |
| JTIDS | | | Ongoing | 14,055 | 2,946 | 1,181 | 484 | 300 | 186 | 19,152 |
| GMSD | VARIOUS | | Ongoing | 607 | 2,171 | 345 | 275 | 275 | 250 | 3,923 |
| Support and Management Property | | | | | | | | | | |
| Test and Evaluation Property | | | | | | | | | | |
| Subtotal Product Development | | | | 1,720,366 | 191,376 | 107,284 | 123,202 | 163,502 | 247,735 | 2,553,465 |
| Subtotal Support and Management | | | | 301,505 | 45,176 | 37,153 | 27,105 | 26,734 | 79,211 | 516,884 |
| Subtotal Test and Evaluation | | | | 72,481 | 42,255 | 24,552 | 19,395 | 10,146 | 16,163 | 184,992 |
| Total Project | | | | 2,094,352 | 278,807 | 168,989 | 169,702 | 200,382 | 343,109 | 3,255,341 |

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

DATE: February, 1995

BUDGET ACTIVITY: 5 - Engineering And Manufacturing Development

PE NUMBER AND TITLE: 0604779F Jt Interoperability Tac Comd/Cntrl

PROJECT: 2189

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2189 JINTACCS | 4,662 | 1,919 | 6,389 | 6,293 | 6,412 | 6,559 | 6,756 | 6,958 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification**

- Description. JINTACCS Budget Activity, Engineering and Manufacturing Development effort, is designed to improve the interoperability of Tactical Command and Control (C2) Systems used in support of joint operations. JINTACCS supports Air Force participation with the Army, Navy and Marines, and the Joint Interoperability and Engineering Organization (JIEO) which acts as the Executive Agent. Service and agency activities are governed by Joint Chiefs of Staff (JCS) approved documentation including Technical Interface Concepts and Technical Interface Design Plans. Close liaison across each of the Service JINTACCS programs precludes duplication of efforts. Elements of the Tactical Air Control System, E-3 Airborne Warning and Control System (AWACS) and Joint Tactical Information Distribution System (JTIDS) participate in this program. The JINTACCS program, formerly Ground and Amphibious Military Operation (GAMO), is directed by JCS Memorandum 205-72, dated 1 April 1971, as modified by a Secretary of Defense memorandum, "Reorganization of the DoD Program to Achieve Interoperability of Tactical C2 Systems for GAMO," dated 2 Aug 1977. The program complies with requirements of DoD Directive 4630.5, "Compatibility, Interoperability, and Integration of Command, Control, Communications, and Intelligence (C3I) Systems," November 12, 1992, and DoD Instruction 4630.8, "Procedures for Compatibility, Interoperability, and Integration of C3I Systems," November 18, 1992.

- Justification.

-- The JINTACCS program entails the compatibility and interoperability of C3 systems including tactical intelligence for joint or combined operations through the development and management of a joint architecture, requirements process, interface definitions, message text formats (MTFs), Tactical Digital Information Links (TADILs), and other combat data link standards. This includes the coordination of all combat data link and MTF testing certification and configuration management of standards efforts under one program element. This project supports the efforts to ensure C3 systems' interoperability among all the CINCs, DoD agencies, and the services.

-- Development/certification testing is a pre-production requirement IAW DoDD 4630.5 and DoDI 4630.8.

-- Program Element is not broken out into projects; program element activities are described on page 6 of this report.

(U) FY 1994

- (U) Began Air Force testing of the TADIL-J message standard. ($200)
- (U) Began acquisition of Iceland Air Defense System (IADS) test equipment. ($600)
- (U) Began Combat Air Forces (CAF) preliminary testing of TADIL-J in ABCCC and AWACS. ($43)
- (U) Began review of impact of emerging DoD data element standardization on United States MTF (USMTF) standard. ($150)
- (U) Began feasibility analysis of ADA 9X for use in object-oriented prototype development. ($150)
- (U) Began acquisition of JTIDS Test Device (JTD). ($500)
- (U) Began CAF testing of JTIDS Modular Air Operations Center Integration (JMI). ($250)
- (U) Began technology exchange/integration with Joint Staff J6 Global Command and Control System (GCCS) project. ($100)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604779F Jt Interoperability Tac Comd/Cntrl |

- (U) Continued development of automated test analysis system. ($367)
- (U) Continued modification of message standards supporting Theater Missile Defense (TMD). ($200)
- (U) Continued development of Digital Message Transfer Device (DMTD) and Variable Message Format (VMF) standards. ($363)
- (U) Continued development of TADIL-J capability. ($200)
- (U) Continued network design and aids development for JTIDS network design facility and architecture. ($420)
- (U) Continued advanced MTF processing development. ($300)
- (U) Continued expansion of MTF certification testing to fielded systems. ($300)
- (U) Continued integration of MCE Operational Facilities (OPFAC) into test facilities. ($319)
- (U) Completed technology exchange/integration with Joint Staff J6 Joint Universal Data Interpreter (JUDI) project. ($150)
- (U) Completed CAF testing of JTIDS Modular Air Operations Center Integration (JMI).
- (U) Completed integration of ABCCC OPFAC into test facility. ($50)

(U) FY 1995

- (U) Begin Joint testing of JMI. ($200)
- (U) Begin exercise participation of expanded USMTF processing Proof-of-Concept. ($50)
- (U) Begin Theater Battle Management (TBM) C4I architecture development/data model development. ($25)
- (U) Continue technology exchange/integration with Joint Staff GCCS project. ($190)
- (U) Continue Air Force testing of the TADIL-J message standard. ($70)
- (U) Continue CAF preliminary testing of TADIL-J in ABCCC and E-3. ($100)
- (U) Continue review of impact of emerging DoD data element standardization on USMTF standard. ($50)
- (U) Continue feasibility analysis of ADA 9X for use in object-oriented prototype development. ($50)
- (U) Continue acquisition of JTD/enhancements. ($416)
- (U) Continue development of automated test analysis system. ($100)
- (U) Continue modification of message standards supporting TMD. ($50)
- (U) Continue development of DMTD and VMF standards. ($50)
- (U) Continue development of TADIL-J capability. ($25)
- (U) Continue network design and aids development for JTIDS network design facility and architecture. ($60)
- (U) Continue advanced MTF processing development. ($100)
- (U) Continue expansion of MTF certification testing to fielded systems. ($43)
- (U) Continue integration of MCE OPFAC into test facilities. ($100)
- (U) Complete acquisition of IADS test equipment. ($240)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604779F Jt Interoperability Tac Comd/Cntrl |
| | PROJECT<br>2189 |

(U) FY 1996

- (U) Begin CAF testing of MCE P3I. ($175)
- (U) Begin CAF testing of IADS. ($150)
- (U) Begin acquisition of JSTARS test equipment. ($300)
- (U) Begin integration of JSTARS OPFAC into test facility. ($200)
- (U) Begin development/evaluation of follow-on USMTF replacement. ($600)
- (U) Begin development of interactive USMTF tool. ($500)
- (U) Continue exercise participation for expanded USMTF processing Proof-of-Concept. ($164)
- (U) Continue TBM C4I architecture development/data model development. ($200)
- (U) Continue technology exchange/integration with Joint Staff GCCS project. ($200)
- (U) Continue CAF preliminary testing of TADIL-J in ABCCC and E-3. ($100)
- (U) Continue review of impact of emerging DoD data element standardization on USMTF standard. ($200)
- (U) Continue feasibility analysis of ADA 9X for use in object-oriented prototype development. ($300)
- (U) Continue acquisition of JTD/enhancements. ($500)
- (U) Continue development of automated test analysis system. ($400)
- (U) Continue modification of message standards supporting TMD. ($300)
- (U) Continue development of DMTD and VMF standards. ($200)
- (U) Continue development of TADIL-J capability. ($300)
- (U) Continue network design and aids development for JTIDS network design facility and architecture. ($500)
- (U) Continue advanced MTF processing development. ($600)
- (U) Continue expansion of MTF certification testing to fielded systems. ($300)
- (U) Complete integration of MCE OPFAC into test facilities. ($200)

(U) FY 1997

- (U) Begin CAF testing of JSTARS. ($200)
- (U) Begin Joint testing of IADS. ($168)
- (U) Continue CAF testing of MCE P3I. ($150)
- (U) Continue development/evaluation of follow-on USMTF replacement. ($600)
- (U) Continue development of interactive USMTF tool. ($500)
- (U) Continue exercise participation for expanded USMTF processing Proof-of-Concept. ($150)
- (U) Continue TBM C4I architecture development/data model development. ($200)
- (U) Continue technology exchange/integration with Joint Staff GCCS project. ($200)
- (U) Continue CAF preliminary testing of TADIL-J in ABCCC and E-3. ($100)
- (U) Continue review of impact of emerging DoD data element standardization on USMTF standard. ($200)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604779F Jt Interoperability Tac Comd/Cntrl |

- (U) Continue feasibility analysis of ADA 9X for use in object-oriented prototype development. ($300)
- (U) Continue acquisition of JTD/enhancements. ($500)
- (U) Continue development of automated test analysis system. ($400)
- (U) Continue modification of message standards supporting TMD. ($300)
- (U) Continue development of DMTD and VMF standards. ($200)
- (U) Continue development of TADIL-J capability. ($200)
- (U) Continue network design and aids development for JTIDS network design facility and architecture. ($500)
- (U) Continue advanced MTF processing development. ($600)
- (U) Continue expansion of MTF certification testing to fielded systems. ($300)
- (U) Complete acquisition of JSTARS test equipment. ($300)
- (U) Complete integration of JSTARS OPFAC into test facility. ($225)

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 4,793 | 2,063 | 6,389 | 6,293 | TBD |
| (U) Appropriated Value | 4,793 | 2,063 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. General Congressional Reduction | -64 | -107 | | | |
| b. Below Threshold reprogramming | -13 | | | | |
| c. Small Business Innovative Research | -54 | -37 | | | |
| (U) Adjustments to Budget Years Since FY95 PB | | | -33 | -32 | |
| (U) Current Budget Submit/President's Budget | 4,662 | 1,919 | 6,356 | 6,261 | TBD |

(U) Change Summary Explanation:

Funding: None

Schedule: None

Technical: None

**(U) C. Other Program Funding Summary ($ in Thousands)** NOT APPLICABLE

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604779F Jt Interoperability Tac Comd/Cntrl |

(U) D. Schedule Profile

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) CERTIFICATION TESTING | | | | | | | | | | | | | | | | |
| - JMI | | | | | | | | | | | | | | | | |
| CAF | | | X | | | | | | | | | | | | | |
| Joint | | | | | | | | X | | | | | | | | |
| - MCE $P^3I$ | | | | | | | | | | | | | | | | |
| CAF | | | | | | | | | | | X | | | | | |
| Joint | | | | | | | | | | | | | X | | | |
| - IADS | | | | | | | | | | | | | | | | |
| CAF | | | | | | | | | | | X | | | | | |
| Joint | | | | | | | | | | | | | X | | | |
| - JSTARS | | | | | | | | | | | | | | | | |
| CAF | | | | | | | | | | | | | | | X | |
| (U) OPFAC INSTALL/INTEGRATION | | | | | | | | | | | | | | | | |
| - ABCCC | | | | | | | | | | | | | | | | |
| Complete | | | | X | | | | | | | | | | | | |
| - MCE $P^3I$ | | | | | | | | | | | | | | | | |
| Complete | | | | | | | | | | X | | | | | | |
| - IADS | | | | | | | | | | | | | | | | |
| Begin | | | | X | | | | | | | | | | | | |
| Complete | | | | | | | | X | | | | | | | | |
| - JSTARS | | | | | | | | | | | | | | | | |
| Begin | | | | | | | | | | X | | | | | | |
| Complete | | | | | | | | | | | | | | | X | |

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | | DATE February, 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>5 - Engineering And Manufacturing Development | PE NUMBER AND TITLE<br>0604779F Jt Interoperability Tac Comd/Cntrl | PROJECT<br>2189 |

(U) A. **Project Cost Breakdown ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 |
|---|---|---|---|---|
| (U) Certification Testing Support Equipment Acquisition | 1,100 | 800 | 800 | 800 |
| (U) System engineering | 2,669 | 499 | 4,214 | 3,925 |
| (U) Certification Testing & Evaluation | 493 | 400 | 725 | 918 |
| (U) Joint Service TADIL/MTF Configuration Management | 250 | 100 | 500 | 500 |
| (U) Travel | 150 | 120 | 150 | 150 |
| (U) Total | 4,662 | 1,919 | 6,389 | 6,293 |

(U) B. **Budget Acquisition History and Planning Information ($ in Thousands)** NOT APPLICABLE

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering Manufacturing and Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

| COST ($ in Thousands) | FY 1994 Actual* | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 125,412 | 140,153 | 192,719 | 162,213 | 78,690 | 71,189 | 33,594 | 0 | 0 | 1,094,548 |
| 133B Rapid Execution and Combat Targeting | 26,001 | 21,792 | 4,092 | 0 | 0 | 0 | 0 | 0 | 0 | 293,100 |
| 3085 Guidance Replacement Program | 84,495 | 92,525 | 120,755 | 70,113 | 0 | 0 | 0 | 0 | 0 | 417,251 |
| 4210 Propulsion Replacement Program | 14,916 | 25,836 | 67,872 | 92,100 | 78,690 | 71,189 | 33,594 | 0 | 0 | 384,197 |

* FY94 funding was under PE 101213F (Minuteman Squadrons)

A. (U) Mission Description and Budget Item Justification

(U) Ongoing directed efforts emphasize extending the operational life of the Minuteman III ICBM weapon system and are in response to DoD direction to the Air Force to expand its effort to extend the life of the Minuteman III. The Rapid Execution and Combat Targeting Program (REACT) replaces unsupportable (1960's) Minuteman launch control center equipment and provides state-of-the-art command, control, and communication systems. The Guidance Replacement Program (GRP) will replace the Minuteman III (NS-20) guidance set electronics. The Propulsion Replacement Program (PRP) will remanufacture solid fuel stages to correct age-related degradations and maintain existing weapon system reliability. These efforts were defined and validated in DoD's Minuteman III Life Extension Report to Congress, dated 29 Jul 92. These programs are in Budget Activity/Research Activity Engineering Manufacturing and Development.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering Manufacturing and Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 130,360 | 151,675 | 168,900 | 107,677 | 1,091,397 |
| Appropriated Value | 131,090 | 138,048* | | | |
| Adjustments to Appropriated Value | | | | | |
| Congressional Reductions | -3,174 | -1,515 | | | |
| LRP moved to PE 0603851 ICBM Dem/Val | -2,504 | | | | |
| SBIR | | -2,881 | | | |
| Below Threshold Reprogramming | | 6,501 | | | |
| Adjustments to Budget Years Since FY95 PB | | | 19,310 | 54,536 | |
| Current Budget Submit/President's Budget | 125,412 | 140,153 | 192,719 | 162,213 | 1,094,548 |

*Appropriations Committee reduced PE 0101213F $10M without prejudice to any program and moved LRP to new ICBM Dem/Val PE. Committee language also moved PRP, GRP, and REACT from PE 0101213 to PE 0604851.

Change Summary Explanation:

(U) Funding: Propulsion Replacement Program funding adjusted to service cost position. Long Range Planning funding moved from PE 0101213 to PE 0603851.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| APPN #14 (Missile Procurement - AF), Cost Cat 21000 (Missile Modifications), PE 11213F (Minuteman Squadrons), BA-03 (Weapons Procurement), WSC M30MLG | 19,763 | 0 | 16,700 | 107,500 | 302,320 | 322,520 | 450,950 | 438,250 | 2,122,800 | 4,102,740 |

D. (U) Schedule Profile See individual projects

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 133B

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Rapid Execution and Combat Targeting | 26,001 | 21,792 | 4,092 | 0 | 0 | 0 | 0 | 0 | 0 | 293,100 |

A. (U) Mission Description and Budget Item Justification ($ In Thousands)

Minuteman launch control centers (LCCs) have been deployed since the early 1960's. Since the original deployment, numerous communications and weapon system modifications have been installed on a stand-alone basis without consideration for human engineering interfaces and space limitations of the LCC. Additional communications requirements and changes in crew procedures have, over time, resulted in task saturation of the crew members. Air Force Materiel Command (AFMC) studies show that the Weapon System Control Element (WSCE) is reaching the end of its useful life. Manufacturers no longer produce many of the replacement parts and computer memory capacity has reached its limits. The Rapid Execution and Combat Targeting (REACT) program was initiated in 1988 to address these concerns. The program combines five related efforts to improve maintainability, supportability, reliability, responsiveness and operability of the weapon system: Weapon System Controller (WSC) hardware replacement, Rapid Message Processing (RMP), rapid retargeting software, launch control center console integration, and Missile Procedures Trainer (MPT) computer replacement. The program will modify LCCs and associated trainers. The new WSCE provides significantly increased system capacity and eliminates supportability difficulties of the current WSC. REACT will be integrated into both currently deployed versions of the Minuteman LCC (AM & B weapon systems). The Rapid Message Processing element and rapid retargeting will streamline current procedures and provide greater flexibility for crew members responding to critical National Command Authority directives. The MPT modification will reflect current operational configurations and ensure crew members receive maximum benefit from training time. This project sustains a fielded operational weapon system.

(U) FY 1994
- (U) WSCE hardware and software development. ($18,097)
- (U) REACT Communications Element development. ($4,329)
- (U) Nuclear Safety Cross Check Analysis (NSCCA) of operational software. ($2,538)
- (U) WSCE software functional configuration audit (FCA)/physical configuration audit (PCA)(AM), complete formal AM weapon system testing. ($1,037)

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 133B

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Rapid Execution and Combat Targeting | 26,001 | 21,792 | 4,092 | 0 | 0 | 0 | 0 | 0 | 0 | 293,100 |

(U) FY 1995
- (U) Continue WSCE hardware and software development (B system). ($12,266)
- (U) Continue REACT Communications Element development (B system). ($2,889)
- (U) Continue NSCCA of operational software. ($2,527)
- (U) Complete depot activation, obtain First Asset Delivery (FAD) of AM weapon system.
- (U) Complete AM weapon system deployment, conduct B system software FCA/PCA, begin B weapon system Initial Operational Test and Evaluation (IOT&E). Complete formal B weapon system test, obtain nuclear certification of B weapon system software. ($4,110)

(U) FY 1996
- (U) Obtain FAD of B system, complete B system deployment, achieve Last Asset Delivery (LAD). ($2,492)
- (U) Develop modifications to Missile Maintenance Trainer. ($1,600)

(U) FY 1997
- (U) Not Applicable (Program complete)

| | DATE |
|---|---|
| | February 1995 |

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604851F ICBM Modernization EMD | 133B |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 26,001 | 21,792 | 4,092 | 0 | 293,100 |
| Appropriated Value | 26,147 | 21,792 | | | |
| Adjustments to Appropriated Value | | | | | |
| Congressional Reductions | -146 | | | | |
| Adjustments to Budget Years Since FY95 PB | | | | | |
| Current Budget Submit/President's Budget | 26,001 | 21,792 | 4,092 | 0 | 293,100 |

Change Summary Explanation: Not applicable

(U) Funding: N/A

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| APPN #14 (Missile Procurement - AF), Cost Cat 21000 (Missile Modifications), PE 11213F (Minuteman Squadrons), BA-03 (Weapons Procurement), WSC M30MLG | 19,763 | 0 | 16,700 | 0 | 0 | 0 | 0 | 0 | 0 | 358,400 |

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604851F ICBM Modernization EMD | 133B |

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| First Asset Delivery (AM System) | | | | | X* | | | | | | | | | | | |
| First Asset Delivery (B System) | | | | | | | | | X | | | | | | | |
| Last Asset Delivery (B System) | | | | | | | | | | | X | | | | | |
| DT&E (AM System) | | X* | | | | | | | | | | | | | | |
| IOT&E (AM System) | | | X* | | | | | | | | | | | | | |
| DT&E (B System) | | | | | | | X | | | | | | | | | |
| IOT&E (B System) | | | | | | | X | | | | | | | | | |

* Complete

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 133B

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| AM Weapon System Development | 22,426 | | | |
| B Weapon System Development | | 15,155 | | 0 |
| NSCCA | 2,538 | 2,527 | | |
| AM System Configuration Audits & Test | 1,037 | | | |
| B Systems Test | | 4,110 | 2,492 | 0 |
| Complete AM & B Deployment | | | 1,600 | |
| Total | 26,001 | 21,792 | 4,092 | 0 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Loral | FPIAF/CPAF | 4 Apr 89 | 160,200 | 159,200 | 241,212 | 26,001 | 21,792 | 4,092 | 0 | 0 | 293,100 |
| Support and Management Organizations | | | | | | | | | | | |
| Test and Evaluation Organizations | | | | | | | | | | | |
| Government Furnished Property | Not applicable | | | | | | | | | | |
| Total Project | | | 160,200 | 159,200 | 241,212 | 26,001 | 21,792 | 4,092 | 0 | 0 | 293,100 |

Exhibit R-3

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 3085

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Guidance Replacement Program | 84,495 | 92,525 | 120,755 | 70,113 | 0 | 0 | 0 | 0 | 0 | 417,251 |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

The Minuteman III will become the only land-based ICBM in the TRIAD when Peacekeeper is retired. Ongoing Minuteman life extension efforts are required to extend the life of the Minuteman III. The Joint Requirements Oversight Council validated the Mission Need Statement for a Future Guidance System for Intercontinental Ballistic Missiles (ICBM) on 5 November, 1992. GRP replaces failing guidance system electronics and preserves the option to configure the missiles with the Peacekeeper Mk 21 reentry vehicle. The guidance electronics must be replaced since they continue to exhibit age-related degradation and are projected to become unreliable as early as 1997 and unsupportable as early as 1998. The Engineering and Manufacturing Development (EMD) contract was awarded to Rockwell International in August 1993. GRP includes the EMD, production, and installation of replacement guidance components to extend the life of the operational Minuteman III ICBM. Funding reflected here is for EMD.

(U) FY 1994
- (U) Hardware/software development. ($60,125)
- (U) Nuclear Surety Cross Check Analysis (NSCCA) and Independent Validation and Verification (IV&V). ($2,346)
- (U) ICBM codes development. ($424)
- (U) Systems engineering and technical support. ($9,500)
- (U) Other engineering support. ($12,100)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 3085

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Guidance Replacement Program | 84,495 | 92,525 | 120,755 | 70,113 | 0 | 0 | 0 | 0 | 0 | 417,251 |

(U) FY 1995
- (U) Hardware/software development. ($74,640)
- (U) NSCCA and IV&V. ($5,268)
- (U) ICBM codes development. ($2,620)
- (U) Systems engineering and technical support. ($6,270)
- (U) Other engineering support. ($3,727)

(U) FY 1996
- (U) Hardware/software development. ($90,585)
- (U) NSCCA and IV&V. ($4,500)
- (U) ICBM codes development. ($2,300)
- (U) Systems engineering and technical support. ($8,100)
- (U) Labs and support agencies. ($2,570)
- (U) Testing. ($12,700)

(U) FY 1997
- (U) Hardware/software development. ($57,493)
- (U) NSCCA and IV&V. ($1,500)
- (U) ICBM codes development. ($1,500)
- (U) Systems engineering and technical support. ($5,000)
- (U) Labs and support agencies. ($2,520)
- (U) Testing. ($2,100)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 3085

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 87,669 | 100,383 | 102,016 | 52,621 | 391,320 |
| Appropriated Value | 87,425 | 90,383 | | | |
| Adjustments to Appropriated Value | | | | | |
| Congressional Reductions | -2520 | -1,478 | | | |
| Reprogrammings | -410 | | | | |
| SBIR | | -2,881 | | | |
| Below Threshold Reprogramming | | 6,501 | | | |
| Adjustments to Budget Years Since FY95 PB | | | 18,739 | 17,492 | |
| Current Budget Submit/President's Budget | 84,495 | 92,525 | 120,755 | 70,113 | 417,251 |

Change Summary Explanation:

(U) Funding: FY96 and FY97 funds increased to reflect estimated cost of development.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| APPN #14 (Missile Procurement - AF), Cost Cat 21000 (Missile Modifications), PE 11213F (Minuteman Squadrons), BA-03 (Weapons Procurement), WSC M30MLG | 0 | 0 | 0 | 107,500 | 302,320 | 321,120 | 310,150 | 225,350 | 6,700 | 1,273,140 |

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 3085

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Program Milestones | | | | | | | | | | | | | | | | |
| Milestone III AFSARC | | | | | | | | | | | | | | | | X |
| Engineering Milestones | | | | | | | | | | | | | | | | |
| SDR | | X* | | | | | | | | | | | | | | |
| PDR | | | | | | | X | | | | | | | | | |
| CDR | | | | | | | | | | | X | | | | | |
| FCA | | | | | | | | | | | | | | | X | |
| PCA | | | | | | | | | | | | | | | | X |
| T&E Milestones | | | | | | | | | | | | | | | | |
| Combined DT&E/IOT&E Start | | | | | | | | | X | | | | | | | |
| First Flight Test | | | | | | | | | | | | | | X | | |
| Contract Milestones | | | | | | | | | | | | | | | | |
| NSCCA/IV&V Contract Award | | X* | | | | | | | | | | | | | | |
| Low Rate Initial Production | | | | | | | | | | | | X | | | | |

* Complete

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 3085

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Hardware/Software Development | 60,125 | 74,640 | 90,585 | 57,493 |
| ICBM Codes Contract | 424 | 2,620 | 2,300 | 1,500 |
| NSCCA Contract | 2,346 | 5,268 | 4,500 | 1,500 |
| Labs/Agencies | 464 | 1,761 | 2,570 | 2,520 |
| Charles S. Draper Lab (CSDL) | 3,144 | 0 | 0 | 0 |
| SETA | 9,500 | 6,270 | 8,100 | 5,000 |
| Other Engineering Support & Testing | 8,492 | 1,966 | 12,700 | 2,100 |
| Total | 84,495 | 92,525 | 120,755 | 70,113 |

Exhibit R-3

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604851F ICBM Modernization EMD | 3085 |

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Rockwell | CPAF | 31 Aug 93 | | 314,566 | 31,723 | 60,125 | 74,640 | 90,585 | 57,493 | | 314,566 |
| Codes Contract | | | | 6,844 | 0 | 424 | 2,620 | 2,300 | 1,500 | | 6,844 |
| Support and Management Organizations | | | | | | | | | | | |
| NSCCA/IV&V | CPAF | 31 Mar 94 | | 13,614 | 0 | 2,346 | 5,268 | 4,500 | 1,500 | | 13,614 |
| SE/TA | CPAF | 4 Jan 94 | | 34,450 | 5,580 | 9,500 | 6,270 | 8,100 | 5,000 | | 34,450 |
| CSDL | FP | 30 Jun 94 | | 6,914 | 3,770 | 3,144 | 0 | 0 | 0 | | 6,914 |
| Other Engineering Support | | 31 Aug 93 | | 33,548 | 8,290 | 8,492 | 1,966 | 12,700 | 2,100 | | 33,548 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| AGMC | PO | | | 1,153 | 0 | 58 | 208 | 481 | 406 | | 1,153 |
| White Sands | PO | | | 1,363 | 0 | 116 | 360 | 481 | 406 | | 1,363 |
| Ltl Mnt/SMIC | PO | | | 3,143 | 0 | 116 | 1,193 | 986 | 848 | | 3,143 |
| Maxwell | MIPR | | | 174 | 0 | 174 | 0 | 0 | | | 174 |
| Sandia | PO | | | 1,482 | 0 | 0 | 0 | 622 | 860 | | 1,482 |
| Subtotal Product Development | | | | 321,410 | 31,723 | 60,549 | 77,260 | 92,885 | 58,993 | | 321,410 |
| Subtotal Support and Management | | | | 88,526 | 17,640 | 23,482 | 13,504 | 25,300 | 8,600 | | 88,526 |
| Subtotal Test and Evaluation | | | | 7,315 | 0 | 464 | 1,761 | 2,570 | 2,520 | | 7,315 |
| Government Furnished Property | Not applicable | | | | | | | | | | |
| Total Project | | | | 417,251 | 49,363 | 84,495 | 92,525 | 120,755 | 70,113 | | 417,251 |

Exhibit R-3

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 4210

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Propulsion Replacement Program | 14,916 | 25,836 | 67,872 | 92,100 | 78,690 | 71,189 | 33,594 | 0 | 0 | 384,197 |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

(U) The Propulsion Replacement Program will remanufacture solid fuel stages to correct age-related degradations, maintain existing weapon system reliability, and support Minuteman III life extension. Any of the degradations (propellant cracking, case corrosion, liner deterioration, inhibitor deterioration, and liner debond) can cause catastrophic motor failure and, in turn, mission failure. RDT&E efforts will identify replacement materials that are no longer available or which have become environmentally unacceptable, reduce life cycle costs, and identify corrections to age-related degradations. This project incorporates only changes that can be demonstrated in an appropriate time frame to ensure the Minuteman III propulsion system continues to meet existing performance capabilities and remains viable and supportable. The project entered Phase 2 (Engineering Manufacturing and Development) in FY94.

