| RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit) | DATE<br>FEBRUARY 2007 |
|---|---|
| APPROPRIATION / BUDGET ACTIVITY<br>RDT&E, DEFENSE-WIDE / 7 | R-1 ITEM NOMENCLATURE / PROJECT NO.<br>PE 1160403BB Special Operations Aviation Systems Advanced Development/Project SF100 |

| COST (Dollars in Millions) | FY06 | FY07 | FY08 | FY09 | FY10 | FY11 | FY12 | FY13 | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| PE1160403BB | 87.267 | 76.679 | 60.750 | 51.529 | 38.343 | 37.674 | 26.656 | 32.578 | Cont. | Cont. |
| SF100, Special Operations Aviation Systems Advanced Development | 87.267 | 76.679 | 60.750 | 51.529 | 38.343 | 37.674 | 26.656 | 32.578 | Cont. | Cont. |

A. Mission Description and Budget Item Justification: This project provides for the investigation, evaluation, demonstration and integration of current and maturing technologies for Special Operations Forces (SOF)-unique aviation requirements. Timely application of SOF-unique technology is critical and necessary to meet requirements in such areas as: Low Probability of Intercept/Low Probability of Detection radar; digital terrain elevation data and electronic order of battle; digital maps; enhanced situational awareness; near-real-time intelligence to include data fusion; threat detection and avoidance; electronic support measures for threat geo location and specific emitter identification; navigation, target detection, evaluation of iridium and global positioning technologies and identification technologies; aerial refueling; and studies for future SOF aircraft requirements.

B. Program Change Summary:

| | FY2006 | FY2007 | FY2008 | FY2009 |
|---|---|---|---|---|
| Previous President's Budget | 102.840 | 83.704 | 59.900 | 41.597 |
| Current Presiden't Budget | 87.267 | 76.679 | 60.750 | 51.529 |
| Total Adjustments | -15.573 | -7.025 | 0.850 | 9.932 |
| Congressional Program Reductions | | -5.297 | | |
| Congressional Rescissions | | | | |
| Congressional Increases | | | | |
| Reprogrammings | -13.254 | | | |
| Other Program Adjustments | | | 0.850 | 9