(U) FY 1994
- (U) Conducted component reuse and materials replacement studies and begin stage design and development changes. ($6,645)
- (U) Integrated program activities such as system engineering and program management. ($4,598)
- (U) Began fabrication, tooling and waste disposal for change verification motors. ($3,673)

(U) FY 1995
- (U) Integrate program activities such as system engineering, program management, range support, AEDC testing, booster disassembly/assembly, booster transportation. ($9,954)
- (U) Continue fabrication, tooling and waste disposal for change verification motors. ($7,988)
- (U) Continue component reuse and materials replacement studies, continue stage design and development. ($7,430)
- (U) Test change verification motors. ($464)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 4210

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Propulsion Replacement Program | 14,916 | 25,836 | 67,872 | 92,100 | 78,690 | 71,189 | 33,594 | 0 | 0 | 384,197 |

(U) FY 1996
- (U) Continue fabrication, tooling and waste disposal for change verification motors. ($31,862)
- (U) Integrate program activities such as system engineering, program management, range support, AEDC testing, booster disassembly/assembly, booster transportation. ($22,266)
- (U) Continue component reuse and materials replacement studies, continue stage design and development to include refurbishment. ($12,075)
- (U) Test change verification motors. ($1,669)

(U) FY 1997
- (U) Integrate program activities such as system engineering, program management, range support, AEDC testing, booster disassembly/assembly, booster transportation. ($32,820)
- (U) Continue component reuse and materials replacement studies, continue stage design and development to include refurbishment. ($27,458)
- (U) Continue fabrication, tooling and waste disposal for change verification motors. ($23,717)
- (U) Begin software modification. ($7,181)
- (U) Test change verification motors. ($924)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604851F ICBM Modernization EMD | 4210 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 14,916 | 25,873 | 62,780 | 50,511 | 370,300 |
| Appropriated Value | 15,000 | 25,873 | | | |
| Adjustments to Appropriated Value | | | | | |
| Congressional Reductions | -84 | -37 | | | |
| Adjustments to Budget Years Since FY95 PB | | | 5,092 | 41,589 | |
| Current Budget Submit/President's Budget | 14,916 | 25,836 | 67,872 | 92,100 | 384,197 |

Change Summary Explanation:

Funding: FY96 and out-year funding adjusted to meet AFSARC approved Service Cost Position.

Schedule: N/A

Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| APPN #14 (Missile Procurement - AF), Cost Cat 21000 (Missile Modifications), PE 11213F (Minuteman Squadrons), BA-03 (Weapons Procurement), WSC M30MLG | 0 | 0 | 0 | 0 | 0 | 1,400 | 140,800 | 212,900 | 2,116,100 | 2,471,200 |

Exhibit R-2

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 4210

D. (U) Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Program Milestones | | | | | | | | | | | | | | | | |
| Milestone I/II Review | | | X* | | | | | | | | | | | | | |
| Engineering Milestones | | | | | | | | | | | | | | | | |
| Design Development Test | | | | | X* | | | | | | | | | | | |
| Stage PDR | | | | | | | | | | | | | X | | | |
| T&E Milestones | | | | | | | | | | | | | | | | |
| Change Verification Test | | | | | | | X | X | X | X | X | X | X | X | X | X |
| Contract Milestones | | | | | | | | | | | | | | | | |
| EMD Contract Awards | | | | X* | | | | | | | | | | | | |
| Software Contract Award | | | | | | | | | | | | | | X | | |

| | |
|---|---|
| DT&E/IOT&E | 2Q98-3Q00 |
| LRIP | 1Q00 |
| Milestone III | 4Q00 |

* Complete

Exhibit R-2

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #5 Engineering and Manufacturing Development | 0604851F ICBM Modernization EMD | 4210 |

A. (U) Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Technology Insertion | 14,916 | 17,592 | 51,586 | 64,653 |
| Software | 0 | 0 | 0 | 6,839 |
| Other Program Cost | 0 | 319 | 1,288 | 1,756 |
| SE/TA | 0 | 5,605 | 7,633 | 9,208 |
| ECC | 0 | 1,758 | 4,385 | 5,496 |
| Risks | 0 | 562 | 2,980 | 4,148 |
| Total | 14,916 | 25,836 | 67,872 | 92,100 |

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #5 Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604851F ICBM Modernization EMD

PROJECT NO.: 4210

B. (U) Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| Thiokol | SS CPAF | Aug 94 | 100,946 | 100,946 | | 4,469 | 4,817 | 17,910 | 28,406 | 45,344 | 100,946 |
| Aerojet | SS CPAF | Jul 94 | 92,603 | 92,603 | | 5,403 | 7,934 | 19,388 | 19,828 | 40,050 | 92,603 |
| CSD | SS CPAF | Jul 94 | 102,647 | 102,647 | | 4,951 | 6,859 | 21,269 | 25,261 | 44,307 | 102,647 |
| Software | C CPAF | 2Q97 | # | 22,870 | | | | | 7,181 | 15,689 | 22,870 |
| Support and Management Organizations | | | | | | | | | | | |
| TRW | SS CPAF | Oct 94 | N/A | 43,458 | | | 5,605 | 7,633 | 9,208 | 21,012 | 43,458 |
| Program Integration | | | N/A | 5,934 | | 93 | 200 | 768 | 913 | 3,960 | 5,934 |
| Test and Evaluation Organizations | | | | | | | | | | | |
| AEDC | PO | Periodic | N/A | 7,360 | | | 421 | 904 | 1,303 | 4,732 | 7,360 |
| Range (VAFB) | PO | Nov 99 | N/A | 8,379 | | | | | | 8,379 | 8,379 |
| Government Furnished Property | Not applicable | | | | | | | | | | |
| Subtotal Product Development | | | | 319,066 | | 14,823 | 19,610 | 58,567 | 80,676 | 145,390 | 319,066 |
| Subtotal Support and Management | | | | 49,392 | | 93 | 5,805 | 8,401 | 10,121 | 24,972 | 49,392 |
| Subtotal Test and Evaluation | | | | 15,739 | | | 421 | 904 | 1,303 | 13,111 | 15,739 |
| Total Project | | | | 384,197 | | 14,916 | 25,836 | 67,872 | 92,100 | 183,473 | 384,197 |

# Data not available until after contract award.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | 65101F, RAND Project AIR FORCE | 1110 |

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| RAND, Project AIR FORCE | 24,000 | 24,039 | 25,924 | 26,571 | 27,807 | 29,194 | 30,264 | 31,458 | Cont | TBD |

(U) A. Mission Description and Budget Item Justification

Program funds RAND Project AIR FORCE (PAF), the only Air Force Federally Funded Research and Development Center for Studies and Analyses. It provides for continuing analytical research across a broad spectrum of aerospace issues and concerns. The PAF research agenda is focused primarily on mid- to long-term problems; in addition, PAF provides quick response assistance for senior Air Force officials on high priority, near-term issues. Results and analytical findings directly impact senior management deliberations on major issues. The Air Force Advisory Group (AFAG), chaired by the Vice Chief of Staff, reviews, monitors, and approves PAF research efforts. Each project is initiated, processed, and approved IAW PAF Sponsoring Agreement that requires General Officer (or SES equivalent) sponsorship and involvement on a continuing basis. This program primarily focuses on studies and analyses, and is in the Research Category and Budget Activity for Management Support.

(U) FY 1994

- (U) Principal research efforts included studies on countering U.S. aerospace power, psychological impact of air power, unanticipated scenarios, air mobility requirements, bomber flexibility, future fighter technologies, non-lethal weapons, effective air campaigns, utility of space operations, lean logistics, enhancing depot responsiveness, and a new paradigm for Air Force acquisition.

- (U) Direct assistance studies included Air Force roles and missions, civil/military airlift mix, support to Air Combat Command force effectiveness study, low altitude training and operations, Air Force modeling and simulation, support to Scientific Advisory Board Theater Missile Defense Summer Study, satellite communications, intelligence support and mission planning, B-1 audit, and FSX support.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | 65101F, RAND Project AIR FORCE | 1110 |

(U) A. Mission Description and Budget Item Justification - (Cont)

(U) FY 1994 - (Cont)

- (U) PAF research continues to be organized in the following seven projects. These seven projects are aimed at ensuring the Air Force can project aerospace power across the entire spectrum of conflict in an era of declining budgets, personnel, and force structure. These projects are continuing efforts, and do not lend themselves to a specific schedule profile.

| FY 1994 Projects | ($ in Millions) |
|---|---|
| Strategy and Doctrine | 3.2 |
| Force Structure | 3.8 |
| Aero Systems Modernization | 3.8 |
| Force Employment | 3.0 |
| C3I/Space | 3.7 |
| Logistics | 3.5 |
| Acquisition | 3.0 |
| Total | 24.0 |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | 65101F, RAND Project AIR FORCE | 1110 |

(U) A. Mission Description and Budget Item Justification - (Cont)

(U) FY 1995

- (U) Research will continue on long-term projects initiated during FY 1994 and prior years.
- (U) The FY 1995 program has been finalized. It includes research on asymmetric strategies, bomber operations, new fighter technologies, air warfare modeling and simulation, air mobility issues, space operations, lean logistics, and the new paradigm for Air Force acquisition.
- (U) PAF research will continue to be organized in the following seven projects:

| FY 1995 Projects | ($ in Millions) |
|---|---|
| Strategy and Doctrine | 3.2 |
| Force Structure | 2.6 |
| Aero Systems Modernization | 4.7 |
| Force Employment | 2.9 |
| C4I/Space | 3.3 |
| Logistics | 3.3 |
| Acquisition | 4.0 |
| Total | 24.0 |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | 65101F, RAND Project AIR FORCE | 1110 |

(U) A. Mission Description and Budget Item Justification - (Cont)

(U) FY 1996

- (U) Research will continue on long-term projects initiated during FY 1995 and prior years.
- (U) New topics will evolve from the major issues established by the AFAG where PAF has developed special expertise and can continue to make unique contributions to the Air Force.
- (U) PAF research will continue to be organized in the following seven projects:

| FY 1996 Projects | ($ in Millions) |
|---|---|
| Strategy and Doctrine | 3.6 |
| Force Structure | 3.9 |
| Aero Systems Modernization | 3.9 |
| Force Employment | 3.4 |
| C4I/Space | 3.9 |
| Logistics | 3.8 |
| Acquisition | 3.5 |
| Total | 26.0 |

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | 65101F, RAND Project AIR FORCE | 1110 |

(U) A. Mission Description and Budget Item Justification - (Cont)

(U) FY 1997

- (U) Research will continue on long-term projects initiated in FY 1996 and prior years.
- (U) New topics will evolve from the major issues established by the AFAG where PAF has developed special expertise and can continue to make unique contributions to the Air Force.
- (U) PAF research will continue to be organized in the following seven projects:

| FY 1997 Projects | ($ in Millions) |
|---|---|
| Strategy and Doctrine | 3.6 |
| Force Structure | 4.0 |
| Aero Systems Modernization | 4.0 |
| Force Employment | 3.6 |
| C4I/Space | 4.0 |
| Logistics | 3.8 |
| Acquisition | 3.6 |
| Total | 26.6 |

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6 - Management Support | 65101F, RAND Project AIR FORCE | 1110 |

(U) B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 26,748 | 28,039 | 26,054 | 26,704 | TBD |
| Appropriated Value | 26,748 | 27,039 | | | |
| Adjustments to Appropriated Value, Cong Gen Reductions | 2,748 | 3,000 | | | |
| Adjustment to Budget Years Since FY95 PB (PBD 604) | | | -130 | -133 | |
| Current Budget Submit/President's Budget | 24,000 | 24,039 | 25,924 | 26,571 | |

Change Summary Explanation:

Funding: One million dollars reduced by Authorization/Appropriation Committee.
Three million dollars reduced for FFRDC general reduction.

Schedule: Not Applicable

Technical: Not Applicable

(U) C. Other Program Funding Summary ($ in Thousands) Not Applicable

(U) Related Activities:

- (U) PAF efforts span functional and organizational boundaries. As a result, the research conducted relates to a wide spectrum of Air Force activities.
- (U) The results are deposited with the Defense Technical Information Center for appropriate dissemination to other qualified recipients.
- (U) To assure unnecessary duplication, each newly proposed research effort is reviewed by the Air Force Studies and Analysis Agency.
- (U) There is no unnecessary duplication of effort within the Air Force or the Department of Defense.

(U) D. Schedule Profile Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6, RDT&E Management Support

PE NUMBER AND TITLE: PE 0605306F, Ranch Hand II Epidemiology Study

PROJECT NO.: 2767

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total 0605306F Cost | 3,686 | 3,156 | 3,139 | 9,709 | 10,082 | 4,769 | 4,912 | 5,058 | Cont | Cont |
| Project 2767, Ranch Hand II Epidemiology Study | 3,686 | 3,156 | 3,139 | 9,709 | 10,082 | 4,769 | 4,912 | 5,058 | Cont | Cont |

A. (U) Mission Description and Budget Item Justification: This RDT&E Management Support program was directed in 1980 by the Assistant to the President of the United States for Domestic Affairs and Policy upon the recommendation of the Interagency Working Group on the Possible Long-Term Effects of Phenoxy Herbicides and Contaminants. As a result of this Presidential direction, PE 0605306F was established to conduct a 20-year epidemiology investigation of approximately 1200 Air Force personnel who were involved with aerial spraying of herbicides in Vietnam from 1962 to 1971 (Operation Ranch Hand). The objective of this investigation is to determine whether long-term health effects exist and can be attributed to occupational exposure to phenoxy herbicides and their associated dioxins. Dioxin is an unwanted by-product from manufacturing Herbicide Orange.

This project involves a 20-year study that compares United States Air Force (USAF) Ranch Hand personnel to other USAF crew members and support personnel who were not exposed to herbicides while serving in Vietnam. Approximately 2,200 individuals (exposed personnel group plus control group) are participating in the study. Analyses of yearly mortality rates and the past and present health status of the study population were begun in 1982 with follow-up health examination schedules at the 3-, 5-, 10-, 15-, and 20-year time periods. The study includes examination of the possible occurrence of birth defects in children as determined from children's medical records and family medical histories.

(U) FY 1994:
- (U) Converted raw data to database format for computer analyses. ($1,186K)
- (U) Conducted serum dioxin analysis and completed serum dioxin assays. ($925K)
- (U) Completed analyses of serum dioxin half-life. ($856K)
- (U) Completed annual mortality update. ($719K)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #6, RDT&E Management Support | PE NUMBER AND TITLE: PE 0605306F, Ranch Hand II Epidemiology Study 2767 — PROJECT NO. |

(U) FY 1995:
- (U) Complete Year-10 morbidity report. ($669K)
- (U) Complete annual mortality update. ($729K)
- (U) Conduct statistical analysis of data sets. ($734K)
- (U) Complete archiving of baseline physical exams. ($500K)
- (U) Conduct additional analyses and reports. ($524K)

(U) FY 1996:
- (U) Issue Air Force Health Study contract. ($1,230K)
- (U) Complete annual mortality update. ($630K)
- (U) Complete archiving of 1985 physical exams. ($580K)
- (U) Conduct Participant Data Base Management. ($419K)
- (U) Conduct statistical analyses in support of journals and reports. ($280K)

(U) FY 1997:
- (U) Initiate next cycle of physical examinations and questionnaires. ($7,778K)
- (U) Conduct examination data base verification. ($418K)
- (U) Archive the 1987 examination data and digitize the 1997 data as received. ($677K)
- (U) Initiate serum dioxin assays. ($178K)
- (U) Start analyses for mortality update and journal articles. ($378K)
- (U) Conduct medical records coding. ($280K)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6, RDT&E Management Support

PE NUMBER AND TITLE: PE 0605306F, Ranch Hand II Epidemiology Study

PROJECT NO.: 2767

B. (U) Program Change Summary ($ in Thousands):

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 3,686 | 3,160 | 3,239 | 9,842 | Cont |
| Appropriated Value | 3,707 | 3,160 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -21 | -4 | | | |
| Current President's Budget | 3,686 | 3,156 | 3,139 | 9,709 | Cont |

Change Summary Explanation:

Funding: Not Applicable.

Schedule: Not Applicable.

Technical: Not Applicable.

C. (U) Other Program Funding Summary: Not Applicable.

D. (U) Schedule Profile: Not Applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605712F Initial Operational Test & Eval

PROJECT: 0191

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 0191 Initial Operational Test and Evaluation | 27,056 | 33,004 | 24,506 | 26,921 | 34,601 | 31,320 | 32,255 | 33,216 | Continuing | TBD |

(1) $400 of FY 94 funds were transferred to pay a must-pay FY 94 bill, paid in Dec 94. The actual FY 94 total is $26,656.

(U) A. **Mission Description and Budget Item Justification:** This program funds IOT&E tests conducted to evaluate a system's operational effectiveness and suitability and to identify any operational deficiencies or need for modifications in support of the acquisition process. This PE funds Congressionally mandated IOT&E to support major weapon system acquisition decision (Milestone III). For major systems designated for use in combat, the law requires IOT&E be completed under realistic field conditions before proceeding beyond low rate initial production. As an essential element of IOT&E, this PE will fund major Operational Utility Evaluations (OUE), Early Operational Assessments (EOA) and Operational Assessments (OA) which support major milestones and decision points prior to Milestone III. IOT&E is an operational evaluation of a system's performance when the complete system is tested and evaluated against operational criteria by personnel with the same qualifications as those who will operate, maintain and support the system when deployed. In general, IOT&Es are performed on new systems in development, major modifications and other systems as directed. IOT&E programs are identified in five categories: aircraft/support; space; missile/munitions; computer, communication, command and control and information (C4I); and general. This PE funds the costs of the test (e.g., data reduction, range costs, etc.), not the development of test resources or the maintenance of test infrastructure.

(U) FY 1994

– (U) HQ AFOTEC conducted IOT&E on the following 137 programs. ($27,056) (See note 1 above.)

– (U) Category: Aircraft/Support Loader 60K, Advanced Support Equipment (ASE), F-15C/E Tactical Electronic Warfare System (TEWS), Tactics Training Route Complex/Route Integration Instrumentation System (TTRC/RIIS), Bomber Airborne Instrumentation System (BAIS), C-17, F-22 Advanced Tactical Fighter, Follow-on Tactical Reconnaissance System (FOTRS), B-2, Advanced X-Ray System, B-1B Conventional Munitions Upgrade Pgm (CMUP), AFMSS Conventional Mission Plan and Preparation System (CMPPS), F-16 Block 50D, EF-111A System Improvement Program (SIP), Advanced Strategic and Tactical IR Expend (ASTE), CV-22 Osprey, Simulator For Elect Combat (SECT), Maintenance Skills Tutors (MST), F-15 Manned Destructive SEAD (MDS), KC-135 Expanded Refueling Capability (ERC), F/A-16 CAS/BAI Aircraft, Standard Flight Data Recorder (SFDR), Airborne Laser (ABL), Directed IR Countermeasures (DIRCM), On-board Electronic Warfare Simulation (OBEWS), F-15 WRM Fuel Upgrade, Advanced Missile Warning System, F-15 APG-63 radar, and Compass Call.

– (U) Category: Space Cheyenne Mountain Upgrade (CMU), CMU-Survivable Communications Integration System (SCIS), CMU-Granite Sentry, CMU-Alternate Processing and Correlation Center (APCC), ICBM-Rapid Execution and Combat Target (REACT), Dual Frequency MEECN RCVR/Portable, Navstar GPS Phase III, Consolidated Space Operations Center (CSOC), Milstar, Integrated Correlation and Display System (ICADS), CMU-Command Center Process and Display System-Replacement, Survivable Defense Satellite Program (DSP-1), HAVE STARE Radar, Dual Frequency MEECN RCVR/Minuteman (DFMR/MM), Brilliant Eyes (BE), Ballistic Missile Defense (BMD)/Global Protection Against Limited Strikes (GPALS), Global Missile Defense (GMD), SDI Command Control Element (C2E), DMSP Block VI, Early Warning Radar, Ground Base Electro-Optical Deep Space Surveillance (GEODSS), GPS BLOCK II Follow-on (GPS IIF),

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605712F Initial Operational Test & Eval |
| | PROJECT<br>0191 |

CMU-Space Defense Operations Center 4C (CMU-SPADOC 4C), Alert Locate and Report Missiles (ALARM), CMU-Stratcom CMD Center Process and Display (CMU-STRATCOM), ICBM Minuteman III Guidance Program Phase I (ICBM-MMIII GR), Ground NDS Terminal (GNT), Attach & Launch Early Report to Theater (ALERT), and Theater Missile Defense-Intercept Missile (TMD-INTERCEPT).

– (U) Category: Missile/Munitions QF-4, Sensor Fused Weapon (SFW), Joint Direct Attack Munitions (JDAM), Joint Standoff Weapon (JSOW), AOD-Joint Programmable Fuze (JPF), Improved Data Link (IDL), and AIM-9X Air-to-Air Missile (AIM-9X).

– (U) Category: Computer, Communication, Command and Control and Information System (C4 I) Tower Restoral Vehicle (TRV), JTIDS (JTIDS Class 2 terminal Multiservice), Joint STARS, E-3 Radar System Improvement Pgm (E-3 RSIP), Advanced Training System, ABO-Base Recovery Communication Sys, AMC C-2 Info Processing System II-IV, Modular TACC (CTAPPS), DMSP Small Tactical Terminal (STT), Combat Survival Evader Locator (CSEL), Region/Sector Operations Control Center (R/SOCC), AF Training/Education Automated Management System (AFTEAMS), Combat Intelligence System (CIS), Improvement of Selected Intelligence Data Handling (IDHS), Modular Control Equipment (MCE P3I), Global Transportation Network (GTN), Military Microwave Landing Sys-Avionics (MMLSA), Microwave Landing Sys-Fixed Base (MLS-Fixed Base), E4B Universal Modem (E-4B UM ATV), CSD-Wartime Medical System (CSD-WARMED), Cloud Depiction and Forecast System II (CDFS II), Strategic War Planning System (SWPS), Combat ID/Cooperative Aircraft ID (CI/CAI), and Military Airspace Management System (MAMS).

– (U) Category: General CWD-Aircrew Eye/Respiratory Protection-SAC, LS-Universal Water Activated Release System (LS-UWARS), CCD Multispec Total Decoys (CCD-MS Decoy), LS-Active Noise Reduction (LS-ANR), Chemically Hardened Air Transportable Hospital (CHATH), ABO-Armored Multi-Role Vehicle (ABO-ARMRV), RRR-Mat Anchoring, AOD-Adverse Terrain Ammo Assembly (ATAAT/ATTV), CCD-Multispectral Smoke (CCD-MS Smoke), CCD-Multispectral Nets (CCD-MS Nets), CCD-Vertical Smoke and Obscurant (CCD-V Smoke), CCD-Laser Warning/Laser Defeat (LASER), CSD-Spinal Cord Injury Transport System (SCITS), LS-Advanced Technology Anti-G Suit (ATAGS), LS-Advanced Night Vision System (LS-ANVS), CCD-Runway Signature Characterization Disguise (CCD-RSCD), SAB-Electric Rapid Utility Repair Kits (SAB-ELECT RURK), SAB-Water Rapid Utility Repair Kits (SAB-WATER RURK), ABO-EOD/Medical Protective Shield (ABO-EOD SHIELD), ABO-Mobile Ordnance Disrupter System (ABO-MOBILE), CCD-SPEED TRAP, CCD-GROUND JAMMER, ABO-Contingency Airfield Lighting System (ABO-CALS), RRR-Deployable Pavement Repair System, (RRR PAVE REPAIR), SAB-POL Rapid Utility Repair Kit (SAB-POL RURK), ABO-Rapid Ordnance Removable System (ABO-RORS), ABO-Aircraft Expedient Dispersal Tech (ABO-AEDT), ABO-EHR Munitions Stores Bins/Containers (ABO-EHR BINS), AFF-Deployable Fire Protection System (AFF-FIRE PROTECTION), BISS Active Denial System (BISS-ADS), Environmental Control Unit Replacement (ECU REPLACE), Wind Correction Munitions Dispenser (WCMD), CSD-Transportable Blood Transshipment Center (CSD-TBTC), LS-Passenger Smoke and Fume Protection (LS-PSFP), CWD-Disposable Eye/Respiratory Protect (CWD-DERP), CWD-Ground Crew Ensemble (CWD-GCENS), CWD-Auto Mustard Agent Det (M8A1) (CWD-AMAD), CWD-Explosive Ordnance Disposal Ensemble (CWD-EOD), AFF-CRASH/FIRE, ABO-Anti-Penetration Tactical Shelters (ABO TAC), Semi-hardened Air Mobile Structures (AIRMOB STRUCT), CCD-Simulation (CCD-SIM), AGM-130 INTEGRATION, Helmet Mounted Cueing System (HMCS), LS-COMBAT ACE, CWD-Fire Fighter's Ensemble (CWD-FFENS), CWD-Individual Vapor Detector (CWD-IVD), and CWD-Biological Detector (CWD-BIO DET).

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605712F Initial Operational Test & Eval |
| | PROJECT<br>0191 |

(U) FY 1995

– (U) FY 95 IOT&E Planning Program: HQ AFOTEC will conduct IOT&E on the following 132 programs. The FY 95 list of programs may not be all inclusive due to changing program schedules and "pop-up" requirements. ($33,004)

– (U) Category: Aircraft/Support F-15C/E Tactical Electronic Warfare System (TEWS), C-17, F-22 Advanced Tactical Fighter, Follow-on Tactical Reconnaissance System (FOTRS), B-2, B-1B Conventional Munitions Upgrade Program (CMUP), F-16 Block 50D, EF-111A System Improvement Program (SIP), Advanced Strategic and Tactical IR Expend (ASTE), CV-22 Osprey, Simulator For Elect Combat (SECT), F-15 Manned Destructive SEAD (MDS), KC-135R Expanded Refueling Capability (ERC), F/A-16 CAS/BAI Aircraft, Compass Call, Loader 60K, B-1B Conventional Munitions Upgrade Pgm Block D/E (B-1B CMUP BLK D/E), Directed IR Countermeasures (DIRCM), F-15 Wrm Fuel Upgrade, Advanced Missile Warning System (ADV MSL WARN SYS), and F-15 APG-63 Radar.

– (U) Category: Space Cheyenne Mountain Upgrade (CMU), CMU-Survivable Communications Integration System (SCIS), Command Center Process and Display System-Replacement/SAC (CCPDS-R/SAC), CMU-Granite Sentry, CMU-Alternate Processing and Correlation Center (APCC), CMU-Space Defense Operation Center 4-C (SPADOC 4C), ICBM-Rapid Execution and Combat Target (REACT), Navstar GPS Phase III, Milstar, Integrated Correlation and Display System (ICADS), Survivable Defense Satellite Program (DSP-1), HAVE STARE Radar, Ground NDS Terminal (GNT), Brilliant Eyes (BE), Ballistic Missile Defense (BMD)/Global Protection Against Limited Strikes (GPALS), Global Missile Defense (GMD), DMSP Block VI, Early Warning Radar, GND Base Electro-Optical Deep Space Survival (GEODSS), Airborne Laser Lab (ABL), Alert Locate and Report Missiles (ALARM), SDI Command Control Element (SDI C2E), ICBM Minuteman III Guidance Program Phase I (ICBM-MMIII GR), ICBM Minuteman III Propulsion Replacement Program (ICBM-MMIII PRP), Navstar GPS Block IIR (GPS IIR), GPS Block II Follow-on (GPS IIF), ICBM Minuteman III Guidance Program Phase II (ICMB-MMIII GRP II), RSA Network Control (RSA-NC), RSA Centralized Telemetry Processing Systems (RSA-CTPS), RSA Unified Tracking Antenna (RSA-UTA), Advanced Electro-optical System (AEOS), and Attach & Launch Early Report to Theater (ALERT).

– (U) Category: Missile/Munitions QF-4, Sensor Fused Weapon (SFW), Joint Direct Attack Munitions (JDAM), Joint Standoff Weapon (JSOW), AOD-Joint Programmable Fuze (JPF), AIM-9X Air-to-Air Missile (AIM-9X), Theater Missile Defense-Intercept Missile (TMD-INTERCEPT), and AMRAAM (AIM-120C) P3I Phase 3 (AMRAAM P3I PH3).

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– (U) Category: Computer, Communication, Command and Control and Information System (C4I) JTIDS (JTIDS Class 2 terminal Multiservice), Joint STARS, E-3 Radar System Improvement Program (E-3 RSIP), AMC C-2 Info Processing System II-IV, Modular TACC (CTAPPS), DMSP Small Tactical Terminal (STT), Combat Survival Evader Locator (CSEL), Region/Sector Operations Control Center (R/SOCC), AF Training/Education Automated Management System (AFTEAMS), Combat Intelligence System (CIS), Improvement of Selected Intelligence Data Handling (IDHS), Modular Control Equipment (MCE P3I), Global Transportation Network (GTN), Military Microwave Landing Sys-Avionics (MMLSA), ABO-Base Recovery Communication System (ABO BRCS), Tower Restoral Vehicle (TRV), Advance Training System (ADV TNG SYS), E4B Universal Modem (E-4B UM ATV), CSD-Wartime Medical System (CSD-WARMED), Cloud

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
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| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605712F Initial Operational Test & Eval |
| | PROJECT<br>0191 |

Depiction and Forecast System II (CDFS II), Theater Missile Defense (TMD - C4I), Strategic War Planning System (SWPS), Combat ID/Cooperative Aircraft ID (CI/CAI), E4B Mod Miniature Receive Terminal (E4B MMRT), and Military Airspace Management System (MAMS).

– (U) Category: General CCD-Multispectral Decoys (CCD-MS Decoy), LS-Active Noise Reduction (LS-ANR), Chemically Hardened Air Transportable Hospital (CHATH), ABO-Armored Multi-Role Vehicle (ABO-ARMRV), RRR-Mat Anchoring, AOD-Adverse Terrain AMMO Assem (ATAAT/ATTV), CCD-Multispectral Nets (CCD-MS Nets), CCD-Vertical Smoke and Obscurant (CCD-V Smoke), CCD-Laser Warning/Laser Defeat (Laser), CSD-Spinal Cord Injury Transport System (SCITS), LS-Advanced Technology Anti-G Suit (ATAGS), CWD-Disposable Eye/Respiratory Protect (DERP), AFF-Deployable Fire Protection System (AFF-Fire Protection), LS-Advanced Night Vision System (LS-ANVS), CCD-Runway Signature Characterization Disguise (CCD-RSCD), CSD-Transportable Blood Transshipment Center (CSD-TBTC), SAB-Electric Rapid Utility Repair Kits (RURK), SAB-Water RURK, ABO-EOD/Medical Protective Shield (ABO-EOD Shield), ABO-Mobile Ordnance Disrupter System (MODS), RRR-Deployable Pavement Repair System, ABO-Rapid Ordnance Removable System (ABO-RORS), BISS Active Denial System, Environmental Control Unit (ECU) Replacement, LS-Passenger Smoke and Fire Protection, ABO-Aircraft Expedient Dispersal Tech, ABO-EHR Munitions Stores Bins/Containers, CCD-Speed Trap, SAB-POL RURK, LS-Universal Water Activated Release System (LS-UWARS), CCD-Multispectral Smoke (CCD-MS-SMOKE), CCD-Ground Jammer, Wind Correction Munitions Dispenser (WCMD), LS-Light Weight Low Profile Backstyle Parachute (LS-LTWT PARACHUTE), CWD Ground Crew Ensemble (CWD-GCENS), CWD-Auto Mustard Agent Det (M8A1) (CWD-AMAD), CWD-Explosive Ordnance Disposal Ensemble (CWD-EOD), AFF-Crash/Fire, ABO-Anti-Penetration Tactical Shelters (ABO-TAC), Semi-Hardened Air Mobile Structures (AIRMOB STRUCT), CCD-Simulation (CCD-SIM), AGM-130 Integration, Helmet Mounted Cueing System (HMCS), LS-Combat Ace, CWD-Fire Fighter's Ensemble (CWD-FFENS), and CWD-Biological Detector (CWD-BIO DET). Milstar: Plan completion of Milestone II of Milstar Polar Adjunct. Test Execution of terminal IOT&E Phase II in 1995. SFW: IOT&E scheduled to begin Oct 1994 and continue until 30 Jun 1995. Testing will be held at Eglin AFB, FL. C-17: IOT&E will end Jan 95, with the accomplishment of Milestone IIIB in Jul 95.

(U) FY 1996

– (U) FY 96 IOT&E Planning Program: HQ AFOTEC will conduct IOT&E on the following 107 programs. The FY 96 list of programs may not be all inclusive due to changing program schedules and "pop-up" requirements. ($24,506)

– (U) Category: Aircraft/Support F-15C/E Tactical Electronic Warfare System (TEWS), C-17, Loader 60K, F-22 Advanced Tactical Fighter, Follow-on Tactical Reconnaissance System (FOTRS), B-2, B-1B Conventional Munitions Upgrade Program (CMUP), EF-111A System Improvement Program (SIP), Compass Call, CV-22 Osprey, F-15 APG-63 Radar, F-15 Manned Destructive SEAD (MDS), F-15 WRM Fuel Tanks, KC-135R Expanded Refueling Capability (ERC), F/A-16 CAS/BAI Aircraft, Advanced Missile Warning, Simulator for Electronic Combat (SECT), Advanced Strategic and Tactical IR Expend (ASTE), and B-1B Conventional Munitions Upgrade Pgm Block D/E (B-1B CNUP BLK D/E).

– (U) Category: Space Cheyenne Mountain Upgrade (CMU), CMU-Survivable Communications Integration System (SCIS), CMU-Granite Sentry, CMU-Alternate Processing and Correlation Center (APCC), Milstar, Integrated Correlation and Display System (ICADS), Survivable Defense Satellite Program (DSP-1), HAVE STARE Radar, Ground NDS Terminal (GNT), Alert Locate and Report Missiles (ALARM), Brilliant Eyes (BE), DMSP Block VI, Airborne Laser Lab

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| | PROJECT: 0191 |

(ABL), Attack and Launch Early Reporting to Theater (ALERT), Ballistic Missile Defense (BMD) System, SDI Command Control Element (SDI C2E), Early Warning Radar (EWR), Ground Base Electro-Optical Deep Space Surveillance (GEODSS), ICBM Minuteman III Propulsion Replacement Program (ICBM-MMIII PRP), Navstar GPS Block IIR (GPS IIR), GPS Block II Follow-on (GPS IIF), ICBM Minuteman III Guidance Program Phase II (ICBM-MMIII GRP II), RSA Network Control (RSA-NC), RSA Centralized Telemetry Processing Systems (RSA-CTPS), RSA Unified Tracking Antenna (RSA-UTA), Advanced Electro-Optical System (AEOS) and ICBM-Rapid Execution and Combat Target (REACT).

– (U) Category: Missile/Munitions Joint Direct Attack Munitions (JDAM), Joint Standoff Weapon (JSOW), AOD-Joint Programmable Fuze (JPF), AIM-9X Air-to-Air Missile (AIM-9X), Theater Missile Defense-Intercept Missile (TMD-Intercept), and AMRAAM (AIM-120C) P3I Phase 3 (AMRAAM P3I PH3).

– (U) Category: Computer, Communication, Command and Control and Information System (C4I) Joint STARS, AMC C-2 Info Processing System II-IV, Combat Survival Evader Locator (CSEL), CWD-Wartime Medical System (CWD-WARMED), Region/Sector Operations Control Center (R/SOCC), Modular Control Equipment (MCE P3I), Military Airspace Management System (MAMS), Global Transportation Network (GTN), Military Microwave Landing Sys-Avionics (MMLSA), Tower Restoral Vehicle (TRV), DMSP Small Tactical Terminal (DMSP-STT), Advance Training System (ADV TNG SYS), Improvement of Selected Intelligence Data Handling (IDHS), E3 Radar System Improvement Program (E3 RSIP), JTIDS Class 2 Terminal Multiservice (JTIDS CL2), E4B Universal Modem (E4B UM ATV), Combat Intelligence System (CIS), Modular TACC (CTAPS), Cloud Depiction and Forecast System II (CDFS II), Theater Missile Defense - C4I (TMD-C4I), Combat ID/Cooperative Aircraft ID (CI/CAI), and E4B Mod Miniature Receive Terminal (E4B MMRT).

– (U) Category: General Chemically Hardened Air Transportable Hospital (CHATH), ABO-Armored Multi-Role Vehicle (ABO-ARMRV), ABO-Anti-Penetration Tactical Shelters (ABO-TAC), AFF Crash/Fire, RRR-Mat Anchoring, CCD-Multispectral Nets (CCD-MS Nets), CCD-Simulation, CCD-Vertical Smoke and Obscurant (CCD-V Smoke), CCD-Laser Warning/Laser Defeat (Laser), CSD-Spinal Cord Injury Transport System (SCITS), CWD-Biological Detector (CWD-BIO DET), CWD-Disposable Eye/Respiratory Protect (DERP), CWD-Fire Fighter's Ensemble (CWD-FFENS), LS-Advanced Night Vision System (LS-ANVS), LS-Combat ACE, CCD-Runway Signature Characterization Disguise (CCD-RSCD), CSD-Transportable Blood Transshipment Center (CSD-TBTC), HMCS, SAB-Electric Rapid Utility Repair Kits (RURK), SAB-Water RURK, ABO-EOD/Medical Protective Shield (ABO-EOD Shield), ABO-Mobile Ordnance Disrupter System (MODS), RRR-Deployable Pavement Repair System, ABO-Rapid Ordnance Removable System (ABO-RORS), BISS Active Denial System, Environmental Control Unit (ECU) Replacement, ABO-Aircraft Expedient Dispersal Tech, ABO-EHR Munitions Stores Bins/Containers, CCD-Speed Trap, Semi-hardened Air Mobile Structures (Airmob Struct), SAB-POL RURK, CCD-Ground Jammer, and AGM-130 Integration.

(U) FY 1997

– (U) FY 97 IOT&E Planning Program: HQ AFOTEC will conduct IOT&E on the following 93 programs. The FY 97 list of programs may not be all inclusive due to changing program schedules and "pop-up" requirements. ($26,921)

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– (U) Category: Aircraft/Support F-22 Advanced Tactical Fighter, Follow-on Tactical Reconnaissance System (FOTRS), B-2, B-1B Conventional Munitions Upgrade Program (CMUP), EF-111A System Improvement Program (SIP), Compass Call, CV-22 Osprey, F-15 APG-63 Radar, F-15 Manned Destructive SEAD (MDS), KC-135R Expanded Refueling Capability (ERC), F/A-16 CAS/BAI Aircraft, Advanced Missile Warning, Loader 60K, Advanced Strategic and Tactical IR Expend (ASTE), and B1B Conventional Munitions Upgrade Pgm Block D/E (B1B CMUP BLK D/E).

– (U) Category: Space Cheyenne Mountain Upgrade (CMU), Milstar, Integrated Correlation and Display System (ICADS), Survivable Defense Satellite Program (DSP-1), Ground NDS Terminal (GNT), Alert Locate and Report Missiles (ALARM), Brilliant Eyes (BE), DMSP Block VI, Airborne Laser Lab (ABL), CMU-GRANITE SENTRY, CMU-Alternate Processing and Correlation Center (CMU-APCC), Ballistic Missile Defense (BMD) System, SDI Command Control Element (SDI C2E), HAVE STARE Radar, Early Warning Radar (EWR), Ground Based Electro-Optical Deep Space Surveillance (GEODSS), ICBM Minuteman III Propulsion Replacement Program (ICBM-MMIII PRP), Navstar GPS Block IIR (GPS IIR), GPS Block II Follow-on (GPS IIF), ICBM Minuteman III Guidance Program Phase II (ICBM-MMIII GRP II), RSA Network Control (RSA-NC), RSA Centralized Telemetry Processing Systems (RSA-CTPS), RSA Unified Tracking Antenna (RSA-UTA), Advanced Electro-Optical System (AEOS), and Attach & Launch Early Report to Theater (ALERT).

– (U) Category: Missile/Munitions Joint Direct Attack Munitions (JDAM), Joint Standoff Weapon (JSOW), AOD-Joint Programmable Fuze (JPF), AIM-9X Air-to-Air Missile (AIM-9X), Theater Missile Defense-Intercept Missile (TMD-Intercept), and AMRAAM (AIM-120C) P3I Phase 3 (AMRAAM P3I PH3).

– (U) Category: Computer, Communication, Command and Control and Information System (C4I) Combat Survival Evader Locator (CSEL), Region/Sector Operations Control Center (R/SOCC), Military Airspace Management System (MAMS), Modular Control Equipment (MCE P3I), Military Microwave Landing Sys-Avionics (MMLSA), AMC C-2 Info Processing System II-IV, DMSP Small Tactical Terminal (DMSP-STT), Advanced Training System (ADV TNG SYS), Improve-ment of Selected Intelligence Data Handling (IDHS), JOINT STARS, E3 Radar System Improvement Program (E3 RSIP), JTIDS Class 2 Terminal Multiservice (JTIDS CL2), CSD-Wartime Medical System (CSD-WARMED), Combat Intelligence System (CIS), Modular TACC (CTAPS), Cloud Depiction and Forecast System II (CDFS II), Theater Missile Defense-C4I (TMD-C4I), Combat ID/Cooperative Aircraft ID (CI/CAI), and E4B Mod Miniature Receive Terminal (E4B MMRT).

– (U) Category: General Chemically Hardened Air Transportable Hospital (CHATH), ABO-Armored Multi-Role Vehicle (ABO-ARMRV), ABO-Anti-Penetration Tactical Shelters (ABO-TAC), AFF Crash/Fire, RRR-Mat Anchoring, CCD-Simulation, CCD-Vertical Smoke and Obscurant (CCD-V Smoke), CCD-Laser Warning/Laser Defeat (Laser), CCD-Runway Signature Characterization Disguise (CCD-RSCD), CSD-Transportable Blood Transshipment Center (CSD-TBTC), HMCS, SAB-Electric Rapid Utility Repair Kits (RURK), SAB-Water RURK, ABO-EOD/Medical Protective Shield (ABO-EOD Shield), ABO-Mobile Ordnance Disrupter System (MODS), RRR-Deployable Pavement Repair System, ABO-Rapid Ordnance Removable System (ABO-RORS), BISS Active Denial System, Environmental Control Unit (ECU) Replacement, ABO-Aircraft Expedient Dispersal Tech, ABO-EHR Munitions Stores Bins/Containers, CCD-Speed Trap, Semi-hardened Air Mobile Structures (Airmob Struct), SAB-POL RURK, and LS-Advanced Night Vision System (LS-ANVS), CCD-Multispectral Nets (CCS-MS Nets), CCD-Ground Jammer, and AGM-130 Integration.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605712F Initial Operational Test & Eval

PROJECT: 0191

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 27,656 | 33,504 | 24,629 | 27,055 | Cont |
| (U) Appropriated Value | | 33,504 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -500 | | | |
| b. Below Threshold Reprogramming | -600 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -123 | -134 | |
| (U) Current Budget Submit/President's Budget | 27,056 | 33,004 | 24,506 | 26,921 | Cont |

(U) Change Summary Explanation:

Funding: None.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

(U) **D. Schedule Profile:** Not applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 495,918 | 483,821 | 454,067 | 458,335 | 482,628 | 482,541 | 477,028 | 476,823 | Continuing | TBD |
| 06TS Test and Evaluation Support/6606TS (1) | 379,871 | 365,365 | 330,727 | 334,054 | 349,235 | 344,258 | 349,725 | 346,673 | Continuing | TBD |
| 06AS Aircraft Support/6606AS (2) | 37,436 | 34,476 | 12,539 | 12,229 | 13,211 | 13,930 | 15,140 | 16,388 | Continuing | TBD |
| 06MC Minor Construction/6606MC (3) | 4,245 | 3,243 | 3,660 | 3,738 | 3,914 | 4,106 | 4,228 | 4,354 | Continuing | TBD |
| 06MR Maintenance and Repair/6606MR (4) | 45,019 | 51,183 | 84,354 | 86,135 | 93,188 | 96,187 | 83,132 | 83,868 | Continuing | TBD |
| 06TG 46 Test Group/6606TG (5) | 29,347 | 29,554 | 22,787 | 22,179 | 23,080 | 24,060 | 24,803 | 25,540 | Continuing | TBD |

Note: Beginning in FY 96, $26,400 is transferred from this PE to PE 0605896F Base Operating Support. The following FY 94/95 funding totals (dollars in thousands) represent what the totals would be considering a reduction of $26,400 in each year. (See Note 1 below.) These totals provide a more meaningful funding trend analysis for this PE.

| | FY 1994 | FY 1995 |
|---|---|---|
| Total PE | 469,518 | 457,421 |
| Project 6606TS | 353,471 | 338,965 |

(1) Test and Evaluation Support, project 6606TS, was combined from projects 06RB, 06YA, and 06ZA in this PE. (FY 94 includes project 06UC and 1013; FY 95 includes project 06UC). Base Operating Support (BOS) funds ($26,400 in FY 96) were transferred from PE 0605807 (Arnold Engineering Development Center) into PE 0605896F. The purpose of the transfer is to more evenly account for BOS-type efforts within PE 0605896F at the three major AF test centers. Similarly, approximately $26,000 has also been transferred in FY 97-01.

(2) Aircraft Support, project 6606AS, was transferred from PE 0605863F (combining projects 662111 and 662112), effective FY 96. Funding in FY 94/95 refers to PE 0605863F.

(3) Minor Construction, project 6606MC, was transferred from PE 0605876F, effective FY 96. Funding in FY 94/95 refers to PE 0605876F.

(4) Maintenance and Repair, project 6606MR, was transferred from PE 0605878F, effective FY 96. Funding in FY 94/95 refers to PE 0605878F.

(5) 46 Test Group, project, 6606TG, was transferred from PE 0605708F, effective FY 96. FY 94/95 totals include both the test infrastructure and test investment portion of PE 0605708F. Beginning in FY 96, the funding in this project is only for test infrastructure. The investment portion transfers to PE 0604256F.

(U) A. **Mission Description and Budget Item Justification:** This program element consolidates five PEs (or portions thereof) as mentioned above. The aircraft support project provides resources for maintaining Air Force Materiel Command (AFMC) assigned test and test support coded aircraft which are included as a portion of the Department of Defense Major Range and Test Facility Base (MRTFB). The Minor Construction project provides essential minor construction at the three Air Force MRTFBs (Eglin AFB FL, Edwards AFB CA, and Arnold AFB TN). The Maintenance and Repair project provides real property maintenance and repair at the three MRTFBs. The 46 Test Group (46TG) project provides the following unique capabilities as part of the DoD MRTFB: the High Speed Test Track (HSTT), Central Inertial Guidance Test Facility (CIGTF), and the Radar Target Scatter (RATSCAT) facility. The Test and Evaluation (T&E) Support program provides resources to operate the above Air Force test activities.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605807F Test And Evaluation Spt |

(U) B. **Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 524,253 | 489,155 | 516,670 | 525,327 | Cont |
| (U) Appropriated Value | | 489,984 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -5,338 | | | |
| b. Omnibus or Other Above Threshold Reprogramming | | -825 | | | |
| c. Below Threshold Reprogramming | -28,335 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -62,603 | -66,992 | |
| (U) Current Budget Submit/President's Budget | 495,918 | 483,821 | 454,067 | 458,335 | Cont |

(U) Change Summary Explanation:

Funding: FY 94/95 totals include funding from PEs 0605807F, 0605863F, 0605876F, 0605878F, and 0605708F. For Test and Evaluation Support (6606TS), beginning in FY 96, this project was combined from projects 06RB, 06YA, and 06ZA which, in prior years was PE 0605807F. (FY 94 funding includes project 06UC (Utah Test and Training Range) and Project 1013 (4950th TW); FY 95 funding includes project 06UC). In FY 96, $26,400 in Base Operating Support (BOS) funds were transferred from PE 0605807 (Arnold Engineering Development Center project) into PE 0605896F (Base Operations Support). The purpose of the transfer is to standardize the BOS-type efforts within PE 0605896F at the three major AF test centers. Similarly, approximately $26,000 has also been transferred in FY 97-01. Beginning in FY 96, funding has been transferred from the Defense Business Operating Fund (DBOF) to pay for T&E financial reporting ($6,700 in FY 96, and $10,900 in FY 97). For Aircraft Support (6606AS), beginning in FY 96, customers will be charged a pro-rata share base on aircraft usage. For Maintenance and Repair (6606MR), changes due to civilian pay repricing and results of Commander's Facility Assessment exercise. For 46 Test Group (6606TG), changes reflect a civilian pay reprice.

Schedule: For Aircraft Support (6606AS), minor schedule adjustments occur based on changes to program priority requirements.

Technical: None.

(U) C. **Other Program Funding Summary ($ in Thousands):** Not applicable.

Related RDT&E:

(U) PE 0605856F, Environmental Compliance

(U) PE 0605896F, Base Operations RDT&E (Base operating support)

(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)

(U) PE 0604940D, Central Test & Evaluation Improvement Program (T&E investments for new tri-service test capabilities)

(U) D. **Schedule Profile:** Not applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt

PROJECT: 06TS

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 06TS Test and Evaluation Support/6606TS (1) | 379,871 | 365,365 | 330,727 | 334,054 | 349,235 | 344,258 | 349,725 | 346,673 | Continuing | TBD |

(1) Test and Evaluation Support, project 6606TS, was combined from projects 06RB, 06YA, and 06ZA in this PE. (FY 94 includes project 06UC and 1013; FY 95 includes project 06UC). Base Operating Support (BOS) funds ($26,400 in FY 96) were transferred from PE 0605807 (Arnold Engineering Development Center) into PE 0605896F. The purpose of the transfer is to more evenly account for BOS-type efforts within PE 0605896F at the three major AF test centers. Similarly, approximately $26,000 has also been transferred in FY 97-01.

(U) A. **Mission Description and Budget Item Justification:** This project provides resources to operate the Air Force test activities which are included in the Department of Defense (DoD) Major Range and Test Facility Base (MRTFB). Test facilities/capabilities operated through this program include wind tunnels, rocket and jet engine test cells, space environmental simulation chambers, armament test ranges, climatic test facilities, avionics test facilities, aircraft testbeds, dry lakebed landing sites, and instrumented test ranges. T&E Support funds test infrastructure overhead activities including: command and supervisory staffs; supply stocks; upkeep, refurbishment, repair, and replacement of worn or obsolete test equipment; test infrastructure for data collection, transmission, reduction, and analysis; civilian salaries; temporary duty travel; support contract costs for hardware and software engineering and maintenance; and minor improvement and modernization projects. Three major Air Force test centers are supported by this project: (1) Arnold Engineering and Development Center (AEDC) which provides the test infrastructure overhead support to operate the largest complex of ground test facilities in the free world (includes transonic, supersonic, and hypersonic wind tunnels; rocket motor and turbine engine test cells; space environmental test chambers, hyperballistic ranges; and other specialized facilities). (2) Air Force Flight Test Center (AFFTC), Edwards AFB CA which provides test infrastructure overhead support for development and operational test and evaluation support for aircraft and aircraft systems, aerospace research vehicles, unmanned miniature vehicles, cruise missiles, parachute delivery/recovery systems, and cargo handling systems. The AFFTC also operates the Utah Test and Training Range (UTTR) in Northwest Utah. T&E overhead support capability for UTTR will be severely curtailed in FY 96 and out. In FY 94, most of the 4950th Test Wing funding transferred to AFFTC. The remaining funds were used to support the Aircraft Modification Directorate, previously called Developmental Manufacturing and Modification Facility (DMMF). (3) Air Force Development Test Center (AFDTC), Eglin AFB FL which provides the test infrastructure overhead support for non-nuclear air armaments (including aircraft guns, ammunition, bombs, and missiles) and Electronic Warfare (EW) systems for DoD and allied forces. AFDTC provides a scientific test process that supports the development and enhancement of munitions and EW systems. This process reduces the risk of acquisition programs and ensures military equipment will work in the combat environment.

(U) FY 1994 Program:

(U) Arnold Engineering Development Center

– (U) Continued test infrastructure overhead support to enable testing for classified programs, and the F-15, F-16, F-18E/F, F-22, B-1 Conventional Stores Certification, Ballistic Missile Defense Organization (BMDO) and other unclassified programs, and provided for ASTF icing capability to support advanced aircraft test needs. ($147,471)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
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| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605807F Test And Evaluation Spt | PROJECT<br>06TS |

(U) DMMF (Aircraft Modification Directorate)
– (U) Funded indirect labor and supporting expenses (training, travel, office supplies, etc.) and support services required for the DMMF mission in support of RBA programs in excess of $27,600. ($6,000)

(U) Air Force Flight Test Center
– (U) Continued to provide test infrastructure overhead support enabling testing of the B-1B, B2, F-16, F-15, F-15E, F-22, AFTI/F-16, Gunship/Combat Talon II, C-17, Benefield Anechoic Facility, ARIA, SMILS, ECCM/ARTB, and classified programs. ($130,700)
– (U) USAF Test Pilot School operating costs. ($17,000)

(U) Air Force Development Test Center
– (U) Continued test infrastructure overhead support for non-nuclear air armaments (AMRAAM, SEEK EAGLE, TMD, JDAM, JSOW, and AIM-9X); climatic simulation (B-2, etc.) (1st qtr); electronic warfare (JSTARS, F15-TEWS, etc.); C4I (JTIDS, AWACS, BISS, Combat Intelligence Systems, Combat Weather Systems, etc.) ($78,700)

(U) FY 1995 Planned Program:
(U) Arnold Engineering and Development Center
– (U) Continue test infrastructure overhead support to enable testing for classified programs, and unclassified programs (F-22, JDAM, F-15, F-16, Minuteman, and F-18. ($144,711)

(U) DMMF (Aircraft Modification Directorate):
– (U) Fund indirect labor and supporting expenses (training, travel, office supplies, etc.) and support services required for the DMMF mission in support of RBA programs in excess of $25,900. ($2,976)

(U) Air Force Flight Test Center
– (U) Continue to provide test infrastructure overhead support enabling testing of the B-1B, B2, F-16, F-15, F-15E, F-22, AFTI/F-16, Gunship/Combat Talon II, C-17, Benefield Anechoic Facility, ARIA, SMILS, ECCM/ARTB, and classified programs. ($121,283)
– (U) USAF Test Pilot School operating costs. ($17,500)
– (U) Fund US test pilots to attend foreign test pilot schools. ($2,700)

(U) Air Force Development Test Center
– (U) Continued test infrastructure overhead support for non-nuclear air armaments (AMRAAM, SEEK EAGLE, TMD, JDAM, JSOW, ASRAAM, and AIM-9); electronic warfare (JSTARS, F15-TEWS, etc.); C4I (JTIDS, AWACS, BISS, Combat Intelligence Systems, Combat Weather Systems, etc.); and refurbishment of the Climatic Test Facility. ($76,195)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605807F Test And Evaluation Spt |
| | PROJECT<br>06TS |

(U) FY 1996 Planned Program:
(U) Arnold Engineering and Development Center
– (U) Continue test infrastructure overhead support to enable testing for classified programs, and unclassified programs (F-22, JDAM, F-15, F-16, Minuteman, and F-18. ($114,431)

(U) DMMF (Aircraft Modification Directorate):
– (U) Fund indirect labor and supporting expenses (training, travel, office supplies, etc.) and support services required for the DMMF mission in support of RBA programs in excess of $25,900. ($2,000)

(U) Air Force Flight Test Center
– (U) Continue to provide test infrastructure overhead support enabling testing of the B-1B, B2, F-16, F-15, F-15E, F-22, AFTI/F-16, Gunship/Combat Talon II, C-17, Benefield Anechoic Facility, ARIA, SMILS, ECCM/ARTB, and classified programs. ($113,649)
– (U) USAF Test Pilot School operating costs. ($18,000)

(U) Air Force Development Test Center
– (U) Continued test infrastructure overhead support for non-nuclear air armaments (AMRAAM, SEEK EAGLE, TMD, JDAM, JSOW, etc.) electronic warfare (JSTARS, F15-TEWS, etc); C4I (JTIDS, AWACS, BISS, AFMSS), and refurbishment of the Climatic Test Facility ($75,947)

(U) Financial Reporting Support: Provide funding from Defense Business Operating Fund (DBOF) for T&E financial reporting. ($6,700)

(U) FY 1997 Planned Program:
(U) Arnold Engineering and Development Center
– (U) Continue test infrastructure overhead support to enable testing for classified programs, and unclassified programs (F-22, JDAM, F-15, F-16, Minuteman, and F-18. ($115,240)

(U) DMMF (Aircraft Modification Directorate):
– (U) Fund indirect labor and supporting expenses (training, travel, office supplies, etc.) and support services required for the DMMF mission in support of RBA programs in excess of $25,900. ($2,000)

(U) Air Force Flight Test Center
– (U) Continue to provide test infrastructure overhead support enabling testing of the B-1B, B2, F-16, F-15, F-15E, F-22, AFTI/F-16, Gunship/Combat Talon II, C-17, Benefield Anechoic Facility, ARIA, ECCM/ARTB, and classified programs. ($112,241)
– (U) USAF Test Pilot School operating costs. ($18,600)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt / PROJECT: 06TS |

(U) Air Force Development Test Center

– (U) Continued test infrastructure overhead support for non-nuclear air armaments (AMRAAM, SEEK EAGLE, TMD, JDAM, JSOW, WCMD, etc.); electronic warfare (JSTARS, F15-TEWS, F-16 ALR 56M, etc); C4I (JTIDS, BISS, TMD), and aircraft software upgrades. ($75,073)

(U) Financial Reporting Support: Provide funding from Defense Business Operating Fund (DBOF) for T&E financial reporting. ($10,900)

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 399,930 | 373,376 | 387,857 | 395,038 | Cont |
| (U) Appropriated Value | | 370,300 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -4,869 | | | |
| b. Omnibus or Other Above Threshold Reprogramming | | -66 | | | |
| c. Below Threshold Reprogramming | -20,059 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -57,130 | -60,984 | |
| (U) Current Budget Submit/President's Budget | 379,871 | 365,365 | 330,727 | 334,054 | |

(U) Change Summary Explanation:.

Funding: In FY 96, this project was combined from projects 06RB, 06YA, and 06ZA which comprised PE 0605807F. (FY 94 includes project 06UC (Utah Test and Training Range) and Project 1013 (4950th TW); FY 95 includes project 06UC). In FY 96, $26,400 in Base Operating Support (BOS) funds were transferred from PE 0605807 (Arnold Engineering Development Center project) into PE 0605896F. The purpose of the transfer is to more evenly account for BOS-type efforts within PE 0605896F at the three major AF test centers. Similarly, approximately $26,000 has also been transferred in FY 97-01. Beginning in FY 96, funding has been transferred from the Defense Business Operating Fund (DBOF) to pay for T&E financial reporting ($6,700 in FY 96, and $10,900 in FY 97). Additional cuts were taken as part of the overall DoD budget reductions.

Schedule: None.

Technical: None.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605807F Test And Evaluation Spt |
| | PROJECT<br>06TS |

**(U) C. Other Program Funding Summary ($ in Thousands):** Not applicable.

Related RDT&E:
(U) PE 0605856F, Environmental Compliance

(U) PE 0605896F, Base Operations RDT&E (Base operating support)
(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)
(U) PE 0604940D, Central Test & Evaluation Improvement Program (T&E investments for new tri-service test capabilities)

**(U) D. Schedule Profile:** Not applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt

PROJECT: 06AS

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 06AS Aircraft Support/6606AS (2) | 37,436 | 34,476 | 12,539 | 12,229 | 13,211 | 13,930 | 15,140 | 16,388 | Continuing | TBD |

(1) Aircraft Support, project 6606AS, was transferred from PE 0605863F (combining projects 662111 and 662112), effective FY 96. Funding in FY 94/95 refers to PE 0605863F.

**(U) A. Mission Description and Budget Item Justification:** The RDT&E aircraft support program provides resources for maintaining Air Force Materiel Command (AFMC) assigned test and test support coded aircraft which are included as a portion of the Department of Defense Major Range and Test Facility Base (MRTFB). This program supports 160 RDT&E aircraft of 18 different types. These include a multitude of configurations, with many prototype, preproduction, and extensively modified/instrumented one-of-a-kind aircraft. Funds pay for depot level maintenance such as: Programmed Depot Maintenance (PDM), the calendar-based cyclic scheduling of aircraft into depots for update/inspection; modifications and any other depot level repairs required by the aircraft System Program Directors (SPD); engine overhauls and engine modules; depot-provided area assistance; and assorted ground support equipment overhauls that require reimbursement.

(U) FY 1994
- (U) Performed PDM and engine overhauls. ($37,436)

(U) FY 1995
- (U) Perform PDM and engine overhauls. ($34,476)

(U) FY 1996
- (U) Perform PDM and engine overhauls. ($12,539)

(U) FY 1997
- (U) Perform PDM and engine overhauls. ($12,229)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | | DATE February 1995 |
|---|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605807F Test And Evaluation Spt | PROJECT<br>06AS |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 42,157 | 34,476 | 41,308 | 41,058 | Cont |
| (U) Appropriated Value | | 34,476 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Below Threshold Reprogramming | -4,721 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -28,769 | -28,829 | |
| (U) Current Budget Submit/President's Budget | 37,436 | 34,476 | 12,539 | 12,229 | Cont |

(U) Change Summary Explanation:

Funding: Beginning in FY 96, customers will be charged a pro-rata share base on aircraft usage.

Schedule: Minor schedule adjustments occur based on changes to program priority requirements.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

Related RDT&E:
(U) PE 0605856F, Environmental Compliance
(U) PE 0605896F, Base Operations RDT&E (Base operating support)
(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)
(U) PE 0604940D, Central Test & Evaluation Improvement Program (T&E investments for new tri-service test capabilities)

(U) **D. Schedule Profile:** Not applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt

PROJECT: 06MC

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 06MC Minor Construction/6606MC (3) | 4,245 | 3,243 | 3,660 | 3,738 | 3,914 | 4,106 | 4,228 | 4,354 | Continuing | TBD |

(1) Minor Construction, project 6606MC, was transferred from PE 0605876F, effective FY 96. Funding in FY 94/95 refers to PE 0605876F.

**(U) A. Mission Description and Budget Item Justification:** This program element provides essential minor construction at three DoD Major Range and Test Facility Base locations: Eglin AFB FL, Edwards AFB CA, and Arnold AFB TN. Physical plant maintained by this account covers 800,000 acres of land; over four thousand structures in excess of 30 years old encompassing fifteen million square feet; over five million square yards of airfield pavement; 1900 miles of road network; utility systems that include 120 wells, 10 sewage treatment plants, 20 substations and over 1600 miles of high voltage electrical distribution lines.

(U) FY 1994 Program:

– (U) Financed in-house work performed by government employees and includes supplies, materials and equipment; financed installation of taxiway lighting and replaced propulsion wind tunnel transformer, and altered aeropropulsion systems test facility control room and financed Federal Emergency Management Program projects. ($4,245)

(U) FY 1995 Planned Program:

– (U) Finance in-house work force (supplies, materials and equipment) and perform most critical minor construction at the three MRTFBs. ($3,243)

(U) FY 1996 Planned Program:

– (U) Finances in-house work force (supplies, materials and equipment); replace plenum escape system transformer and add 16KV circuit breaker to plenum escape system substation; and finance addition to equipment research laboratory and provide additional well reservoir. ($3,660)

(U) FY 1997 Planned Program:

– (U) Finances in-house work force (supplies, materials and equipment); provide additions to fire station and base supply and equipment warehouse and alter various facilities to promote access to physically challenged persons. ($3,738)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt / PROJECT: 06MC |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 7,739 | 3,281 | 3,678 | 3,757 | Cont |
| (U) Appropriated Value | 7,739 | 3,281 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -38 | | | |
| b. Below Threshold Reprogramming | -3,494 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | -18 | -19 | |
| (U) Current Budget Submit/President's Budget | 4,245 | 3,243 | 3,660 | 3,738 | Cont |

(U) Change Summary Explanation:
Funding: None.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

Related RDT&E:
(U) PE 0605856F, Environmental Compliance
(U) PE 0605896F, Base Operations RDT&E (Base operating support)
(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)

(U) **D. Schedule Profile:** Not applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt

PROJECT: 06MR

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 06MR Maintenance and Repair/6606MR (4) | 45,019 | 51,183 | 84,354 | 86,135 | 93,188 | 96,187 | 83,132 | 83,868 | Continuing | TBD |

(1) Maintenance and Repair, project 6606MR, was transferred from PE 0605878F, effective FY 96. Funding in FY 94/95 refers to PE 0605878F.

(U) A. **Mission Description and Budget Item Justification:** This project provides essential Real Property Maintenance and Repair at three DoD Major Range and Test Facility Base (MRTFB) locations: Eglin AFB FL, Edwards AFB CA, and Arnold AFB TN. Physical plant maintained by this account covers 800,000 acres of land; over four thousand structures in excess of 30 years old encompassing fifteen million square feet; over five million square yards of airfield pavement; 1900 miles of road network; utility systems that include 120 wells, 10 sewage treatment plants, 20 substations and over 1600 miles of high voltage electrical distribution lines. Beginning in FY 96, the increases represent an Air Force corporate decision to implement a new initiative to measure and improve facility conditions: the Commander's Facility Assessment (CFA). CFA puts a "readiness face" on real property maintenance requirements by having commanders at all levels assess their facility's condition and its impact on mission accomplishment. Facilities are assessed as either Level 1 (Unsatisfactory - minimal mission support) or Level 2 (Degraded - impaired mission support). The field commanders have unanimously endorsed CFA as the best way to determine and address mission impacts due to facility deficiencies. The program increases represent a concerted effort to fund the majority of the Level 1 requirements with a particular emphasis on operational facilities and base infrastructure. Recently, a combined Air Staff (HQ USAF) and Air Force Materiel Command (AFMC) team visited Edwards AFB to better understand the MRTFB real property maintenance (RPM) requirements. It was readily apparent that the CFA results indicating significant PRM requirements was accurate. The base's poor condition clearly reflects the historically inadequate RPM funding for the MRTFBs. Beginning in FY96, we start funding RPM at reasonable levels to adequately support the unique test mission of these bases.

(U) FY 1994 Program:
- (U) Financed in-house M&R work force (payroll, supplies, materials and equipment). ($34,619)
- (U) Funded repair of roofs, 11 test facility valves, airfield asphalt, and repairs to building 5605 (Noncommissioned Officer Quarters). ($8,300)
- (U) Funded repair to electrical lines, painting exteriors of 144 buildings, cylinders repair at propulsion wind tunnel, and repairs to helipad. ($2,100)

(U) FY 1995 Planned Program:
- (U) Finance in house work force. ($33,883)
- (U) Finance repairs to engine test facility, airfield asphalt and runway, overhead lines, Visiting Airmen Quarters (VAQ), electrical substation and various sewer lines. ($8,600)
- (U) Perform various M&R activities (overlay roads, repair aftercooler bundles, transformers, rotor discs, hangar doors, HVAC (heating, ventilation and air conditioning) in various buildings. ($8,700)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt / PROJECT: 06MR |

(U) FY 1996 Planned Program:
- (U) Finance in house work force. ($38,254)
- (U) Repair heat exchangers in engine test facility, 26,500 hp rotor and starter, process air valve, liquid rheostats and water manifolds. ($13,800)
- (U) Repair various water and sewer lines, dorms, circuit breakers and various roofs. ($11,600)
- (U) Commander's Facility Assessment (CFA) exercise identified requirements necessary to improve facilities rated unsatisfactory up to an adequate level at the three MRTFB locations. ($20,700)

(U) FY 1997 Planned Program:
- (U) Finance in-house work force. ($39,535)
- (U) Repair refrigerant insulation, rotor discs, gaseous helium refrigerators, heaters in air processing system and water control valves. ($13,600)
- (U) Repair various roads, underground cable, HVAC (heating, ventilation and air conditioning), airfield pavement, electrical distribution lines and re-roof buildings. ($12,700)
- (U) CFA exercise identified requirements necessary to improve facilities rated below satisfactory up to a satisfactory level at the three MRTFB locations. ($20,300)

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 46,020 | 51,904 | 58,092 | 59,416 | Cont |
| (U) Appropriated Value | | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -721 | | | |
| b. Below Threshold Reprogramming | -1,001 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | 26,262 | 26,719 | |
| (U) Current Budget Submit/President's Budget | 45,019 | 51,183 | 84,354 | 86,135 | Cont |

(U) Change Summary Explanation:

Funding: Changes due to civilian pay repricing and results of Commander's Facility Assessment exercise.

Schedule: None.

Technical: None.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605807F Test And Evaluation Spt |
| | PROJECT<br>06MR |

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

Related RDT&E:
(U) PE 0605856F, Environmental Compliance
(U) PE 0605896F, Base Operations RDT&E (Base operating support)
(U) PE 0604759F, Major T&E Investment (Technical capability improvement and modernization)
(U) PE 0604940D, Central Test & Evaluation Improvement Program (T&E investments for new tri-service test capabilities)

(U) **D. Schedule Profile:** Not applicable.

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt

PROJECT: 06TG

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 06TG 46 Test Group/6606TG (5) | 29,347 | 29,554 | 22,787 | 22,179 | 23,080 | 24,060 | 24,803 | 25,540 | Continuing | TBD |

(1) 46 Test Group, project, 6606TG, was transferred from PE 0605708F, effective FY 96. FY 94/95 totals include both the test infrastructure and test investment portion of PE 0605708F. Beginning in FY 96, the funding in this project is only for test infrastructure. The investment portion transfers to PE 0604256F.

**(U) A. Mission Description and Budget Item Justification:** Beginning in FY 96, this project funds only test infrastructure overhead support including: command and supervisory staffs; supply stocks; upkeep, refurbishment, repair, and replacement of non-repairable or obsolete test equipment; test infrastructure for data collection, transmission, reduction, and analysis; civilian salaries, utilities, temporary duty travel, support contract costs for hardware and software engineering and maintenance. Project infrastructure support is provided for the unique capabilities of the 46th Test Group facilities: the High Speed Test Track (HSTT), Central Inertial Guidance Test Facility (CIGTF), and the Radar Target Scatter (RATSCAT) facility. In FY 94/95 part of the funding was for investment programs: Radar Target Scatter (RATSCAT), Aircraft Navigation System Verification, and the Hypersonic Sled Track Development programs. The RATSCAT program transferred to PE 0604256F in FY 96. There is no Air Force funding in FY 96 and beyond for either the Aircraft Navigation System Verification or the Hypersonic Sled Track Development programs.

(U) FY 1994 Program:

Infrastructure

– (U) Provided infrastructure test support for programs such as Advanced Inertial Measurement System (AIMS), Minuteman III, IRCM, TMD, PAC-3, F-111, Arrow, GBI, FAA GPS Precision Approach field tests, GPS integrated and imbedded INS programs, aircraft navigation systems, Standard Missile II, Advanced Tactical Infrared Countermeasures, F-22 egress testing, Fourth Generation Seat egress testing, Theater High Altitude Area Defense (THAAD) lethality testing, Special Infrared (SIR) flare testing, and Static RCS testing for both classified and unclassified programs, including the F-117A; began development of an automated trajectory system to reduce the cost of egress, flare and IRCM testing at the sled track deferred from FY 92; supported the development a magnetic levitation prototype system at the sled track; and replaced obsolete data acquisition/computer systems for CIGTF. ($21,847)

Investments

– (U) Continued test support operations for Aircraft Navigation System Verification; continued RATSCAT upgrades; and developed designs and prototypes for the construction of a magnetic levitation system. ($7,500)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605807F Test And Evaluation Spt<br>PROJECT<br>06TG |

(U) FY 1995 Planned Program:

– (U) Provide infrastructure test support for programs such as AIMS, Minuteman III, IRCM, TMD, THAAD, PAC-3, F-111, Arrow, GBI, standard missile, FAA GPS Precision Approach field tests, GPS integrated and imbedded INS programs, aircraft navigation systems, Joint Primary Aircraft Training System egress testing, and static RCS testing for both classified and unclassified programs including the F-117A; complete development of an automated trajectory system to reduce the cost of egress, flare and IRCM testing at the sled track deferred from FY 92; continue development activities for the magnetic levitation system; and acquire updated computer systems to improve sled design development activities. ($22,554)

Investments

– (U) Continued test support operations for Aircraft Navigation System Verification; continued RATSCAT upgrades; and continue magnetic levitation system development. ($7,000)

(U) FY 1996 Planned Program:

– (U) Provide infrastructure test support for programs such as IRCM, Peacekeeper, THAAD, F-111, Sparrow, Corps SAM, Standard Missile, FAA GPS Precision Approach field tests, GPS integrated and imbedded INS programs, aircraft navigation systems, F-22 and Joint Primary Aircraft Training System egress testing, and static RCS testing for both classified and unclassified programs including the F-117A; initiate acquisition of special avionics to support GPS integration and testing; continue development activities for the magnetic levitation system; and initiate procurement of equipment for the target fabrications facility at the High Speed Test Track. ($22,787)

(U) FY 1997 Planned Program:

– (U) Provide infrastructure test support for programs such as A-10, IRCM, Peacekeeper, THAAD, Hellfire F/O, Corps SAM, Standard Missile, FAA GPS Precision Approach field tests, GPS integrated and imbedded INS programs, aircraft navigation systems, F-22 and Joint Primary Aircraft Training System egress testing, and static RCS testing for both classified and unclassified programs including the F-117A; complete acquisition of special avionics to support GPS integration and testing; continue development activities for the magnetic levitation system; and continue procurement of equipment for the target fabrications facility at the High Speed Test Track. ($22,179)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0605807F Test And Evaluation Spt / PROJECT: 06TG |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 28,313 | 26,023 | 25,639 | 25,961 | Cont |
| (U) Appropriated Value | | 30,023 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -469 | | | |
| b. Below Threshold Reprogramming | 1,034 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | | | |
| (U) Current Budget Submit/President's Budget | 29,347 | 29,554 | 22,787 | 22,179 | Cont |

(U) Change Summary Explanation:

Funding: Civilian pay reprice.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

(U) **D. Schedule Profile:** Not applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6-RDT&E Management Support

PE NUMBER AND TITLE: PE 0605808F Development Planning

PROJECT NO.: 3361

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Development Planning | 6,724 | 5,870 | 6,745 | 6,764 | 6,952 | 7,166 | 7,398 | 7,628 | Continuing | TBD |

A. Mission Description and Budget Item Justification

The Air Force is in compliance with the DoD 5000 series regulations which mandate that a full range of requirements analyses be conducted to identify and substantiate current operational deficiencies through the Air Force Modernization Planning Process. This PE supports this process. This is a significant change and has a substantial impact on the pre-Milestone I process. First, a Mission Area Assessment (MAA) is conducted to identify tasks and substantiate operational deficiencies. These deficiencies must relate directly to assigned Air Force operational roles, missions, and supporting tasks that cannot be performed efficiently, or in a cost effective manner. Second, a Mission Needs Analysis (MNA) is conducted to identify potential cost effective, non-materiel and materiel alternatives that address the deficiency, or present new technological opportunities. Non-materiel alternatives include doctrine, tactics, training, and organizational changes. Materiel alternatives will include modification and review of all existing DoD, Allied and non-developmental systems, or development of new systems. Operational requirements analyses and supporting acquisition milestone documentation includes MAAs, MNAs, and Mission Need Statements (MNS). Phase 0 concepts studies and Cost and Operational Effectiveness Analyses (COEAS) are not normally conducted in this program element. This PE is in management support because the efforts perform operational requirements studies and analyses directed in support of assigned mission areas and mission area plans. Studies are competitively selected on a yearly basis. There is no unnecessary duplication of effort within the Air Force or DoD.

(U) FY 1994 Accomplishments (Amts in Thousands of Dollars)

- (U) Complete mission area assessment/mission needs analysis to identify most promising alternatives in the area of aircraft emanations detection/interceptibility and explore system integration factors that effectively enhance situation awareness. (581)
- (U) Completed identification of architecture for in-theater weather prediction and determine operational utility of fusing meteorological satellite data with other meteorological data. (702)
- (U) Continue mission needs analysis for destruction of non-emitting surface-to-air targets and investigate alternatives for incorporation into existing aircraft/munitions programs. (950)
- (U) Continue IDEF (Integrated Definition for Functional Modeling) analysis of Air Mobility Command C2 processes-- resolve deficiencies. (1336)
- (U) Continue surveillance and reconnaissance mission area assessment to identify architecture to support the battlefield commander. (726)
- (U) Completed mission needs analysis for the next generation air-to-surface munitions. (494)
- (U) Continue mission needs analysis for theater missile defense. (968)
- (U) Continue mission needs analysis to identify options for hostile target identification-- transition selected options to existing programs. (968)
- (U) Continue mission area assessment/mission needs analysis of C4I architectures for Theater Battle Management. (FY 93 Program- No FY 94 Funds)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #6-RDT&E Management Support | PE NUMBER AND TITLE: PE 0605808F Development Planning — PROJECT NO.: 3361 |

(U) FY 1995 Plans

- (U) Continue to identify operational deficiencies through Mission Area Assessments and Mission Needs Analysis
- (U) Complete development of a merged IDEF Air Mobility Command and Control processes to identify mission area deficiencies and alternative concepts. (985)
- (U) Complete mission needs analysis to identify and options for hostile target identification--transition selected options to existing programs. (785))
- (U) Complete mission need analysis for destruction of non-emitting surface-to-air targets and investigate alternatives for incorporation into existing aircraft/munitions programs. (390)
- (U) Continue mission needs analyses for theater missile defense concepts. (943)
- (U) Continue surveillance and reconnaissance mission area assessment to identify architecture alternatives to support the battlefield commander. (785)
- (U) Continue mission area assessment/mission needs analysis of C4I architectures for Theater Battle Management. (153)
- (U) Initiate IDEF mission area assessment of combat weather support requirements for worldwide AF and Army missions. (675)
- (U) Initiate IDEF mission area assessment of intelligence systems. (528)
- (U) Initiate mission area assessment to investigate cost savings in all aspects of space system life cycle costs. (314)
- (U) Initiate mission area assessment tool definition for education and training missions to include student throughput, technological advances , and force structure changes. (208)
- (U) Initiate mission needs analysis for next generation bare base operations. (104)

(U) FY 1996 Plans and Potential Studies

- (U) Continue to identify operational deficiencies through Mission Area Assessments and Mission Needs Analysis.
- (U) Complete IDEF intelligence functional area assessment tool to identify duplication in intelligence systems.
- (U) Complete mission area assessment tool definition for education and training missions to include student throughput, technological advances, and force structure changes.
- (U) Continue IDEF mission area assessment of combat weather support requirements for worldwide AF and Army missions and joint task forces.
- (U) Continue mission needs analyses for theater missile defense concepts.
- (U) Continue surveillance and reconnaissance mission area assessment to identify architecture to support the battlefield commander.
- (U) Continue mission area assessment/mission needs analysis of C4I architectures for Theater Battle Management.
- (U) Continue mission area assessment to investigate cost savings in all aspects of space system life cycle costs.
- (U) Continue mission needs analysis for next generation bare base operations.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #6-RDT&E Management Support | PE 0605808 Development Planning | 3361 |

(U) FY 1997 Plans and Potential Studies

- (U) Transition IDEF intelligence functional area assessment tool to streamline operational intelligence systems.
- (U) Continue to identify operational deficiencies through Mission Area Assessments and Mission Needs Analysis.
- (U) Continue mission needs analyses for theater missile defense concepts.
- (U) Continue IDEF mission area assessment of combat weather support requirements for worldwide AF and Army missions and joint task forces .
- (U) Continue surveillance and reconnaissance mission area assessment to identify architecture alternatives to support the battlefield commander.
- (U) Continue mission area assessment/mission needs analysis of C4I architectures for Theater Battle Management.
- (U) Continue mission area assessment to investigate cost savings in all aspects of space system life cycle costs.
- (U) Continue mission area assessment tool definition for education and training missions to include student throughput, technological advances, and force structure changes.
- (U) Continue mission needs analysis for bare base operations.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #6-RDT&E Management Support

PE NUMBER AND TITLE: PE 0605808F Development Planning

PROJECT NO.: 3361

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 6,674 | 9,959 | 10,189 | 10,218 | Continuing |
| Appropriated Value | 6,724 | 7,500 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reduction: | | -1,590 | | | |
| Adjustments to BY since FY 95 PB | | | -3,444 | -3,454 | |
| Current Budget Submit/President's Budget | 6,724 | 5,870 | 6,745 | 6,764 | Continuing |

Change Summary Explanation:

Funding: Listed Above

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary ($ in Thousands) and Related Actvities :

(U) - Projects funded by this program element analyze potential nonmateriel and materiel alternatives that include integrating emerging technology into on-going weapon system programs. Army uses multiple O&M PEs (e.g. PE 0208015A and PE 0208018A) to support similar mission needs analyses. Navy uses multiple PEs (e.g. PE 0603763N and PE 0605853N) to support similar mission needs analyses.

(U) - Joint Potential Designator to be determined at Milestone 1. PE only supports pre-Milestone 0 requirements analyses.

(U) - There is no unnecessary duplication of effort within the Air Force.

D. Schedule Profile : Not Applicable

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

DATE: February, 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605853F Environmental Conservation

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 4392 Environmental Conservation | 0 | 0 | 14,169 | 14,070 | 14,578 | 14,767 | 14,685 | 14,682 | Continuing | TBD |

**(U) A. Mission Description and Budget Item Justification**

This program element provides essential RDT&E Management Support for Environmental Conservation (CN) services at three Air Force Material Command Major Range and Test Facility Bases (MRTFBs): Eglin AFB, FL; Edwards AFB, CA; and Arnold AFB, TN. The account provides funds for Operations and Services (O&S), Level I (currently out of compliance with federal, state or local environmental law) and Level II (pending compliance deadline in the future) requirements. Typical projects/services include endangered species survey, monitoring and protection; National Environmental Protection Act Requirements for environmental assessments and environmental impact analysis; wetland and floodplain surveys; cultural resources evaluations; and archeological surveys. This program was moved from the environmental compliance program element (65856) to pay Level I (out of compliance) conservation costs.

- (U) FY 1994 Program element did not exist this fiscal year. Program requirements were funded under environmental compliance program element (65856f).

- (U) FY 1995 Program element did not exist this fiscal year. Program requirements were funded under environmental compliance program element (65856f).

- (U) FY 1996 This program element was established by DoD to capture environmental conservation requirements required by laws and regulations. The entire amount of this program was moved from the environmental compliance program element (65856) to pay Level I (out of compliance) costs. This program has very few recurring requirements. Civilian pay is the major expense in the O&S category. Program funds surveys of endangered species (flora and fauna) , wetlands, historic and archeological sites required by law. Florida and California both have laws requiring extensive surveys of facilities.

(U) FY 1997. Costs are to survey and protect endangered species, wetlands, and historic and archeological sites that are required by federal and state laws. Survey generate plans and programs to preserve natural and cultural resources in compliance with state and federal requirements. Environmental Impact Statements are required for all actions that might affect resources.

Exhibit R-2

| | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>**6 - Management Support** | PE NUMBER AND TITLE<br>**0605853F Environmental Conservation** |

(U) Acquisition Strategy: *Not Applicable*

(U) B. Program Change Summary ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | TBD |
| (U) Appropriated Value | | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. | | | | | |
| b. | | | | | |
| (U) Current Budget Submit/President's Budget | 0 | 0 | 14169 | 14070 | TBD |

(U) Change Summary Explanation:

Funding: The funds for this program were transferred from the environmental compliance program (65956f). The program element did not exist prior to this DoD directed transfer.

Schedule:

Technical:

(U) C. Other Program Funding Summary ($ in Thousands) *Not Applicable*

(U) D. Schedule Profile *Not Applicable*

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605854F Pollution Prevention |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1007 Pollution Prevention | 0 | 0 | 14,046 | 21,361 | 6,965 | 4,975 | 6,134 | 6,301 | Continuing | TBD |

(U) A. Mission Description and Budget Item Justification

This program funds pollution prevention efforts required to accomplish the objectives and subobjectives of the Air Force Pollution Prevention Strategy at the Research and Development Activities Installations (Eglin, Arnold, and Edwards AFBs). It also funds efforts to validate and qualify environmentally acceptable materials and processes to replace existing common hazardous materials and processes. The account provides funds for Operations and Services (O&S), Level P1 (ozone depleting chemical and legal requirements), Level P2 (meet future Air Force goals, policies, and legal requirements), and Level P3 (beyond Air Force goals and legal requirements) projects. Typical project areas include eliminating the use of ozone depleting chemicals; reducing the generation of hazardous waste, air emissions, and wastewater, and the disposal of solid wastes; establishing and operating recycling and composting programs; and establishing hazardous material pharmacies. Prior to FY 96, all funding for this program was in program element (PE) 0708054F. To properly realign program funding into the appropriate major force programs and budget activities for the supported installations, additional PEs were established in Jul 94 (mandatory use starting in FY 96). All RDT&E funding in PE 0708054F was then realigned to PE 0605854F.

(U) FY 1994

– (U) Program element did not exist this fiscal year. Program requirements were funded under pollution prevention PE 0708054F (RDT&E Appropriation).

(U) FY 1995

– (U) Program element did not exist this fiscal year. Program requirements were funded under pollution prevention PE 0708054F (RDT&E Appropriation).

(U) FY 1996

– (U) Funding of Eglin, Arnold, and Edwards AFBs pollution prevention requirements to include solid waste recycling, composting, hazardous waste minimization, and hazardous material management ($4,169,000).

– (U) Validation and qualification of commercially available material, equipment, and processes to support the Montreal Protocol and Air Force Pollution Prevention Strategy objectives and subobjectives in accordance with the Air Force Environmental Research and Development Strategic Plan ($9,877,000).

(U) FY 1997

– (U) Funding of Eglin, Arnold, and Edwards AFBs pollution prevention requirements to include solid waste recycling, composting, hazardous waste minimization, and hazardous material management ($4,668,000).

– (U) Validation and qualification of commercially available material, equipment, and processes to support the Montreal Protocol and Air Force Pollution Prevention Strategy objectives and subobjectives in accordance with the Air Force Environmental Research and Development Strategic Plan ($16,693,000).

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605854F Pollution Prevention |

(U) **Acquisition Strategy:** Not Applicable

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 0 | 0 | 0 | 0 | TBD |
| (U) Appropriated Value | | | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. | | | | | |
| b. | | | | | |
| (U) Current Budget Submit/President's Budget | 0 | 0 | 14,046 | 21,361 | TBD |

(U) Change Summary Explanation:

Funding: This program element was established to properly realign program funding into the appropriate budget structure (major force program and budget activity) for the supported installations. It reflects a transfer of RDT&E appropriation funding from PE 0708054F to PE 0605854F and covers installation level pollution prevention programs and evaluation of commercially available, environmentally acceptable materials and processes. Funding change between FY 96 and FY 97 reflects adjustments made in the program to increase efforts associated with eliminating the requirement for ozone depleting chemicals and reducing hazardous waste.

Schedule:

Technical:

(U) **C. Other Program Funding Summary ($ in Thousands):** Not Applicable

(U) **D. Schedule Profile:** Not Applicable

Exhibit R-2

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

DATE: February, 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605856F Environmental Compliance

PROJECT: 5856

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 5856 Environmental Compliance | 39,355 | 42,371 | 26,423 | 26,229 | 26,398 | 27,092 | 26,160 | 27,372 | Continuing | TBD |

**(U) A. Mission Description and Budget Item Justification**

This program element provides essential RDT&E Management Support for Environmental Compliance (EC) services at three Air Force Material Command Major Range and Test Facility Bases (MRTFBs): Eglin AFB, FL; Edwards AFB, CA; and Arnold AFB, TN. The account provides funds for Operations and Services (O&S), Level I (currently out of compliance with federal, state or local environmental law) and Level II (pending compliance deadline in the future) and Level III (not currently under law, but will enhance the environment) requirements. Typical projects/services include hazardous waste management and disposal; upgrade and removal of underground fuel storage tanks; air and water pollution compliance projects; asbestos abatement and disposal; and polychlorinated biphenyl elimination. Also funds for environmental sampling and analysis, studies, testing and inspections; permits and fees. Funding for environmental conservation moved to PE 65853F in FY 96 and beyond.

(U) FY 1994 (*$ in millions*)
- (U) $25.6 in FY94 for essential " must pay" O&S requirements, such as civilian pay; hazardous waste disposal, environmental permits and fees.
- (U) $13.7 funds Level I (out of compliance) requirements.

(U) FY 1995 (*$ in millions*)
- (U) $26.1 for essential "must pay" O&S requirements, such as civilian pay; hazardous waste disposal; and environmental permits and fees.
- (U) $9.2 funds Level I (out of compliance) requirements.
- (U) $7.1 will fund a limited number of projects classified as Level II (required to meet a future compliance date). Funding will only permit accomplishment of the most critical of these requirements that would go out of compliance during the program FY.

(U) FY 1996 (*$ in millions*)
- (U) $21.2 for essential "must pay" O&S requirements, such as civilian pay; hazardous waste disposal; and environmental permits and fees.
- (U) $3.5 funds Level I (out of compliance) requirements.
- (U) $1.7 will fund a limited number of projects classified as Level II (required to meet a future compliance date). Funding will only permit accomplishment of the most critical of these requirements that would go out of compliance during the program FY.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605856F Environmental Compliance |
| | PROJECT<br>5856 |

(U) FY 1997 *($ in millions)*

- (U) $21.0 for essential "must pay" O&S requirements, such as civilian pay; hazardous waste disposal; and environmental permits and fees.
- (U) $2.9 funds Level I (out of compliance) requirements.
- (U) $2.4 will fund a limited number of projects classified as Level II (required to meet a future compliance date). Funding will only permit accomplishment of the most critical of these requirements that would go out of compliance during the program FY.

**(U) B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 39355 | 42876 | 38505 | 38334 | TBD |
| (U) Appropriated Value | 39575 | 42876 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Congressional General Reductions | -10 | -505 | | | |
| Adjustments to Budget Years | | -495 | 12082 | 12105 | |
| (U) Current Budget Submit/President's Budget | 39355 | 42371 | 26423 | 26229 | TBD |

(U) Change Summary Explanation:

Funding: Funds were transferred from this program element to the environmental conservation program element (65853F) along with the responsibility for compliance with natural and cultural resources laws. This transfer accounts for the large change in FY 96 and following years.

Schedule: ***Not Applicable***

Technical: ***Not Applicable***

**(U) C. Other Program Funding Summary ($ in Thousands)** ***Not Applicable***

**(U) D. Schedule Profile** ***Not Applicable***

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: # 6 Management Support

PE NUMBER AND TITLE: #0605860F Rocket Systems Launch Program

PROJECT NO.: 1023

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Actual | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Rocket System Launch Program | 16,336 | 23,827 | 5,949 | 6,126 | 6,241 | 6,404 | 6,577 | 6,762 | LOE | LOE |

A. (U) Mission Description and Budget Item Justification ($ in Thousands)

(U) Rocket System Launch Program (RSLP) is tasked to provide Research, Development, Test and Evaluation (RDT&E) launch vehicle support to DoD and other government agencies. RSLP was established by the Secretary of Defense in 1972. It provides mission planning, payload integration, launch support, booster storage and disposal, maintenance and logistics support for selected DoD RDT&E launches. Costs directly attributable to a specific launch or program are paid by the user (Air Force, Navy, Army, Ballistic Missile Defense Organization, etc.). RSLP directly supports deactivation of Minuteman II by providing storage of these and other assets as well as continued development of the Multiservice Launch System (MSLS). MSLS will provide a cost-effective modular front section, including guidance system, payload deck, and attitude control system, for retired Minuteman missiles. PBD 120 realigned FY96-2001 RSLP funds from Budget Activity #4, Demonstration and Validation (PE 0603851F) and research category 6.4 to PE 0605860F, Budget Activity #6. RSLP performs research and development support operations required for general research and development use.

(U) FY 1994
- (U) Research test launch vehicle configuration; develop, acquire, store and maintain test launch vehicles, motors, components, and facilities in support of projected governmental user requirements. ($5,200)
- (U) Provide storage for deactivated Minutemen II missiles and other missile flight test assets. ($6,136)
- (U) Continue MSLS development. ($5,000)

(U) FY 1995
- (U) Research test launch vehicle configurations; develop, acquire, store and maintain test launch vehicles, motors, components, facilities and capabilities in support of projected governmental user requirements. ($5,369)
- (U) Provide necessary storage requirements for deactivated Minuteman II and other missile flight test assets. ($5,458)
- (U) Continue MSLS development. ($5,500)
- (U) Develop transportable launch support equipment to launch from various national and state test ranges. ($7,500)
- (U) Provide launch assets and technical assistance for all DoD RDT&E launches. (Funded by Users)

(U) FY 1996
- (U) Continue storage and refurbishment of deactivated Minuteman II and other missile flight test assets. ($5,949)

(U) FY 1997
- (U) Continue storage and refurbishment of deactivated Minuteman II and other missile flight test assets. ($6,126)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| # 6 Management Support | #0605860F Rocket Systems Launch program | 1023 |

B. (U) Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget* | 16,336 | 11,827 | 12,878 | 11,256 | LOE |
| Appropriated Value | 16,336 | 23,827 | | | |
| Adjustments to Appropriated Value | | | | | |
| Current Budget Submit/President's Budget | 16,336 | 23,827 | 5,949 | 6,126 | LOE |

Change Summary Explanation:

(U) Funding: PB FY96 - FY97 reduced for affordability to minimum required for booster storage
* FY96 funded in PE 0605860F; FY95 funded in PE 0603851F; FY94 funded in 0305119F

(U) Schedule: N/A

(U) Technical: N/A

C. (U) Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Military Construction (PE 0305119F) (for Minuteman II Storage) | 7,250 | | | | | | | | | 7,250 |

Related RDT&E: PE 0605851F

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| # 6 Management Support | #0605860F Rocket Systems Launch Program | 1023 |

D. Schedule Profile

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Multiservice Launch System | | | | | | | | | | | | | | | | |
| Complete Development | | | | | | X | | | | | | | | | | |
| First Flight | | | | | | | | | X | | | | | | | |
| Navajo Facilities | | | | | | | | | | | | | | | | |
| Complete Mods to Storage Facilities | | | | | | X | | | | | | | | | | |
| Last Missile Delivery | | | | | | | | | X | | | | | | | |

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

DATE: February 1995

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605896F Base Operations - RDT&E

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 109,888 | 105,525 | 117,083 | 124,311 | 125,388 | 127,354 | 126,536 | 139,424 | Continuing | TBD |
| 06BS Base Operating Support | 65,534 | 59,967 | 67,453 | 73,193 | 72,737 | 73,123 | 70,678 | 81,890 | Continuing | TBD |
| 06CE Other Support | 21,076 | 20,358 | 23,248 | 23,945 | 24,663 | 25,403 | 26,165 | 26,950 | Continuing | TBD |
| 06UT Operations Of Utilities | 23,278 | 25,200 | 26,382 | 27,173 | 27,988 | 28,828 | 29,693 | 30,584 | Continuing | TBD |

Note: The following FY 94/95 funding totals represent what the totals would be considering an increase of $26,400 in each year. Beginning in FY 96 $26,400 is transferred to this PE from PE 0605807F (Test and Evaluation Support). (See Note 1 below.) These totals provide a more meaningful funding trend analysis for this PE.

| | FY 1994 | FY 1995 |
|---|---|---|
| Total PE | 136,288 | 131,925 |

(1) Base Operating Support funds ($26,400 in FY 96) were transferred from PE 0605807 (Arnold Engineering Development Center) into PE 0605896F. The purpose of the transfer is to more evenly account for BOS type efforts within PE 0605896F at the three AF major test centers. Similarly, $26,000 has also been transferred in FY 97-01.

(U) A. **Mission Description and Budget Item Justification:** This program element provides basic, essential services of base operating support at three Air Force Materiel Command (AFMC) bases: Eglin AFB FL, Edwards AFB CA, and Arnold AFB TN. These three Air Force Bases form the core of the Air Force Test and Evaluation infrastructure to support the DoD test mission. These bases are unique national assets specifically established for test and evaluation and are funded by RDT&E appropriations. The program finances "quality of life" costs of day-to-day support for the Air Force portion of the DoD Major Range and Test Facility Bases (MRTFBs). These three locations have over 90 tenant organizations and an aggregate population in excess of 55,000 people. Civilian payroll represents approximately 41 percent of the total program, with the remainder of the program financing administrative support, security and guard services, dormitories, billeting, food services, training, utility operations, civil engineering services, transportation, and motor pools. Functions supported by this program element include comptroller, chaplain, personnel, supply, transportation and information management.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605896F Base Operations - RDT&E |

(U) **B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 111,350 | 106,914 | 106,048 | 114,961 | Cont |
| (U) Appropriated Value | | 106,914 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -1,389 | | | |
| b. Below Threshold Reprogramming | -1,462 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | 11,035 | 9,350 | |
| (U) Current Budget Submit/President's Budget | 109,888 | 105,525 | 117,083 | 124,311 | Cont |

(U) Change Summary Explanation:

Funding: For Base Operating Support (06BS), FY 96 $8,124 is partial offset for $17,100 Arnold AFB BOS support realigned to this PE from PE 65807F, and FY 97 $6,309 is partial offset for $16,600 Arnold AFB BOS support realigned to this PE from PE 65708F. For Other Support (06CE), FY 96 $2,955 is result of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB and offset increase costs for custodial and miscellaneous contract services, and FY 97 $2,901 is continuing support of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB. For Operations of Utilities (06UT), FY 96 $137 is result of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB, and FY 97 $140 is continuing support of PE realignment and transfer of funds from PE 65897F to this PE to support BOS effort at Arnold AFB.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

(U) **D. Schedule Profile:** Not applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0605896F Base Operations - RDT&E / PROJECT: 06BS |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 06BS Base Operating Support | 65,534 | 59,967 | 67,453 | 73,193 | 72,737 | 73,123 | 70,678 | 81,890 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** Finances essential base operating support which includes civilian pay, security and guard services, dormitories, billeting, food services, training, transportation and motor pools, comptroller, chaplain, supply, information management and quality of life services for the three bases.

(U) FY 1994
- (U) Financed civilian payroll. ($35,334)
- (U) Financed mission-related travel. ($1,300)
- (U) Financed rental and transportation costs (permanent change of stations (PCS)). ($4,500)
- (U) Financed communications systems, tools, contract education, and equipment maintenance. ($5,800)
- (U) Financed supplies, fuels, and miscellaneous contract services. ($15,100)
- (U) Financed information processing and other equipment, data processing services, and on-flying support of depot-level repairables. ($3,500)

(U) FY 1995
- (U) Financed civilian payroll. ($35,267)
- (U) Financed mission-related travel. ($1,300)
- (U) Financed rental and transportation costs (permanent change of stations (PCS)). ($4,200)
- (U) Financed communications systems, tools, contract education, and equipment maintenance. ($5,700)
- (U) Financed supplies, fuels, and miscellaneous contract services. ($10,000)
- (U) Financed information processing and other equipment, data processing services, and on-flying support of depot-level repairables. ($3,500)

(U) FY 1996
- (U) Financed civilian payroll. ($35,253)
- (U) Financed mission-related travel. ($1,700)
- (U) Financed rental and transportation costs (permanent change of stations (PCS)). ($4,900)
- (U) Financed communications systems, tools, contract education, and equipment maintenance. ($5,900)
- (U) Financed supplies, fuels, and miscellaneous contract services. ($15,500)
- (U) Financed information processing and other equipment, data processing services, and on-flying support of depot-level repairables. ($4,200)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605896F Base Operations - RDT&E |
| | PROJECT<br>06BS |

(U) FY 1997
- (U) Financed civilian payroll. ($35,793)
- (U) Financed mission-related travel. ($1,700)
- (U) Financed rental and transportation costs (permanent change of stations (PCS)). ($4,900)
- (U) Financed communications systems, tools, contract education, and equipment maintenance. ($7,500)
- (U) Financed supplies, fuels, and miscellaneous contract services. ($18,800)
- (U) Financed information processing and other equipment, data processing services, and on-flying support of depot-level repairables. ($4,500)

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 65,534 | 60,839 | 59,329 | 66,884 | Cont |
| (U) Appropriated Value | | 60,952 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -985 | | | |
| (U) Adjustments to budget years since FY 95 PB | | | 8,124 | 6,309 | |
| (U) Current Budget Submit/President's Budget | 65,534 | 59,967 | 67,453 | 73,193 | Cont |

(U) Change Summary Explanation:

Funding: FY 96 $8,124 is partial offset for $17,100 Arnold AFB BOS support realigned to this PE from PE 65807F. FY 97 $6,309 is partial offset for $16,600 Arnold AFB BOS support realigned to this PE from PE 65708F.

Schedule: None.

Technical: None.

**(U) C. Other Program Funding Summary ($ in Thousands):** Not applicable.

**(U) D. Schedule Profile:** Not applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY: 6 - Management Support | PE NUMBER AND TITLE: 0605896F Base Operations - RDT&E / PROJECT: 06CE |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 06CE Other Support | 21,076 | 20,358 | 23,248 | 23,945 | 24,663 | 25,403 | 26,165 | 26,950 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** Provides resources for fundamental civil engineering services such as custodial, fire protection, hazardous material systems certification, refuse collection, insect and pest control, rentals and leases, architectural and engineering design, grounds maintenance as well as civil engineering administrative costs, including equipment, supplies, temporary duty and civilian pay.

(U) FY 1994
- (U) Civilian positions. ($7,276)
- (U) Mission-related travel. ($500)
- (U) Architect/engineering and other CE services. ($4,900)
- (U) Contract education, equipment maintenance and miscellaneous contract services. ($900)
- (U) Custodial service, supplies, fuels and equipment purchases. ($7,500)

(U) FY 1995
- (U) Civilian positions. ($7,158)
- (U) Mission-related travel. ($500)
- (U) Architect/engineering and other CE services. ($4,700)
- (U) Contract education, equipment maintenance and miscellaneous contract services. ($900)
- (U) Custodial service, supplies, fuels and equipment purchases. ($7,100)

(U) FY 1996
- (U) Civilian positions. ($7,548)
- (U) Mission-related travel. ($500)
- (U) Architect/engineering and other CE services. ($4,900)
- (U) Contract education, equipment maintenance and miscellaneous contract services. ($1,600)
- (U) Custodial service, supplies, fuels and equipment purchases. ($8,700)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605896F Base Operations - RDT&E |
| | PROJECT<br>06CE |

(U) FY 1997
- (U) Civilian positions. ($7,645)
- (U) Mission-related travel. ($500)
- (U) Architect/engineering and other CE services. ($4,700)
- (U) Contract education, equipment maintenance and miscellaneous contract services. ($1,600)
- (U) Custodial service, supplies, fuels and equipment purchases. ($9,500)

**(U) B. Program Change Summary ($ in Thousands):**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 21,076 | 20,595 | 20,473 | 21,044 | Cont |
| (U) Appropriated Value | | 29,632 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -237 | | | |
| b. Omnibus or Other Above Threshold Reprogramming | | -9037 | | | |
| (U) Adjustments to budget years since FY 95 PB | | | 2,955 | 2,901 | |
| (U) Current Budget Submit/President's Budget | 21,076 | 20,358 | 23,428 | 23,945 | Cont |

(U) Change Summary Explanation:

Funding: FY 96 $2,955 is result of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB and offset increase costs for custodial and miscellaneous contract services. FY 97 $2,901 is continuing support of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB.

Schedule: None.

Technical: None.

**(U) C. Other Program Funding Summary ($ in Thousands):** Not applicable.

**(U) D. Schedule Profile:** Not applicable.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605896F Base Operations - RDT&E<br>PROJECT<br>06UT |

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 06UT Operations Of Utilities | 23,278 | 25,200 | 26,382 | 27,173 | 27,988 | 28,828 | 29,693 | 30,584 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification:** Finances purchase of utilities (electricity, natural gas, water and sewage treatment), base operation of water and sewage treatment plants and distribution systems. Amounts of utilities consumed and waste processed for discharge exceed those of other operating bases due to unique test mission.

(U) FY 1994
- (U) Civilian positions. ($2,100)
- (U) Purchased utilities. ($18,778)
- (U) Travel, rentals, other CE, contract education and miscellaneous contracts. ($200)
- (U) Equipment purchases and maintenance, supplies and materials, and fuels. ($2,200)

(U) FY 1995
- (U) Civilian positions. ($2,200)
- (U) Purchased utilities. ($19,900)
- (U) Travel, rentals, other CE, contract education and miscellaneous contracts. ($700)
- (U) Equipment purchases and maintenance, supplies and materials, and fuels. ($2,400)

(U) FY 1996
- (U) Civilian positions. ($2,200)
- (U) Purchased utilities. ($20,482)
- (U) Travel, rentals, other CE, contract education and miscellaneous contracts. ($1,200)
- (U) Equipment purchases and maintenance, supplies and materials, and fuels. ($2,500)

(U) FY 1997
- (U) Civilian positions. ($2,300)
- (U) Purchased utilities. ($20,873)
- (U) Travel, rentals, other CE, contract education and miscellaneous contracts. ($1,500)
- (U) Equipment purchases and maintenance, supplies and materials, and fuels. ($2,500)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>6 - Management Support | PE NUMBER AND TITLE<br>0605896F Base Operations - RDT&E<br>PROJECT<br>06UT |

(U) **B. Program Change Summary ($ in Thousands)**

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 24,740 | 25,480 | 26,245 | 27,033 | Cont |
| (U) Appropriated Value | 24,740 | 16,443 | | | |
| (U) Adjustments to Appropriated Value | | | | | |
| a. Cong Gen Reductions | | -280 | | | |
| b. Omnibus or Other Above Threshold Reprogramming | | 9037 | | | |
| c. Below Threshold Reprogramming | -1462 | | | | |
| (U) Adjustments to budget years since FY 95 PB | | | 137 | 140 | |
| (U) Current Budget Submit/President's Budget | 23,278 | 25,200 | 26,382 | 27,173 | Cont |

(U) Change Summary Explanation:

Funding: FY 96 $137 is result of PE realignment and transfer of funds from PE 65807F to this PE to support BOS effort at Arnold AFB. FY 97 $140 is continuing support of PE realignment and transfer of funds from PE 65897F to this PE to support BOS effort at Arnold AFB.

Schedule: None.

Technical: None.

(U) **C. Other Program Funding Summary ($ in Thousands):** Not applicable.

(U) **D. Schedule Profile:** Not applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: 7, Operational Systems Development

PE NUMBER AND TITLE: 0702207F, Depot Maintenance

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 1792 | 2032 | 1464 | 1495 | 1567 | 1618 | 1668 | 1720 | Continue | TBD |
| 3326, Precision Measurement & Calibration Equipment Development (PMCED) | 1792 | 2032 | 1464 | 1495 | 1567 | 1618 | 1668 | 1720 | Continue | TBD |

A. Mission Description and Budget Item Justification

This program develops, tests, and evaluates national and Air Force measurement standards and calibration equipment in support of all Air Force programs and activities including over 150 base Precision Measurement Equipment Laboratories (PMELs) worldwide. The technology of modern weapons systems require continuing research and development of calibration equipment to ensure aerospace equipment meets Air Force readiness objectives. Work for this program is performed under Budget Activity 7 and research categories 6.1 Basic Research, 6.2 Exploratory Development, 6.3A Advanced Development, 6.3B Demonstration/Validation, 6.4 Engineering and Manufacturing Development, 6.5 Management Support, and 6.6 Operational Systems Development. Metrology research provides technology to support systems in all phases of development and acquisition, as well as R&D lab efforts, test ranges, and operational weapon systems support.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: 7, Operational Systems Development

PE NUMBER AND TITLE: 0702207F, Depot Maintenance

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1820 | 2099 | 1472 | 1503 | 6894 |
| Appropriated Value | 1830 | | | | |
| Adjustments to Appropriated Value: | | | | | |
| a) Congressional General Reduction | -10 | -23 | | | |
| b) SBIR | -28 | -44 | | | |
| c) Non-pay purchases inflation | | | -8 | -8 | |
| Current Budget Submit/President's Budget | 1792 | 2032 | 1464 | 1495 | 6827 |

Change Summary Explanation: None

C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Aircraft Procurement, BA5, Modifications | 2462 | 18482 | 9082 | 17483 | 5739 | 4431 | 4217 | 4106 | N/A | N/A |
| Aircraft Procurement, BA7, Common Support Equipment, | 3 | 2171 | 1 | 1 | 1 | 1 | 1 | 1 | N/A | N/A |
| Aircraft Procurement, BA6, Spares and Repair Parts | 110 | 165 | 283 | 507 | 773 | 10603 | 10921 | 11249 | N/A | N/A |
| O&M, Air Force | 241240 | 154523 | 136353 | 141182 | 143122 | 146836 | 151012 | 155262 | N/A | N/A |
| Military Personnel, Air Force | 32616 | 30982 | 24826 | 24383 | 25014 | 25523 | 25931 | 26445 | N/A | N/A |

Related activities: Not applicable

D. Schedule Profile: Not applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: FEBRUARY 1995

BUDGET ACTIVITY: 7, Operational Systems Development

PE NUMBER AND TITLE: 0702207F, Depot Maintenance

PROJECT NO.: 3326

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Precision Measurement & Calibration Equipment Development (PMCED) | 1792 | 2032 | 1464 | 1495 | 1567 | 1618 | 1668 | 1720 | Continue | TBD |

A. Mission Description and Budget Item Justification

(U) Designed to develop, test, and evaluate standards and associated equipment used in the measurement and calibration of advanced weapons systems and support equipment. Includes such high technology as lasers, microwave, millimeter wave, electro-optical, and automated test equipment. Work supports critical metrology and calibration requirements throughout the Air Force and the overall advancement of national measurement standards and technology.

(U) FY 1994
- (U) Completed development of error correction software; continued development of new photometric standards and high brightness IR source in support of electro-optical weapon systems. ($120K)
- (U) Continued development of IR reflectance standards and IR and laser detector standards for infrared / laser weapon systems.($641K)
- (U) Developed prototype calibration standard for coordinate measuring machines (CMMs). ($181K)
- (U) Continued improvements in measurement capabilities (noise figure, impedance, and phase noise) to support low radar observables and improve quality and reliability of radar and communication systems. ($355K)
- (U) Continued development of resistance, voltage, high frequency and electrical pulse standards to support high accuracy test equipment. ($355K)
- (U) Completed fabrication of prototype supershaker in support of propulsion system vibration monitoring instrumentation. ($100K)
- (U) Completed analysis of beta surface measurement problems required to develop measurement support of radiation hazard instruments.($40K)

(U) FY 1995
- (U) Complete development of IR reflectance standards; continue development of IR transmittance and laser detector standards for IR / laser weapon systems. ($530K)
- (U) Complete development of improved IR source; continue development of improved IR & photometric detector standards for electro-optical weapon systems. ($390K)
- (U) Complete development of measurement capabilities to support low radar observables and continue development of standards for radar and communications systems. ($300K)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: FEBRUARY 1995 |
|---|---|
| BUDGET ACTIVITY: 7, Operational Systems Development | PE NUMBER AND TITLE: 0702207F, Depot Maintenance |
| | PROJECT NO.: 3326 |

(U) FY 1995 (cont)
- (U) Continue development of efficient calibration methodologies for CMMs used for measurement of precision aircraft components/fixtures.($326K)
- (U) Continue development of microwave noise figure standards used to support radar and communication receivers. ($240)
- (U) Continue development work to support radiation hazard instrumentation. ($60K)
- (U) Continue development of power standards for RF communication and radar systems. ($85K)
- (U) Continue model development to improve electrical standards accuracy and reliability for precision measurement equipment. ($145K)

(U) FY 1996
- (U) Initiate development of dimensional standards to support high performance aircraft joints and fasteners. ($82K)
- (U) Continue development of improved electro-optical standards to support low observables and weapon tracking systems. ($675K)
- (U) Continue development of efficient calibration methodologies for CMMs used in calibration support equipment. ($150K)
- (U) Continue development of standards and measurements for radar support instruments to provide traceability to DoD. ($250K)
- (U) Continue development work to support radiation hazard instrumentation. ($80K)
- (U) Continue development of power standards for RF communication and radar systems. ($120K)
- (U) Continue model development to improve electrical standards accuracy and reliability. ($115K)

(U) FY 1997
- (U) Complete development work to support radiation hazard instrumentation. ($83K)
- (U) Continue development of improved electro-optical standards to support low observables and weapon tracking systems. ($700K)
- (U) Continue development of efficient methodologies for CMMs used in calibration support equipment. ($200K)
- (U) Continue development of standards and measurements for radar support instrumentation to provide traceability to DoD. ($250K)
- (U) Continue development of power standards for RF communication and radar systems. ($150K)
- (U) Continue model development to improve electrical standards accuracy and reliability. ($120K)

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: FEBRUARY 1995

**7, Operational Systems Development**

PE NUMBER AND TITLE: **0702207F, Depot Maintenance**

PROJECT NO.: **3326**

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Development Measurement Standards and Calibration Support | 1748 | 1968 | 1444 | 1475 |
| Travel | 16 | 20 | 20 | 20 |
| SBIR | 28 | 44 | | |
| Total | 1792 | 2032 | 1464 | 1495 |

B. Budget Acquisition History and Planning Information ($ in Thousands)

**Performing Organizations:**

| Contractor or Government Performing Activity | Contract Method/Type or Funding Vehicle | Award or Obligation Date | Performing Activity EAC | Project Office EAC | Total Prior to 1994 | Budget 1994 | Budget 1995 | Budget 1996 | Budget 1997 | Budget to Complete | Total Program |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Product Development Organizations | | | | | | | | | | | |
| National Institute of Standards Technology | Funds Transfer (SF 1080) | 1st QTR | TBD | TBD | 5816 | 1776 | 2012 | 1444 | 1475 | Continue | TBD |
| AGMC | In house | N/A | TBD | TBD | 41 | 16 | 20 | 20 | 20 | Continue | TBD |
| **Government Furnished Property: Not Applicable** | | | | | | | | | | | |
| Subtotal Product Development | | | | | 5857 | 1792 | 2032 | 1464 | 1495 | Continue | TBD |
| Total Project | | | | | 5857 | 1792 | 2032 | 1464 | 1495 | Continue | TBD |

C. Funding Profile ($ in Thousands): Not applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708012F Logisitic Support Activities

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 6,203 | 5,742 | * | * | * | * | * | * | Continuing | TBD |
| 3090, Embedded Computer Resources Support Improvement Program | 4,909 | 4,523 | * | * | * | * | * | * | Continuing | TBD |
| 3317, Air Force Digital Specifications and Standards | 1,294 | 1,219 | * | * | * | * | * | * | Continuing | TBD |

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: This program funds the growing need for research and development of support issues related to the increasing reliance on computer resources. New software design techniques, software support tools, environments, and processes; and standards or digital documentation will result from this program. Functions formerly accomplished in hardware have been assumed by software, and software which can be changed to meet new and different threats and missions is critical to the ability of the Air Force to be responsive to world situations. Project 3090 conducts research to improve support of embedded computer system software. It encompasses automation and standardization of support processes, advanced support methodologies, tools and environments, and readiness support to facilitate rapid turnaround of software in response to changing mission and/or changing threat requirements. Project 3317 conducts research leading to the development and updating of digital standards. These standards are required to implement the Continuous Acquisition and Life-cycle Support (CALS) concept.

*** Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F**

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708012F Logistic Support Activities

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 6,301 | 5,804 | * | * | TBD |
| Appropriated Value | | | | | |
| Adjustments to Appropriated Value | -98 | -62 | | | |
| Current Budget Submit/President's Budget | 6,203 | 5,742 | * | * | TBD |

Change Summary Explanation:

Funding: *Funds were transferred into PE 070861F starting in FY96 from PE 0708012F

Schedule: Not Appicable

Technical: Not Applicable

C. Other Program Funding Summary ($ in Thousands)

Not Applicable

D. Schedule Profile

Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708012F Logistic Support Activities

PROJECT NO.: 3090

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Embedded Computer Resources Support Improvement Program (ESIP) | 4,909 | 4,523 | * | * | * | * | * | * | Continuing | TBD |

A. Mission Description and Budget Item Justification

Project 2522, Embedded Computer Resources Support Improvement Program (ESIP): Conducts research to improve support of embedded computer system software. It encompasses automation and standardization of support proceses, advanced support methodologies, tools and environments, and readiness support to facilitate rapid turnaround of software in response to changing mission and/or changing threat requirements.

(U) FY 1994
- (U) Began advanced avionics instrumentation and sensor control capability for capturing software anomalies in flight (12K).
- (U) Test data instrumentation collection prototype on F-15 test aircraft (625K).
- (U) Demonstrated avionics visualization concepts to improve data analysis to identify and correct anomalies (704K).
- (U) Continued development of prototype virtual simulator (2096K).
- (U) Preliminary work to use hypermedia on technical manuals (500K).
- (U) Demonstrated automated verification and validation test case generation and begin evaluation within an ASE (1070K).

(U) FY 1995
- (U) Demonstrate hypermedia-based Integrated Product Development (IPD) (400K).
- (U) Complete adaptive software support study (145K).
- (U) Demonstrate virtual node software (350K).
- (U) Develop prototype capability for quick/detailed analysis of data from different avionics sources (700K).
- (U) Define system monitor and interactive processor architecture for advanced avionics intrumentation (700K).
- (U) Demonstrate virtual simulator concept (2290K).

(U) FY 1996 Not Applicable

(U) FY 1997 Not Applicable

*Funds were transferred into PE 0708611F starting in FY 96 from PE 0708012F

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708012F Logistic Support Activities

PROJECT NO.: 3317

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Air Force Digital Specifications and Standards | 1,294 | 1,219 | * | * | * | * | * | * | Continuing | TBD |

A. Mission Description and Budget Item Justification

This project conducts research leading to the development and updating of digital standards. These standards are required to implement the Continuous Acquisition and Life Cycle Support (CALS) concept.

(U) FY 1994
- (U) Published final MIL-HDBK 59B (40K) (1st Qtr).
- (U) Supported development of document type definitions under technical manual specifications and standards (370K).
- (U) Supported development of format output specification standards development (556K).
- (U) Surveyed need for Product Data/engineering drawings (85K).
- (U) Examined process improvement opportunities from Product Data acquisition (85K).
- (U) Represented AF needs at national and international standards activities (158K).

(U) FY 1995
- (U) Continue developing and testing document type definitions and formatting output specifications instances for JCALS IOT&E (500K) (3rd Qtr).
- (U) Develop and test specifications and standards in support of Product Data Systems Modernization (PDSM) implementation (637K).
- (U) Represent AF needs at national and international standards activities (82K).

* (U) FY 1996 Not Applicable

* (U) FY 1997 Not Applicable

* Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #7 Operational Systems Development | 0708012F Logistic Support Activities | 3317 |

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1,294 | 1,219 | * | * | TBD |
| Appropriated Value | | | | | |
| Adjustments to Appropriated Value | | | | | |
| Current Budget Submit/President's Budget | 1,294 | 1,219 | * | * | TBD |

Change Summary Explanation:

Funding: * Funds were transferred into PE 0708611F starting in FY96.from PE 0708012F

Schedule: Not Applicable

Technical: Not Applicable

C Other Program Funding Summary ($ in Thousands)

Not Applicable

D Schedule Profile

Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE February 1995

BUDGET ACTIVITY
**#7 Operational Systems Development**

PE NUMBER AND TITLE
**0708026F Productivity, Reliability, Availability, Maintainability (PRAM)**

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost[1] | 36,380 | 15,467 | 15,719 | 15,340 | 16,019 | 16,784 | 17,288 | 17,805 | Continuing | Continuing |
| 2146, Productivity, Reliability, Availability, Maintainability (PRAM) | 17,946 | 6,732 | 15,719 | 15,340 | 16,019 | 16,784 | 17,288 | 17,805 | Continuing | Continuing |
| 3263, Reliability and Maintainability Technology Insertion Program (RAMTIP)[1] | 18,434 | 8,735 | 0 | 0 | 0 | 0 | 0 | 0 | Not Applicable | Not Applicable |

1 - RAMTIP FY 95 and prior years funded in PE 0604609F.

A. Mission Description and Budget Item Justification

This descriptive summary combines two separate AF Reliability and Maintainability technology initiatives, formerly PRAM and RAMTIP. PRAM addresses acute R&M deficiencies by funding prototypes of mature, commercial off-the-shelf technologies that can be incorporated into existing AF weapon systems and subsystems. RAMTIP addresses R&M needs by developing state-of-the-art new technologies that can be readily incorporated into AF weapon systems. The objective of this program is to emphasize the rapid incorporation of R&M technology "fixes" that will improve the operational capability of weapon systems and equipment at a significantly lower cost. The impetus to combine PRAM and RAMTIP into a single program reflects an increasing emphasis on PRAM-related projects to address a greater number of R&M problems. Beginning in FY 96, RAMTIP efforts will terminate and any ongoing work will transition to PRAM. Average project length is twenty-seven months. This will constitute one of the most cost effective programs within the Air Force, with a proven return on investment averaging 16:1. PRAM, a level-of-effort program, is dependent upon MAJCOMS and field support to adapt technology once the initial investment is completed. Listed below are projects being pursued as identified by the Air Force Materiel Command (AFMC) Technology Master Process (TMP). The objective of the TMP is to strategically focus technology application/insertion for the Air Force's future needs. A periodic review for all projects is held to ascertain the opportunity for success of those currently underway and to select new projects. The category of research being performed in this PE is Operational Systems Development because projects are being engineered for already operational weapon systems.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE **February 1995**

BUDGET ACTIVITY
**#7 Operational Systems Development**

PE NUMBER AND TITLE
**0708026F Productivity, Reliability, Availability, Maintainability (PRAM)**

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 36,761 | 15,589 | 15,809 | 15,428 | Continuing |
| Appropriated Value | 36,761 | 15,589 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Small Business Innovative Research (SBIR) - PRAM | -282 | | | | |
| b. SBIR - RAMTIP | -214 | | | | |
| c. Transfer of funds from PE 064704F, Common Support Equipment - PRAM | 160 | | | | |
| d. Unknown reduction (RAMTIP) | -45 | | | | |
| e. Undistributed Congressional University Research Reductions | | -3 | | | |
| f. Non-FFRDC General Reduction | | -119 | | | |
| g. Non-Pay Purchases Inflation (PRAM) | | | -90 | -88 | |
| Current Budget Submit/President's Budget | 36,380 | 15,467 | 15,719 | 15,340 | Continuing |

Change Summary Explanation:

Funding: RAMTIP FY 95 and prior years funded within PE 0604609F. Amount shown here represents sum of funding formerly within PE 0604609F and PE 0708026F. Beginning in FY 96, all RAMTIP funds in PE 0604609F will transfer to PE 0708026F and all RAMTIP efforts will terminate with any ongoing efforts absorbed into PRAM

Schedule: None

Technical: None

C. Other Program Funding Summary ($ in Thousands) Not applicable

D. Schedule Profile Not applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE **February 1995**

BUDGET ACTIVITY
**#7 Operational Systems Development**

PE NUMBER AND TITLE
**0708026F Productivity, Reliability, Availability, Maintainability (PRAM) 2146**

PROJECT NO.

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 2146, Productivity, Reliability, Availability, Maintainability (PRAM) | 17,946 | 6,732 | 15,719 | 15,340 | 16,019 | 16,784 | 17,288 | 17,805 | Continuing | Continuing |

A. Mission Description and Budget Item Justification Initiated in 1975 by the Chief of Staff to reduce current and potential operations and support costs; and to improve the effectiveness of Air Force operational systems, subsystems and equipment by providing "front end" investments for the adaptation and prototyping of commercial-off-the-shelf technology. The efforts described below represent a "snapshot" of ongoing efforts and may be subject to change due to evolving R&M priorities.

(U) FY 1994

- (U) Completed work on the C-130 Air Refueling Improvement. ($0.210M)
- (U) Began development, modification, prototype and test for Structural Efficiency of Fighter Aircraft Doors. ($0.700M).
- (U) Completed Preliminary Design Review for a more reliable, rugged, man-portable Mini-Zone Marker. ($0.700M)
- (U) Initiated development of Cryogenic Foil-Bearing Turbopump and Portable Line Replaceable Unit (LRU) Cannot Duplicate Test System. ($0.550M)
- (U) Started test and manufacturing for Fatigue Resistant Bulkheads. ($1.720M).
- (U) Completed inlet rain erosion tape project. ($0.130M)
- (U) Completed the integrated product development acquisition tools project. ($0.533M)
- (U) Started the reusable software for spacecraft project. ($0.530M)
- (U) Started the advanced magnetic azimuth detector, a form-fit-function replacement for the current magnetic azimuth detector fitted to the KC-135, C-130, F-15, and the B-1B. A ten-fold increase in reliability is expected. ($1.100M)
- (U) Performed the PDR, CDR, and complete the design on the compressor blade monitor system. ($0.495M)
- (U) Incremental funding will be provided for the continuation of activities begun in prior years. ($10.919M)
- (U) Completed High Load Bearing Surface Enhancement Program, already approved for implementation at Ellsworth AFB, SD. ($0.025M)
- (U) Completed Over Wing Fairing Seal Refurbishment and repair. ($0.157M).
- (U) Completed Mini Arch Evaluation ($0.025M)
- (U) Completed Multiplace Vacuum Packed Liferafts ($0.130M)
- (U) Completed Inductive Proximity Switch. ($0.022M)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>**#7 Operational Systems Development** | PE NUMBER AND TITLE<br>**0708026F Productivity, Reliability, Availability, Maintainability (PRAM)** PROJECT NO. **2146** |

A. Mission Description and Budget Item Justification (Continued)

(U) FY 1995
- (U) Complete work on B-1B Oxygen Analyzer, Low cost Titanium Casting, Automated Vehicle Data Acquisition, Miniature RF Blind-mated Connector, Repair Technologies for CRT High Voltage Power Supply, Electronic Board and Tester Simulation Software, Fatigue Resistant Bulkheads, Compressor Blade Monitor, Mini Zone Marker, Improved Fighter Aircraft Doors, and Combustor Rework Cell. ($3.800M)
- (U) Continue incremental funding on Nickel-hydrogen Battery, and Reusable Software for Spacecraft. ($0.600M)
- (U) Given funding required for continuation of on-going projects and reduced level of funding, there will be a minimal amount set aside for Quick Reaction Projects. ($0.785M)
- (U) Start Fiber Optic Attitude Sensor. ($1.547M)

(U) FY 1996
- (U) Continue incremental funding on Nickel-hydrogen Battery, Reusable Software for Spacecraft and Fiber Optic Attitude Sensor. ($0.850M)
- (U) Flight Test Digital Map System in F-15. ($4.100M)
- (U) Complete testing of Modular Mission Computer in the F-16 ($0.350)
- (U) Complete work on Advanced Hybrid Oxygen System ($1.050M)
- (U) Complete work on Fiber Optic Rate Gyro ($0.600M)
- (U) Complete work on Laser Ultrasonic Inspection System ($0.439M)
- (U) The AFMC Technology Master Process (TMP) will be used to review needs and level of funding during 2nd Qtr FY95 to consider future projects. The TMP and the Quick Reaction Team will identify potential projects with the highest payback in terms of operational capability, reliability and maintainability improvement, and cost for execution. ($8.330M)

(U) FY 1997
- (U) Complete activity on Nickel-hydrogen Battery and Reusable Software for Spacecraft. ($0.550M)
- (U) The TMP will review needs and funding during 2nd Qtr FY96 to consider future projects. The TMP will identify potential projects with the highest payback in terms of operational capability, reliability and maintainability improvement, and cost for execution. ($14.790M)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE **February 1995**

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| **#7 Operational Systems Development** | **0708026F Productivity, Reliability, Availability, Maintainability (PRAM) 2146** | |

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 18,068 | 6,785 | 6,881 | 6,705 | Continuing |
| Appropriated Value | 18,068 | 6.785 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Small Business Innovative Research (SBIR) | -282 | | | | |
| b. Transfer from PE 064709F | 160 | | | | |
| c. PRAM-RAMTIP Consolidation | | | 8928 | 8723 | |
| d. Undistributed Congressional University Research Reductions | | -1 | | | |
| e. Non-FFRDC General Reduction | | -52 | | | |
| f. Non-Pay Purchases Inflation | | | -90 | -88 | |
| Current Budget Submit/President's Budget | 17,946 | 6,732 | 15,719 | 15,340 | Continuing |

Change Summary Explanation:

Funding: FY 95 funding reflects Congressional and AF reductions. FY 96 and FY 97 funding reflect transfer of funds from PE 0604609F, RAMTIP, and inflation adjustments.

Schedule: None

Technical: None

C. Other Program Funding Summary ($ in Thousands) Not applicable.

Related Activities:

- PRAM works in a complimentary role with the Fastener, Actuator, Connectors, Tools, and Subsystems (FACTS) program, PE 0708004F, and the Aircraft Engine Component Improvement Program (CIP), PE 0604268F as it relates to reliability and maintainability improvements in operational engines.
- All PRAM projects are closely coordinated with the AF Laboratories to preclude duplication of effort and to take advantage of technology advances emanating from the laboratory environment.
- All PRAM projects are reviewed for potential Army/Navy interest, and dialogue established in cases where commonality of problems exist such that solutions become DoD-wide.
- There is no duplication of effort within the Air Force or the Department of Defense.

D. Schedule Profile Not applicable.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE **February 1995**

BUDGET ACTIVITY
**#7 Operational Systems Development**

PE NUMBER AND TITLE
**0708026F Productivity, Reliability, Availability, Maintainability (PRAM) 3263**

PROJECT NO.

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3263, Reliability and Maintainability Technology Insertion Program (RAMTIP) | 18,434 | 8,735 | 0 | 0 | 0 | 0 | 0 | 0 | Not Applicable | Not Applicable |

A. Mission Description and Budget Item Justification Originally established to complement PRAM, to accelerate development and transition of emerging, high-leverage technologies from the laboratory to the implementation phase. The efforts described below represent a "snapshot" of ongoing efforts and may be subject to change due to evolving R&M priorities.

(U) FY 1994
- (U) Critical Design Review for Digital Map System and laser ultrasonic inspection system. ($7.136M)
- (U) Conducted feasibility study for Ada compiler modifications, improving maintenance of F-16 MMC through real-time monitorability improvements. ($1.543M)
- (U) Completed qualification and pre-flight test review of advanced maintenance-free aircraft battery for E-8, F-22, B-52 and others. Anticipate substantial increase for MTBF. ($1.400M)
- (U) Began full-scale testing of thin dense chrome bearings to reduce corrosion and increase endurance in engines on F-16, B1-B, KC-135, and others. ($1.300M)
- (U) Installed electric actuators on C-141 to replace central hydraulic system on cargo aircraft including C-5 and KC-135 .($4.400M)
- (U) Began fabrication of modular, miniature, fiber-optic, rate gyroscope for use in multiple Air Force systems with a MTBF improvement of 9:1. ($0.700M)
- (U) Continued work on universal water activated release system, advanced fiber optic connector, erosion-resistant coating for IR windows, random agile de-interleaver and laser automated decoating system. ($1.955M)

(U) FY 1995
- (U) Flight test electric actuators on C-141 and install/ground-test Digital Map System. ($5.000M)
- (U) Deliver prototype Ada compiler for monitorability of F-16-MMC. ($1.350M)
- (U) Complete thin dense chrome bearings, erosion resistant infra-red windows and laser ultrasonic inspection system projects. ($1.185M)
- (U) Fabricate and field test miniature, fiber-optic, rate gyro. ($1.200M)
- (U) Given funding required for continuation of on-going projects and reduced level of funding, there will not be any new projects initiated during FY95.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>**#7 Operational Systems Development** | PE NUMBER AND TITLE<br>**0708026F Productivity, Reliability, Availability, Maintainability (PRAM) 3263** |
| | PROJECT NO. |

A. Mission Description and Budget Item Justification (Continued)

(U) FY 1996
- (U) RAMTIP efforts terminate in FY 1996.

(U) FY 1997
- (U) RAMTIP efforts terminate in FY 1996.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #7 Operational Systems Development | 0708026F Productivity, Reliability, Availability, Maintainability (PRAM) | 3263 |

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 18,693 | 8,804 | 8,928 | 8,723 | Continuing |
| Appropriated Value | 18,693 | | | | |
| Adjustments to Appropriated Value | | | | | |
| a. Small Business Innovative Research | -214 | | | | |
| b. Unknown Reduction | -45 | | | | |
| c. PRAM-RAMTIP Consolidation | | | -8928 | -8723 | |
| d. Undistributed Congressional University Research Reductions | | -2 | | | |
| e. Non-FFRDC General Reduction | | -67 | | | |
| Current Budget Submit/President's Budget | 18,434 | 8,735 | 0 | 0 | Not Applicable |

Change Summary Explanation:

Funding: FY 95 funding reflects Congressional and AF reductions. RAMTIP efforts terminate in FY 96. FY 96 and out funding will transfer to PE 0708026F, PRAM.

Schedule: None

Technical: None

C. Other Program Funding Summary ($ in Thousands) Not applicable.

Related Activities:

- RAMTIP works in a complimentary role with the PRAM program, PE 0708026F.
- All RAMTIP projects are closely coordinated with the AF Laboratories to preclude duplication of effort and to take advantage of technology advances emanating from the laboratory environment.
- All RAMTIP projects are reviewed for potential Army/Navy interest, and dialogue established in cases where commonality of problems exist such that solutions become DoD-wide.
- There is no duplication of effort within the Air Force or the Department of Defense.

D. Schedule Profile Not applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element (PE) Cost | 9,383[4] | 8,874[4] | 5,906 | 5,662 | 5,875 | 6,093 | 6,268 | 6,462 | Continuing | Continuing |
| 3090, Embedded Computer Resources Support Improvement Program (ESIP) | 4,909[1] | 4,523[1] | 3,268 | 3,117 | 3,332 | 3,575 | 3,682 | 3,800 | Continuing | Continuing |
| 3318, Product Data Systems Modernization (PDSM) | 3,734[2] | 3,688[2] | 2149 | 2068 | 2037 | 1978 | 2033 | 2095 | Continuing | Continuing |
| 3759, Air Force Support Equipment Management (AFSEM) | 740[3] | 663[3] | 489 | 477 | 506 | 540 | 553 | 567 | Continuing | Continuing |

A. Mission Description and Budget Item Justification

(U) This program element (PE) improves support of embedded computer system software, automates and standardizes weapon system support processes, establishes advanced support methodologies, provides automated tools and infrastructure environments, and improves readiness support to facilitate rapid software turnaround in response to changing mission and/or threat requirements. It conducts research and development to update Air Force digital data standards to commercial industry standards that support the Continuous Acquisition and Life-Cycle Support (CALS) concept. This program element also supports the Air Force support equipment (SE) management objective to develop, support, distribute, and maintain products that improve Air Force SE acquisition. It supports the Air Force Automatic Test Systems (ATS) Product Master Plan and Air Force ATS Database to identify and evaluate all Air Force ATS for both long and short-term planning. The category of research being performed in this PE is Operational Systems Development because projects are being engineered to support already operational weapon systems.

[1] FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program.
[2] FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards, and PE 0604740F, Project 3315, Digital Information Technology Transition. Amount shown represents sum of both PEs.
[3] FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management.
[4] Amount shown represents sum of funds from PEs listed in notes 1-3 above. Funding transfers to this PE starting in FY 96.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

B. Program Change Summary ($ in Thousands)

| | 1994* | 1995* | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 9,481 | 9,166 | 6,855 | 6,545 | Continuing |
| Appropriated Value | 9,481 | 9,166 | | | |
| Adjustments to Appropriated Value | | | | | |
| a. FY 94 Actuals | -98 | | | | |
| b. Congressional General Reductions | | -179 | | | |
| c. Small Business Innovative Research (SBIR) | | -113 | | | |
| d. Air Force & Defense Wide Com | | | -879 | -824 | |
| e. Defense Standardization Program | | | -36 | -28 | |
| f. Non-Pay Purchases Inflation | | | -34 | -31 | |
| Current Budget Submit/President's Budget | 9,383 | 8,874 | 5,906 | 5,662 | Continuing |

Change Summary Explanation:

Funding: * Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F for Project 3090, Embedded Computer Resources Support Improvement Program and Project 3318, Product Data Systems Modernization, PE 0604704F for Project 3759, Air Force Support Equipment Management, and PE 0604740 for Project 3318, Product Data Systems Modernization. FY 96 and FY 97 reductions based on inflation adjustments and AF reductions to fund higher priority programs.

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| O&M (Project 3090, ESIP) | 0* | 0* | 15,043 | 18,283 | 19,557 | 15,662 | 16,188 | 16,721 | Continuing | Continuing |
| Other Proc (Project 3090, ESIP) | 3,282* | 2,542* | 1,789 | 2,289 | 2,345 | 2,435 | 2,508 | 2,584 | Continuing | Continuing |

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program.

D. Schedule Profile: See individual projects.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

PROJECT NO.: 3090

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3090, Embedded Computer Resources Support Improvement Program (ESIP) | 4,909* | 4,523* | 3,268 | 3,117 | 3,332 | 3,575 | 3,682 | 3,800 | Continuing | Continuing |

A. Mission Description and Budget Item Justification

(U) This project conducts research to improve support of embedded computer system software. It encompasses automation and standardization of support processes, advanced support methodologies, tools and environments, and readiness support to facilitate rapid turnaround of software in response to changing mission and/or changing threat requirements. The category of research being performed in this PE is Operational Systems Development because projects are being engineered to support already operational weapon systems.

(U) FY 1994 ($ in Thousands)*

- (U) Began advanced avionics instrumentation and sensor control capability for capturing software anomalies in flight ($12).
- (U) Test data instrumentation collection prototype on F-15 test aircraft ($625).
- (U) Demonstrated avionics visualization concepts to improve data analysis to identify and correct anomalies ($704).
- (U) Continued development of prototype virtual simulator ($2,096).
- (U) Preliminary work to use hypermedia on technical manuals ($500).
- (U) Demonstrated automated verification and validation test case generation and begin evaluation (972).

(U) FY 1995 ($ in Thousands)*

- (U) Demonstrate hypermedia-based Integrated Product Development (IPD) ($400).
- (U) Complete adaptive software support study ($145).
- (U) Demonstrate virtual node software ($350).
- (U) Develop prototype capability for quick/detailed analysis of data from different avionics sources ($700).
- (U) Define system monitor and interactive processor architecture for advanced avionics instrumentation ($700).
- (U) Demonstrate virtual simulator concept ($2,228).

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY 96.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #7 Operational Systems Development | PE NUMBER AND TITLE: 0708611F, Support Systems Development — PROJECT NO.: 3090 |

(U) FY 1996 ($ in Thousands)
- (U) Demonstrate real-time fault tolerant software techniques ($200).
- (U) Demonstrate virtual hypermedia-based support environment ($390).
- (U) Demonstrate automated testing for displays ($598).
- (U) Develop virtual simulator module switching unit ($825).
- (U) Transition Radio Frequency (RF) testing techniques to Air Logistics Centers (ALCs) ($350).
- (U) Test and demonstrate data analysis prototype and techniques ($540).
- (U) Continuation of A Broad Based Environment for Test (ABBET) commercial off-the-shelf (COTS) tools evaluation and interface standardization development ($365)*

(U) FY 1997 ($ in Thousands)
- (U) Test and demonstrate virtual simulator module switching unit ($745).
- (U) Demonstrate prototype capability for adaptive interactive instrumentation of advanced avionics systems ($616).
- (U) Transition data analysis/data visualization system and techniques to ALCs ($195).
- (U) Initiate reconfiguration of real-time software capability for dynamic adaptation of avionics to environment for fault tolerance ($494).
- (U) Demonstrate advanced automatic verification and validation testing with displays ($640).
- (U) Continuation of ABBET COTS tools evaluation and interface standardization development ($427)*

* ABBET tasks continue efforts begun in FY94 within PE 0604704F, Project 2479, Common Support Equipment, as a portion of a larger tasking to develop support equipment software standards.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #7 Operational Systems Development | 0708611F, Support Systems Development | 3090 |

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 5,007* | 4,585* | 4,202 | 3,987 | Continuing |
| Appropriated Value | | | | | |
| Adjustments to Appropriated Value | | | | | |
| a. FY 94 Actuals | -98 | | | | |
| b. General Reduction | | -62 | | | |
| c. AF & Defense Wide Com | | | -879 | -824 | |
| d. Non-Pay Purchases Inflation | | | -19 | -18 | |
| e. Defense Standardization Program | | | -36 | -28 | |
| Current Budget Submit/President's Budget | 4,909 | 4,523 | 3,268 | 3,117 | Continuing |

Change Summary Explanation:

Funding: * FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY96. FY 96 and FY 97 reductions based on inflation adjustments and AF reductions to fund higher priority programs.

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary ($ in Thousands) See Page 2, C. Other Program Funding Summary

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development 3090

D. (U) Schedule Profile

| | 1994* | | | | 1995* | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Begin advanced avionics instrumentation and sensor control capability. | X | | | | | | | | | | | | | | | |
| Test data instrumentation collection prototype on F-15 test aircraft. | X | | | | | | | | | | | | | | | |
| Demonstrate avionics visualization concepts. | X | | | | | | | | | | | | | | | |
| Continue development of prototype virtual simulator. | | X | | | | | | | | | | | | | | |
| Preliminary work to use hypermedia on technical manuals. | | | X | | | | | | | | | | | | | |
| Demonstrate automated verification and validation test case generation and evaluation. | | | X | | | | | | | | | | | | | |
| Demonstrate hypermedia-based Integrated Product Development (IPD). | | | | | X | | | | | | | | | | | |
| Complete adaptive software support study. | | | | | | | | | | | | | | | | |
| Demonstrate virtual node software. | | | | | X | | | | | | | | | | | |
| Develop prototype capability for quick/detailed analysis of data from different avionics sources. | | | | | | | X | | | | | | | | | |
| Define system monitor and interactive processor architecture for advanced avionics instrumentation. | | | | | | | X | | | | | | | | | |
| Demonstrate virtual simulator concept. | | | | | | | X | | | | | | | | | |

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY 96.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development 3090

D. (U) Schedule Profile (Continued)

| | 1994* | | | | 1995* | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Demonstrate real-time fault tolerant software techniques. | | | | | | | | | X | | | | | | | |
| Demonstrate virtual hypermedia-based support environment. | | | | | | | | | X | | | | | | | |
| Demonstrate automated testing for displays. | | | | | | | | | X | | | | | | | |
| Develop virtual simulator module switching unit. | | | | | | | | | | X | | | | | | |
| Transition RF testing techniques to Air Logistics Centers (ALCs). | | | | | | | | | | X | | | | | | |
| Test and demonstrate data analysis prototype and techniques. | | | | | | | | | | | X | | | | | |
| Continuation of A Broad Based Environment for Test (ABBET) commercial off-the-shelf (COTS) tools evaluation and interface standardization development | | | | | | | | | X | | | | | | | |
| Test and demonstrate virtual simulator module switching unit. | | | | | | | | | | | | | X | | | |
| Demonstrate prototype capability for adaptive interactive instrumentation of advanced avionics systems. | | | | | | | | | | | | | X | | | |
| Transition data analysis/data visualization system and techniques to ALCs. | | | | | | | | | | | | | | X | | |
| Initiate reconfiguration of real-time software. capability for dynamic adaptation of avionics to environment for fault tolerance. | | | | | | | | | | | | | | X | | |
| Demonstrate advanced automatic verification and validation testing with displays. | | | | | | | | | | | | | | | X | |

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY 96.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

PROJECT NO.: 3090

A. Project Cost Breakdown ($ in Thousands)

| | 1994* | 1995* | 1996 | 1997 |
|---|---|---|---|---|
| Begin advanced avionics instrumentation and sensor control. | 12 | | | |
| Test data instrumentation collection prototype on F-15 test aircraft. | 625 | | | |
| Demonstrate avionics visualization concepts. | 704 | | | |
| Continue development of prototype virtual simulator. | 2,096 | | | |
| Preliminary work to use hypermedia on technical manuals. | 500 | | | |
| Demonstrate automated verification and validation test case generation and evaluation. | 972 | | | |
| Demonstrate hypermedia-based Integrated Product Development (IPD). | | 400 | | |
| Complete adaptive software support study. | | 145 | | |
| Demonstrate virtual node software. | | 350 | | |
| Develop prototype capability for quick/detailed analysis of data from different avionics sources. | | 700 | | |
| Define system monitor and interactive processor architecture for advanced avionics instrumentation. | | 700 | | |
| Demonstrate virtual simulator concept. | | 2,228 | | |
| Demonstrate real-time fault tolerant software techniques. | | | 200 | |
| Demonstrate virtual hypermedia-based support environment. | | | 390 | |
| Demonstrate automated testing for displays. | | | 598 | |
| Develop virtual simulator module switching unit. | | | 825 | |
| Transition Radio Frequency (RF) testing techniques to Air Logistic Centers (ALCs). | | | 350 | |
| Test and demonstrate data analysis prototype and techniques. | | | 540 | |
| Continue A Broad Based Environment for Test (ABBET) commercial off-the shelf (COTS) tools evaluation and interface standardization | | | 365 | 427 |
| Test and demonstrate virtual simulator module switching unit | | | | 745 |
| Demonstrate prototype capability for adaptive interactive instrumentation of advanced avionics systems | | | | 616 |
| Transition data analysis/data visualization system and techniques to ALCs. | | | | 195 |
| Initiate reconfiguration of real-time software capability for dynamic adaptation of avionics to environment for fault tolerance | 494 | | | |
| Demonstrate advanced automatic verification and validation testing with displays | | | | 640 |
| Total | 4,909 | 4,523 | 3,268 | 3,117 |

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3090, Embedded Computer Resources Support Improvement Program. Funds transfer into PE 0708611F starting in FY 96.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE |
|---|---|
| | February 1995 |

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #7 Operational Systems Development | 0708611F, Support Systems Development | 3090 |

B. Budget Acquisition History and Planning Information ($ in Thousands) Not Applicable

C. Funding Profile ($ in Thousands) Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

PROJECT NO.: 3318

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3318, Product Data Systems Modernization | 3,734*** | 3,688*** | 2,149 | 2,068 | 2,037 | 1,978 | 2,033 | 2,095 | Continuing | Continuing |

A. Mission Description and Budget Item Justification

(U) This project implements digital product data management within the Air Force Integrated Weapon System Management infrastructure and ensures uninterrupted transition of functional capabilities of legacy systems to the new joint systems. The category of research being performed in this PE is Operational Systems Development because projects are being engineered to support already operational weapon systems.

(U) FY 1994 ($ in Thousands)

- (U) Published final MIL-HDBK 59B ($40)*.
- (U) Supported development of document type definitions under technical manual specifications and standards ($370)*.
- (U) Supported development of format output specification standards development ($556)*.
- (U) Surveyed need for product data/engineering drawings ($85)*.
- (U) Examined process improvement opportunities from product data acquisition ($85)*.
- (U) Represented Air Force needs at national and international standards activities ($158)*.
- (U) Continued to manage the development and implementation of an AF digital product data infrastructure ($1,195)**.
- (U) Planned for Air Force participation in Continuous Acquisition and Life Cycle Support (CALS) EXPO 94 ($85)**.
- (U) Developed test cases for AF infrastructure to implement CALS ($485)**.
- (U) Developed and coordinated digital data strategy ($450)**.
- (U) Transitioned Air Force CALS Strategic Plan/Roadmap into electronic document ($225)**.

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards. Funds were transferred into PE 0708611F starting in FY 96.

** FY 94 and FY 95 efforts funded within PE 0604740F, Project 3315, Digital Information Technology Transition. Funds were transferred into PE 0708611F starting in FY 96.

*** FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards and PE 0604740F, Project 3315, Digital Information Technology Transition. Amounts shown represent sum from both PEs.

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #7 Operational Systems Development | PE NUMBER AND TITLE: 0708611F, Support Systems Development / PROJECT NO.: 3318 |

(U) FY 1995 ($ in Thousands)
- (U) Continue developing and testing document type definitions and formatting output specifications instances for Joint Continuous Acquisition and Life-Cycle Support (JCALS) Initial Operational Test and Evaluation (IOT&E) ($500)*.
- (U) Develop and test specifications and standards in support of Product Data Systems Modernization (PDSM) implementation ($637)*.
- (U) Represent AF needs at national and international standards activities ($82)*.
- (U) Continue to manage the development and implementation of the Air Force digital product data infrastructure ($1,410)**.
- (U) Manage the deployment of digital technical and engineering product data systems such as JCALS and Joint Engineering Data Management and Information Control System (JEDMICS) ($760)**.
- (U) Plan and implement the conversion of AF legacy data for use by future systems such as JCALS and JEDMICS ($70).
- (U) Coordinate transition from AF legacy data systems to digital technical and engineering product data systems such as JCALS & JEDMICS ($109)**.
- (U) Develop and present Continuous Acquisition and Life Cycle Support (CALS) orientation materials and instruction to AF users of digital product data systems such as JCALS & JEDMICS ($120)**.

(U) FY 1996 ($ in Thousands)
- (U) Continue to manage AF legacy technical orders (TO) conversion. ($279).
- (U) Continue to plan/participate/activate AF JEDMICS sites ($150).
- (U) Continue to develop digital data templates for use in JCALS ($151).
- (U) Continue to plan/participate in JCALS to ensure AF requirements and schedules are met ($537).
- (U) Begin to activate AF JCALS sites to ensure timely and accurate data is available and useable ($301).
- (U) Continue to test digital data specifications/standards ($344).
- (U) Continue direct support to weapon systems, Logistics and Product Centers, and Major Commands (MAJCOMS)($387).

(U) FY 1997 ($ in Thousands)
- (U) Continue to manage AF legacy technical orders (TO) conversion ($268).
- (U) Continue to plan/participate/activate AF JEDMICS sites ($139).
- (U) Continue to develop digital data templates for use in JCALS ($140).
- (U) Continue to plan/participate in JCALS to ensure AF requirements and schedules are met ($522).
- (U) Continue to activate AF JCALS sites to ensure timely and accurate data is available and useable ($290).
- (U) Continue to test digital data specifications/standards ($333).
- (U) Continue direct support to weapon systems, Logistics and Product Centers, and MAJCOMS ($376).

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards. Funds were transferred into PE 0708611F starting in FY 96.

** FY 94 and FY 95 efforts funded within PE 0604740F, Project 3315, Digital Information Technology Transition. Funds were transferred into PE 0708611F starting in FY 96.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #7 Operational Systems Development | 0708611F, Support Systems Development | 3318 |

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 3,774* | 3,888* | 2,162* | 2,079* | Continuing |
| Appropriated Value | | | | | |
| Adjustments to Appropriated Value | | | | | |
| a. FY 94 Actuals | -40 | | | | |
| b. General Reduction | | -100 | | | |
| c. Small Business Innovative Research (SBIR) | | -100 | | | |
| d. Non-pay Purchases Inflation | | | -13 | -11 | |
| Current Budget Submit/President's Budget | 3,734 | 3,688 | 2,149 | 2,068 | Continuing |

Change Summary Explanation:

Funding: * Funds were transferred into PE 0708611F starting in FY96 from PE 0708012F and PE 0604740 for Project 3318, Product Data Systems Modernization. FY 96 and FY 97 reductions based on inflation adjustments.

Schedule: Not Applicable

Technical: Not Applicable

C. Other Program Funding Summary ($ in Thousands) Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

PROJECT NO.: 3318

D. (U) Schedule Profile

| | 1994 1 | 2 | 3 | 4 | 1995 1 | 2 | 3 | 4 | 1996 1 | 2 | 3 | 4 | 1997 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Publish final MIL-HDBK 59B*. | X | | | | | | | | | | | | | | | |
| Support development of document type definitions*. | X | | | | | | | | | | | | | | | |
| Support development of format output specification standards*. | X | | | | | | | | | | | | | | | |
| Survey need for drawings. | X | | | | | | | | | | | | | | | |
| Examine process improvement opportunities*. | X | | | | | | | | | | | | | | | |
| Represented AF needs at national and international standards activities*. | | Ongoing | | | | | | | | | | | | | | |
| Continue to manage the development and implementation of an AF digital product data infrastructure**. | | Ongoing | | | | | | | | | | | | | | |
| CALS EXPO 94 Planning**. | | X | ------ | ------ | X | | | | | | | | | | | |
| Develop test cases for AF infrastructure**. | | X | ------ | ------ | X | | | | | | | | | | | |
| Develop and coordinate digital data strategy**. | | X | ------ | ------ | X | | | | | | | | | | | |
| Transition Air Force Plan/Roadmap**. | X | | | | | | | | | | | | | | | |

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards. Funds were transferred into PE 0708611F starting in FY 96.

** FY 94 and FY 95 efforts funded within PE 0604740F, Project 3315, Digital Information Technology Transition. Funds were transferred into PE 0708611F starting in FY 96.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

PROJECT NO.: 3318

D. (U) Schedule Profile (Continued)

| | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Continue developing and testing document type definitions and formatting output specifications instances for Joint Computer-aided Acquisition and Life-Cycle Support (JCALS) Initial Operational Test and Evaluation (IOT&E)*. | | | | | | | | | X | | | | | | | |
| Develop and test specifications and standards*. | | | | | X | | | | | | | | | | | |
| Manage the deployment of digital technical and engineering product data systems such as JCALS and Joint Engineering Data Management and Information Control System (JEDMICS)**. | | | | | | X | | | | | | | | | | |
| Plan and implement the conversion of AF legacy data for use by future systems such as JCALS and JEDMICS**. | | | | | | | X | | | | | | | | | |
| Coordinate transition from AF legacy data systems **. | | | | | | | X | | | | | | | | | |
| Develop and present the Continuous Acquisition and Life-Cycle Support (CALS) orientation materials and instruction to AF users**. | | | | | X | | | | | | | | | | | |
| Continue to manage AF legacy technical order (TO) conversion. | | | | | | | | | | | | X | | | | |
| Continue to plan/participate/activate AF JEDMICS sites. | | | | | | | | | X | | | | | | | |
| Continue to develop digital data templates. | | | | | | | | | | | X | | | | | |
| Continue to plan/participate in JCALS. | | | | | | | | | | X | | | | | | |
| Begin to activate JCALS sites. | | | | | | | | | | X | | | | | | |
| Continue to test digital data specifications and standards. | | | | | | | | | | X | | | | | | |
| Continue direct support to weapon systems. | | | | | | | | | | X | | | | | | |

* FY 94 and FY 95 efforts funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards. Funds were transferred into PE 0708611F starting in FY 96.

** FY 94 and FY 95 efforts funded within PE 0604740F, Project 3315, Digital Information Technology Transition. Funds were transferred into PE 0708611F starting in FY 96.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

PROJECT NO.: 3318

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Publish final MIL-HDBK 59B. | 40* | | | |
| Develop and test document type definitions and format output specifications standards. | 926* | 500* | | |
| Survey need for drawings. | 85* | | | |
| Examine process improvement opportunities. | 85* | | | |
| Represent AF needs at national and international standards activities. | 158* | 82* | | |
| Continue to manage the development and implementation of an AF digital product data infrastructure. | 1,195** | 1,410** | | |
| Continuous Acquisition and Life-Cycle Support (CALS) EXPO 94 Planning. | 85** | | | |
| Develop test cases for AF infrastructure to implement CALS. | 485** | | | |
| Develop and coordinate digital data strategy. | 450** | | | |
| Transition Air Force CALS Strategic Plan/Roadmap into electronic document. | 225** | | | |
| Develop and test digital data specifications/standards. | | 637* | 344 | 333 |
| Manage the deployment of digital technical and engineering product data systems such as Joint Continuous Acquisition and Life-Cycle Support (JCALS) and Joint Engineering Data Management and Information Control System (JEDMICS). | | 760** | | |
| Plan and implement the conversion of AF legacy data for use by future systems. | | 70** | | |
| Coordinate transition from AF legacy data systems. | | 109** | 279 | 268 |
| Develop and present CALS orientation materials and instruction to AF users. | | 120** | | |
| Continue to plan/participate/activate JEDMICS sites. | | | 150 | 139 |
| Continue to develop digital data templates for use in JCALS. | | | 151 | 140 |
| Continue to plan/participate in JCALS to ensure AF requirements and schedules are met. | | | 537 | 522 |
| Activate AF JCALS sites to ensure timely and accurate data is available and useable. | | | 301 | 290 |
| Continue direct support to weapon systems (C-17, Titan IV, VCX, T-1A, F-22, etc.), Logistics and Product Centers, and Major Commands (MAJCOMS). | | | 387 | 376 |
| Total | 3,734*** | 3,688*** | 2,149 | 2,068 |

* Funded within PE 0708012F, Project 3317, Air Force Digital Specifications and Standards.
** Funded within PE 0604740F, Project 3315, Digital Information Technology Transition.
*** Amounts shown represent sum from both PE 0708012F and PE 0604740F.

| RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3) | DATE: February 1995 |
|---|---|
| BUDGET ACTIVITY: #7 Operational Systems Development | PE NUMBER AND TITLE: 0708611F, Support Systems Development — PROJECT NO.: 3318 |

B. Budget Acquisition History and Planning Information ($ in Thousands) Not Applicable

C. Funding Profile ($ in Thousands) Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

PROJECT NO.: 3759

| COST ($ in Thousands) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 3759, Air Force Support Equipment Management (AFSEM) | 740* | 663* | 489 | 477 | 506 | 540 | 553 | 567 | Continuing | Continuing |

A. Mission Description and Budget Item Justification

(U) The Automatic Test Systems (ATS) Product Group Manager (PGM) Product Master Plan (PMP) and ATS Database development effort is designed to give the ATS Product Group Manager (PGM) the tools to track and plan Air Force ATS direction. The PMP will support standardization and ATS PGM long-term planning by capturing essential data on all Air Force ATS. The Database will include all ATS identified in the PMP and be used to interface with Integrated Weapon System Master Plans. The ATS Database will also include the ATS Preferred Item List (PIL). It will provide ATS users and managers the capability to match new test requirements to existing test capabilities and ATS developments. The category of research being performed in this PE is Operational Systems Development because projects are being engineered to support already operational weapon systems.

(U) FY 1994 ($ in Thousands)*

- (U) Continued development of Automatic Test Systems (ATS) Master Plans ($415)
- (U) Develop the Air Force ATS Preferred Item List (PIL) ($40)
- (U) Program the database and collect parametric data on the ATS PIL ($245)
- (U) Program Management support ($40)

(U) FY 1995 ($ in Thousands)*

- (U) Complete development of the ATS Master Plans ($430)
- (U) Continue ATS Product Master Plan (PMP) data maintenance ($10)
- (U) Program upgrades to the ATS Database ($30)
- (U) Update and maintain ATS PIL Database ($147)
- (U) Program Management support ($46)

* FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management. Funds transfer into PE 0708611F starting in FY 96.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: #7 Operational Systems Development

PE NUMBER AND TITLE: 0708611F, Support Systems Development

PROJECT NO.: 3759

(U) FY 1996 ($ in Thousands)
- (U) Develop detailed Product Line Master Plans ($362)
- (U) Continue Automatic Test Systems (ATS) Product Master Plan (PMP) data maintenance ($20)
- (U) Program upgrades to the ATS Database ($20)
- (U) Update and maintain ATS Preferred Item List (PIL) Database ($35K)
- (U) Upgrade Database hardware/software ($14)
- (U) Program Management Support ($38)

(U) FY 1997 ($ in Thousands)
- (U) Develop detailed Product Line Master Plans ($349)
- (U) Continue ATS PMP data maintenance ($35).
- (U) Program upgrades to the ATS Database ($20).
- (U) Update and maintain ATS PIL Database ($35).
- (U) Program Management Support ($38)

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #7 Operational Systems Development | 0708611F, Support Systems Development | 3759 |

B. Program Change Summary ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 700* | 693* | 491 | 479 | Continuing |
| Appropriated Value | | | | | |
| Adjustments to Appropriated Value | | | | | |
| a. FY 94 Actuals | +40 | | | | |
| b. General Reduction | | -17 | | | |
| c. Small Business Innovative Research (SBIR) | | -13 | | | |
| d. Non-pay purchases inflation | | | -2 | -2 | |
| Current Budget Submit/President's Budget | 740 | 663 | 489 | 477 | Continuing |

Change Summary Explanation:

Funding: * FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management. Funds transfer into PE 0708611F starting in FY96. FY 96 and FY 97 reductions due to inflation adjustments.

Schedule: Not Applicable

Technical: Not Applicable

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #7 Operational Systems Development | 0708611F, Support Systems Development | 3759 |

C. Other Program Funding Summary ($ in Thousands) Not Applicable

D. (U) Schedule Profile

| | 1994* | | | | 1995* | | | | 1996 | | | | 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Continued development of Automatic Test Systems (ATS) Master Plans | X | | | | | | | | | | | | | | | |
| Develop the Air Force ATS Preferred Item List (PIL) | | X | | | | | | | | | | | | | | |
| Program the database and collect parametric data on the ATS PIL | | X | | | | | | | | | | | | | | |
| Program Management support | | | X | | | | X | | | | X | | | | X | |
| Complete development of the ATS Master Plans | | | | | X | | | | | | | | | | | |
| Continue ATS Product Master Plan (PMP) data maintenance | | | | | | X | | | | | | | | | | |
| Program upgrades to the ATS Database | | | | | | | X | | | | X | | X | | | |
| Update and maintain ATS PIL Database | | | | | | | | X | | | | X | | | X | |
| Develop detailed Product Line Master Plans. | | | | | | | | | X | | | | | | | |
| Upgrade Database hardware and software. | | | | | | | | | | | X | | | | | |

* FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management. Funds transfer into PE 0708611F starting in FY 96.

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1995

| BUDGET ACTIVITY | PE NUMBER AND TITLE | PROJECT NO. |
|---|---|---|
| #7 Operational Systems Development | 0708611F, Support Systems Development | 3759 |

A. Project Cost Breakdown ($ in Thousands)

| | 1994* | 1995* | 1996 | 1997 |
|---|---|---|---|---|
| Develop Product Line Master Plan | 415 | 430 | 362 | 349 |
| Develop Automatic Test Systems (ATS) Preferred Item List (PIL) Database | 285 | 147 | | |
| Update ATS PIL Database | | | 35 | 35 |
| Update ATS Database | | 30 | 20 | 20 |
| ATS Product Master Plan (PMP) data maintenance | | 10 | 34 | 35 |
| Program Management Support | 40 | 46 | 38 | 38 |
| Total | 740* | 663* | 489 | 477 |

B. Budget Acquisition History and Planning Information ($ in Thousands) Not Applicable

C. Funding Profile ($ in Thousands) Not Applicable

* FY 94 and FY 95 efforts funded within PE 0604704F, Project 3759, Air Force Support Equipment Management. Funds transfer into PE 0708611F starting in FY 96.

# RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)

DATE: February 1995

BUDGET ACTIVITY: 7. Operational Systems Development

PE NUMBER AND TITLE PROJECT NO.: 0804734F, CRYPTO/SIGINT Related Skill Training 1005

| | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Project 1005, SENTINEL BRIGHT Phase II/SENTINEL II | 1.885 | 1.441 | 1.139 | 1.954 | 1.498 | 0 | 0 | 0 | 7.917 | 7.917 |

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT:

- Supports completion of SENTINEL BRIGHT Phase II (SBII)/SENTINEL II (SII) software development/integration
- Development and acquisition of computer aided/computer managed instruction for intelligence personnel
  - -- SBII supports cryptologic analysts and maintenance personnel
  - -- SENTINEL ASPEN II (SAII) supports general military intelligence analysts
  - -- SII integrates SBII and SAII with common software on like hardware
- Program parallels the fielding of modernized operational intelligence systems
- Corrects long-standing deficiencies in training "mission ready technicians"

(U) FY 1994

(U) - SENTINEL II Contract (1099)
(U) - Program Office ( 726)
(U) - CBT Upgrade ( 60)

(U) FY 1995

(U) - SENTINEL II Contract ( 406)
(U) - Courseware Development ( 168)
(U) - Program Office ( 867)

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT) | DATE February 1995 |
|---|---|
| BUDGET ACTIVITY<br>7. Operational Systems Development | PE NUMBER AND TITLE PROJECT NO.<br>08043734F, CRYPTO/SIGINT Related Skill Training 1005 |

(U) FY96 Plans:
(U) - SENTINEL II Contract (1017)
(U) - Program Office ( 122)

(U) FY97 Plans:
(U) - SENTINEL II Contract (802)
(U) - Courseware Development (332)
(U) - Program Office (820)

B. Program Change Summary ($ in Thousands)

| | FY94 | FY95 | FY96 | FY97 | Total Cost |
|---|---|---|---|---|---|
| Previous President's Budget | 1926 | 1526 | 1139 | 1954 | 8.058 |
| Appropriated Value | 1926 | 1526 | | | |
| Adjustmensts to Appropriated Value | | | | | |
| General Congressional Reductions | -11 | -54 | | | |
| SBIR | -30 | -31 | | | |
| Current Budget Submit/President's Budget | 1885 | 1441 | 1139 | 1954 | |

C. Other Program Funding Summary ($ in Thousands)
NOT APPLICABLE

D. Schedule Profile
NOT APPLICABLE

# RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)

DATE: February 1994

BUDGET ACTIVITY
7. Operational Systems Development

PE NUMBER AND TITLE PROJECT NO.
0804734, CRYPTO/SIGINT Related Skill Training 1005

A. Project Cost Breakdown ($ in Thousands)

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| 1. Software Developement | 1.129 | .580 | 1.017 | 1.123 |
| 2. System Engineering Support | .701 | .685 | .122 | .614 |
| 3. Configuration Management | | .073 | | .082 |
| 4. Travel | .055 | .103 | 0 | .135 |
| Total | 1.885 | 1.441 | 1.139 | 1.954 |

B. Budget Acquisition History and Planning Information ($ in Thousands)
NOT APPLICABLE

C. Funding Profile ($ in Thousands)
NOT APPLICABLE

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

DATE: February, 1995

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0901218F Civilian Compensation Program

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 Civilian Compensation Program | 5,775 | 5,655 | 5,827 | 5,917 | 6,146 | 6,401 | 6,593 | 6,791 | Continuing | TBD |

(U) A. **Mission Description and Budget Item Justification**

This program element provides for payment of civilian compensation benefits for disability due to personal injury sustained while in the performance of duty or due to employment-related disease according to the Federal Employees Compensation Act (FECA) under Title 5 U.S.C. Chapter 81. The Department of Labor (DOL) administers this program and charges the Department of the Air Force for its employee costs. The PE excludes manpower authorizations and costs.

(U) FY 1994

- (U) $5,755 million cited above funded disability compensation of personnel assigned to RDT&E activities for injuries and/or illnesses in the performance of duties or due to employment-related disease.

(U) FY 1995

- (U) $5,655 million funds a level of effort program based on bills already received to compensate employees assigned to RDT&E facilities for work-related injury or disease

(U) FY 1996

- (U) $5,827 million funds to continue a level of effort program to compensate employees assigned to RDT&E facilities for work-related injury or disease.

(U) FY 1997

- (U) $5,917 million requested to continue a level of effort program to compensate employees assigned to RDT&E facilities for work-related injury or disease.

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

DATE: February, 1995

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 0901218F Civilian Compensation Program

((U) B. Program Change Summary ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 5775 | 5655 | 5860 | 5951 | TBD |
| (U) Appropriated Value | | 5655 | | | TBD |
| (U) Current Budget Submit/President's Budget | 5775 | 5655 | 5827 | 5917 | TBD |

(U) Change Summary Explanation:
Funding: Due to general reductions.

Schedule: Not applicable

Technical: Not applicable

(U) C. Other Program Funding Summary ($ in Thousands)

| | FY 1994 | FY 1995 | FY 1996 | FY 1997 | FY 1998 | FY 1999 | FY 2000 | FY 2001 | To Compl | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| (U) Operation and Maintenance (O&M) | 21054 | 20641 | 23814 | 21283 | 21562 | 22355 | 22679 | 23528 | Cont'd | TBD |

(U) D. Schedule Profile: Not applicable

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

DATE: February, 1995

BUDGET ACTIVITY: 7 - Operational System Development

PE NUMBER AND TITLE: 1001004F International Activities

PROJECT: 00AH

| COST (*In Thousands*) | FY 1994 Actual | FY 1995 Estimate | FY 1996 Estimate | FY 1997 Estimate | FY 1998 Estimate | FY 1999 Estimate | FY 2000 Estimate | FY 2001 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| 00AH Shape Tech Center, VKI, AGARD, AFIPSA, ICRD&A Support | 1,896 | 1,915 | 3,713 | 3,762 | 3,901 | 4,050 | 4,169 | 4,287 | Continuing | TBD |

**A. Mission Description and Budget Item Justification**

The mission of this budget activity is to gain access to the world's best defense technologies, eliminate costly duplication of research and development efforts, accelerate availability of defense systems, and to deploy and sustain common or interoperable USAF and Allied equipment through international cooperative research and development.

The USAF is party to multiple international cooperative agreements to solve common US and Allied military scientific and technological problems and to develop materiel solutions to harmonize coalition requirements. This budget activity funds the Department of the Air Force to support, develop, process, negotiate, implement, and manage these international cooperative agreements and projects in compliance with statutory reporting provisions and exacting legal statutes, fiscal constraints, technology transfer controls, intellectual property rights, third party transfer provisions, quid-pro-quo criteria, industrial base factors, and political-military interests. Included in this budget are domestic and international technology assessment teams; specialized working groups; long-term technology project developments; support for cooperative opportunity assessments; developing, processing, and negotiating international agreements; oversight of international cooperative research and development (R&D) projects; overseas R&D liaison and coordination offices; bilateral and multilateral staff talks; exchanges of scientist and engineers; and the US share of the budget for the Von Karman Institute (VKI), NATO Air Force Armaments Group (NAFAG), and NATO Advisory Group for Aerospace Research and Development (AGARD).

**Justification for Budget Activity Assignment**

This program element funds general R&D management for all USAF international cooperative R&D. This includes management support and execution of projects in (1) Basic Research (2) Concept Exploration (3) Demonstration and Validation (4) Engineering and Manufacturing Development and (5) Production.

**(U) FY 1994 Accomplishments:**

- **(U) SHAPE Technical Center (STC) R&D Coordination Office** - Funded US R&D coordination office and its administrative support to eight US professionals assigned to the STC. ($100)
- **(U) Von Karman Institute (VKI)** - Funded US share of residual VKI budget. ($202)
- **(U) Advisory Group for Aerospace R&D (AGARD)** - Funded US national-level representation at HQ AGARD Delegates Board and technical experts from Air Force field-level and US industry/university-level to support 7 technical panels, 21 working groups, 4 study groups, and 1 study committee sponsored by NATO AGARD. Funded technical reports and exchanges in 14 areas as follows: (1) High Power Microwaves (2) Aircraft Load Factors and Impact of Acoustics and Turbulence, (3) Erosion, Corrosion and Foreign Object Damage Effects in Gas Turbine Engines (4) Guidance and Control Techniques for Future Air Defense Systems (5) Dual Use of Military and Commercial Technology in Guidance and Control (6) Issues and Advances in Aeromedical Evacuation (7) Low-Level Nap-of-the-Earth Night Operations (8) Space System

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
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Design and Development (9) Composite Repair of Aircraft Structures (10) Corrosion, Detection and Management of Advanced Airframe Materials (11) Aerodynamics and Aeroacoustics of Rotorcraft (12) Propagation Assessment in Coastal Environments (13) Reconnaissance, Surveillance and Target Acquisition Architecture to Meet NATO's Reaction Force Requirements (14) Non-Lethal Means for Diverting or Forcing Non-Cooperative Aircraft to Land. ($500)

- (U) **Air Force International Programs Support Activity (AFIPSA)** - Funded AFIPSA as the consolidated Air Force process center for international cooperative research and development agreements. The following 19 agreements were signed in FY94: Australia: (1) Master R&D and Engineering Agreement (2) Radar Tracking Project (3) Radar Detection and Warning Project; Finland: (1) Master Information Exchange Agreement; France: (1) Master Technology Research and Development Agreement (2) Aircraft Vulnerability Studies (3) Hypervelocity Vehicle Tire Loan; Germany: (1) Emulsifier and Support Equipment Loan (2) High Energy Lasers; Israel: (1) Advanced Technology Anti-G Suit Loan; The Netherlands: (1) Wind Tunnel; Norway: (1) Master Environmental R&D Agreement (2) Aircraft Shelters Project; Turkey: (1) Advanced Technology Anti-G Suit Loan; United Kingdom: (1) Master Information Exchange Agreement (2) Master Engineer and Scientist Exchange Agreement (3) Turbine Engine Technology (4) Conventional Air Launched Munitions. ($426)

- (U) **International Cooperative Research, Development and Acquisition (ICRD&A)** - Funded Air Force Materiel Command and HQ Air Force ICRD&A activities to identify, assess, and develop support packages for new Air Force international cooperative projects culminating in the approval of the above listed international agreements and processing of 31 new candidate agreements. Funded USAF headquarters and field-level representation at the US-Japan Systems and Technology Forum, NATO Four-Power Council, NAFAG and its 5 Subgroups to promote NATO harmonization of requirements, standardization, and development of international cooperative R&D programs. Supported engineer and scientists exchanges with 14 nations. Funded USAF overseas R&D liaison offices. Funded management support and oversight of USAF Foreign Comparative Test Program and Nunn Cooperative R&D Program. Supported assessments and acquisition of technology from the newly independent states of the Former Soviet Union. ($668)

(U) <u>FY 1995</u>:

- (U) **STC** - Fund US R&D coordination office and administrative support to eight US professionals assigned to the STC. ($80)
- (U) **VKI** - Fund US share (12.8%) of VKI budget as approved by US Mission NATO. ($400)
- (U) **AGARD** - Fund US national-level representation at HQ AGARD Delegates Board. Fund the 1995 AGARD National Delegates Board Meeting in the US as the host nation. Fund technical experts from Air Force field-level and US industry/university-level to support 7 technical panels, 21 working groups, 4 study groups, and 1 study committee sponsored by NATO AGARD. Fund technical reports and exchanges in 12 areas as follows: (1) Limitations and Enhancement in Situational Awareness (2) Aerodynamics of Stores Integration and Separation (3) Loss Mechanisms and Unsteady Flow in Turbomachinery (4) Advanced Aeroservoelastic Testing and Data Analysis (5) Widespread Fatigue Damage in Military Aircraft (6) Neurological Limitations of Aircraft Operations: Human Performance Implications (7) Progress and Challenges in Computational Fluid Dynamics Methods and Algorithms (8) Advanced Aero-Engine Concepts and Controls (9) Practical Implications of Thermal Mechanical Fatigue in the Performance of Military Aircraft Engines (10) Design, Qualification, and Maintenance of Vibration-Free Landing Gear (11) Enhancing the Survivability of Military Transport Aircraft (12) Use of Commercial Satellites for Military Applications. Expand Partnership for Peace initiative through AGARD outreach program incorporating Eastern Europe and Former Soviet Union scientific and technical groups. ($440)
- (U) **AFIPSA** - Fund USAF management of International Cooperative R&D Agreements. We anticipate approximately 31 agreements will be needed for signature in FY95, as follows: Australia: (1) Aircraft and Stores Compatibility Testing; Canada: (1) Master Technology, Research and Development Agreement (2) Lens Antenna Deployment Demonstration Test (3) Unmanned Aerial Vehicle (4) Air Base Operability (5) High Powered Microwaves; Four-Powers (Germany, France, UK, and US): (1) High Powered Microwaves Project (2) Military Aircraft Survivability (3) Electro-Optics Technology (4) Future Multi-Band Tactical Radio; France: (1) Image/Information

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
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| BUDGET ACTIVITY: 7 - Operational System Development | PE NUMBER AND TITLE: 1001004F International Activities / PROJECT: 00AH |

Reformatter (2) Satellite Early-Warning (3) Optical Properties of the Atmosphere (4) Flight in Adverse Atmosphere Conditions (5) Future Equipment for Pilots (6) Airborne Electronic Countermeasures (7) Ground-Based Radars Operating in the HF and Low VHF Bands Data; Germany: (1) Master Research and Technology Project Agreement (2) Environmental R&D (3) Wind Tunnel and Flight Simulation; Israel: (1) Electronic Warfare; Italy: (1) Non-Destructive Evaluation of Composite Materials; The Netherlands: (1) Infrared Celestial Background (2) Unmanned Aerial Vehicles; NATO: (1) NATO AWACS Radar System Improvement; United Kingdom: (1) Master Technology Research and Development Agreement (2) Aircrew Protection (3) Mass and Performance Estimation Methodology (4) Future Space Systems and Concepts (5) Battlefield Identification (6) Wind Tunnel Test Technology. ($113)

- **(U) ICRD&A** - Fund Air Force Materiel Command and HQ Air Force ICRD&A activities to identify, assess, and develop support packages for new Air Force international cooperative projects culminating in the approval of the above listed international agreements and processing of 42 new candidate agreements. Fund USAF leadership initiatives as the new Chair of the NATO Air Force Armaments Group (NAFAG). Fund USAF headquarters and field-level representation at the US-Japan Systems and Technology Forum, NATO Four-Power Council, NAFAG and its 6 Subgroups to promote harmonization of requirements, standardization, and development of international cooperative R&D programs. Support engineer and scientists exchanges with 14 nations. Fund USAF overseas R&D liaison offices. Fund management support and oversight of USAF Foreign Comparative Test Program and Nunn Cooperative R&D Program. Partially fund deployment of the Joint STARS System to promote it as part of the solution to the NATO Alliance Ground Surveillance requirement. Fund acquisition and assessment of technology from the newly independent states of the Former Soviet Union. ($882)

(U) <u>FY1996</u>

- **(U) STC** - Fully fund US R&D coordination office and administrative support to US professionals assigned to the STC. ($100)
- **(U) VKI** - Fully fund US share (12.8%) of VKI budget as approved by US Mission NATO ($500). Award two USAF VKI fellowships. ($20)
- **(U) AGARD** - Fully fund US national-level representation at HQ AGARD Delegates Board. Fund technical experts from Air Force field-level and US industry/university-level to support 7 technical panels, 21 working groups, 4 study groups, and 1 study committee sponsored by NATO AGARD. Fund technical reports and exchanges in 13 areas as follows: (1) Minimizing Collateral Damage During Peace Support Operations (2) Radar Cross-Section Analysis and Imaging of Military Targets (3) Remote Sensing (4) Space Systems Contributions to NATO Defense Strategy (5) Advanced Architectures for Mission Avionics (6) Characterization and Modification of Wakes from Lifting Vehicles in Fluids (7) Aerodynamics of Wind Tunnel Circuits and their Components (8) Aging Combat Aircraft Fleets - Long Term Implications (9) Smart Structures and Materials - Implications for Military Aircraft of a New Generation (10) Medical Complications and Screening for Sustained High-G and Positive Pressure Breathing (11) Service-Life of Solid Rocket Propellants (12) Acute Visual and Cognitive Incapacitation of Aircrews: Protection Management and Cockpit Integration (13) Aircraft Fire Safety. Continue the Partnership for Peace initiative through AGARD outreach program incorporating additional Eastern Europe and Former Soviet Union scientific and technical groups. ($500)
- **(U) AFIPSA** - Fully fund AFIPSA and USAF to clear a growing backlog of approximately 84 proposals for International Cooperative R&D Agreements. The following is a sample list of 42 candidate agreements for signature in FY96: Australia: (1) Passive Sensors (2) Semiconductor Materials and Microelectronics Circuits; Brazil: (1) Ionospheric Experiments (2) Engineer and Scientist Exchange Agreement; Canada: (1) Infrared Spectral Imaging (2) Lithium Battery Technology (3) Human System Interfaces (4) Computational Electromagnetic; Egypt: (1) Seismic Monitoring Station; Four-Powers (Germany, France, UK, and US): (1) Human Effects of Directed Energy (2) Non-Destructive Evaluation Techniques (3) Integrated Sensor System (4) Technology Beyond Visual Range (5) Insensitive High Explosive (6) Tactical Laser Hardened Material Exchange; France: (1) Nuclear Propulsion (2) Synthetic Aperture Radar Imaging (3) Sensor Data Fusion (4) Photonics (5) Aerial Reconnaissance and Geographics (6) International Military Satellite Project Definition; Germany: (1) Boron-Fueled Variable Flow Ducted Rocket (2) Hard Target Defeat Technology (3) Armament Defeat

| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE February, 1995 |
|---|---|
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Technology (4) Hard Target Defeat Penetrators; Israel: (1) Indium Phosphide Optical Devices and Circuits (2) Pulsed Laser Deposited Coatings; Japan: (1) F-15 Upgrade Program (2) FS-X Production (3) Bioprocessing for Decontamination (4) Environmentally Compatible Solid Rocket Propellants; Multilateral: (1) Master Advanced Medium Range Air-To-Air Missile (AMRAAM) Users' Group Agreement (2) Command Control Communications and Intelligence (C3I) Interoperability; NATO: (1) NATO AWACS Electronic Support Measures (2) Alliance Ground Surveillance Embryonic Program Office; Russia: (1) Seismic Monitoring Station (2) Master Data Exchange Agreement; Turkey: (1) Seismic Monitoring Station; United Kingdom: (1) Joint Tactical Information Distribution System (2) Combat Air Operations Center (3) Variable Flow Ducted Rocket (4) Non-Cooperative Target Recognition (5) Airborne Tactical Communications (6) International Military Satellite Project Definition. ($250)

- (U) **ICRD&A** - Fully fund Air Force Materiel Command and HQ Air Force ICRD&A activities to identify, assess, and develop support packages for new Air Force international cooperative projects culminating in the approval of the above listed international agreements and processing of 85 new candidate agreements. Fund USAF leadership initiatives as the Chair of the NAFAG. Fund USAF headquarters and field-level representation at the US-Japan Systems and Technology Forum, NATO Four-Power Council, NAFAG and its 6 Subgroups to promote harmonization of requirements, standardization, and development of international cooperative R&D programs. Support engineer and scientists exchanges with 14 nations. Fund USAF overseas R&D liaison offices. Fund management support and oversight of USAF Foreign Comparative Test Program and Nunn Cooperative R&D Program. Fund expanded technology acquisition contracts and follow-on assessments of Russian technology. Explore opportunities for US-Russian cooperative R&D projects. Partially fund start-up costs of promising out-of-cycle cooperative R&D programs by matching program funds. ($2,343)

(U) <u>FY1997</u>

- (U) **STC** - Fund US R&D coordination office and administrative support to US professionals assigned to the STC. ($100)
- (U) **VKI** - Fund US share (12.8%) of VKI budget as approved by US Mission NATO ($500). Award two USAF VKI fellowships. ($20)
- (U) **AGARD** - Fully fund US national-level representation at HQ AGARD Delegates Board. Fund technical experts from Air Force field-level and US industry/university-level to support 7 technical panels, 21 working groups, 4 study groups, and 1 study committee sponsored by NATO AGARD. Fund technical reports and exchanges documented in the AGARD FY97 Program of Work as endorsed by US National Delegate and approved by the HQ AGARD National Delegates Board and NATO Military Committee. Continue Partnership for Peace initiative through the AGARD outreach program incorporating new scientist and engineers from Central Europe. ($500)
- (U) **AFIPSA** - Fully fund AFIPSA to continue clear the backlog of approximately 85 proposals for International Cooperative R&D Agreements. The following is a sample list of 42 candidate agreements for signature in FY97: Australia: (1) Software Engineering; Canada (1) Avionics (2) Synthetic Aperture Radar (3) Infrared Sensors; Four-Powers (Germany, France, UK, and US): (1) Three Long-Term Technology Project Arrangements; France: (1) Laser Radar (2) Formulation and Testing of More Energetic Materials (3) High Temperature Graphite Materials (4) Over-the Horizon Backscatter Radar Ionospheric Clutter; Germany: (1) Machine Intelligence and Robotics (2) High Strength Plastics (3) Photonics (4) 3-D Image Processing (5) High Temperature Materials for Superconductivity (6) Data Fusion; Israel: (1) Hypervelocity Projectiles; Japan: (1) Data Fusion Displays and Components (2) Pattern Recognition (3) Multi-Band Capable Components (4) Low-Loss Fiber Optics (5) Photo-Conductive Switching (6) Digital Superconducting Devices (7) Process and Fabrication Techniques; Korea: (1) Seismic Monitoring Station (2) Hard Target Penetration; Multilateral: (1) AMRAAM Users' Group Improvement Project; NATO: (1) Alliance Ground Surveillance System; Norway: (1) Air Battle Management and C3I; Pakistan: (1) Seismic Monitoring Station; Peoples Republic of China: (1) Seismic Monitoring Station; Russia: (1) Biotechnology, Biocybernetics, Neural Networks (2) Energetic Materials (3) Human Acceleration and Performance (4) Tribological Coatings and Application Processes (5) Ultra Pure Gallium Arsenide Compounds (6)

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Hypersonic Wind Tunnel Technology (7) Human Factors in Space (8) High Speed Propulsion Technology; Sweden: (1) Computational Fluid Dynamics (2) Neural-Computing for Pattern Recognition; United Kingdom: (1) Neural Networks for Radar Processing (2) High Performance Distributed Computing ($250)

- (U) **ICRD&A** - Fully fund Air Force Materiel Command and HQ Air Force ICRD&A activities to identify, assess, and develop support packages for new Air Force international cooperative projects culminating in the approval of the above listed international agreements and processing of approximately 90 new candidate agreements. Fund USAF headquarters and field-level representation at the US-Japan Systems and Technology Forum, NATO Four-Power Council, NAFAG and its 6 Subgroups to promote harmonization of requirements, standardization, and development of international cooperative R&D programs. Fund engineer and scientists exchanges with 14 nations. Fund USAF overseas R&D liaison offices. Fund management support and oversight of USAF Foreign Comparative Test Program and Nunn Cooperative R&D Program. Fund enhanced cooperative opportunity assessments of Russian technology projects and associated negotiations. Partially fund start-up costs of promising out-of-cycle cooperative R&D programs by matching program funds. ($2,392)

(U) **Acquisition Strategy:**

This program element is the only source of USAF funds to pursue opportunities for international armament's cooperation to (a) deploy and support common or interoperable equipment with our allies; (b) leverage USAF resources with our allies through cost sharing and economies of scale; and (c) exploit the best US and allied technologies for equipping coalition forces. We obtain these benefits only after international cooperative opportunities are identified, explored, developed, assessed and after the international agreements are negotiated and concluded. This program element provides funds to execute up front armaments cooperation responsibilities, rationalize cooperative opportunities, assess allied technologies, and generate sound, cost-effective cooperative programs between the USAF and our international partners. Once these initiatives and programs are started as international efforts they are transferred to the appropriate technology or systems program office and are funded in their own program elements.

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**(U) B. Program Change Summary ($ in Thousands)**

| | FY1994 | FY1995 | FY1996 | FY1997 | Total Cost |
|---|---|---|---|---|---|
| (U) Previous President's Budget | 1,909 | 3,436 | 3,339 | 3,378 | TBD |
| (U) Appropriated Value | | | | | |
| Adjustments to Appropriated Value | | | | | |
| a. AF Cut | | -1,521 | | | |
| b. Cooperative Opportunities | | | 374 | 384 | |
| c. Cong General Reductions | -40 | | | | |
| (U) Current Budget Submit/President's Budget | 1,869 | 1,915 | 3,713 | 3,762 | |

(U) Change Summary Explanation:
Funding: For this program element, Congress cut the FY94 President's Budget request from $3,820 to $1,909, and again in FY95 from $3,436 to $1,915. This has significantly affected the USAF's ability to proactively support DoD's Renaissance in Armament Cooperation with foreign countries. FY96 and FY97 have been increased to cover cooperative opportunities to promote additional ICRD&A programs with our allies.

Schedule: N/A

Technical: The FY94 and FY95 congressional reductions forced us to cancel all new ICRD&A initiatives funded by this Program Element, severely restricted USAF participation in International Cooperative Armaments Forums, and reduced the number of Fellowships in support of VKI.

**(U) C. Other Program Funding**

Procurement Line P-1 N/A

Milcon Project N/A

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**Related RDT&E:**

(U) This program provides for USAF management of DoD funded R&D Nunn (PE 0605130D) and Foreign Comparative Test (FCT) (PE 0603790D) programs. It also provides international agreement support for 6.1 through 6.3 programs for USAF Laboratories and for 6.4 through 6.5 programs for USAF Product and Logistic Centers.

**(U) D. Schedule Profile**

| | FY 1994 | | | | FY 1995 | | | | FY 1996 | | | | FY 1997 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| (U) | | | | | | | | | | | | | | | | |
| -SHAPE Technical Center | X | | X | | X | | X | | X | | X | | X | | X | |
| -VKI Board of Directors | X | X | | | X | X | | | X | X | | | X | X | | |
| -AGARD Delegate Board | | X | | X | | X | | X | | X | | X | | X | | X |
| -Aerospace Applications Studies Committee | X | | | | X | | | | X | | | | X | | | |
| -Bilateral Technology R&D Projects MOUs | X | | | | X | | | | X | | | | X | | | |
| -Cooperative R&D Projects | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -R&D Loans of Defense Equipment | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -Systems & Technology Forum (JA) | | X | | X | | X | | X | | X | | X | | X | | X |
| -Other Bilateral forums (CA,BZ) | | | | X | X | | X | | X | | X | | X | | X | |
| -Data/Information Exchange Annexes | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -Engineer and Scientist Exchanges | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -NATO Air Force Armaments Group | | X | | X | | X | X | | | X | | X | | X | X | |
| -Four-Power Air Senior National | X | | X | X | | | X | | X | | X | X | | | X | |
| -Four-Power Long-Term Technology Projects | | X | | X | | X | | X | | X | | X | | X | | X |
| -FCT Quarterly Reports | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -Nunn Quarterly Reports | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| -FS-X Tech Assessments | | | | | X | | X | | X | | X | | X | | | |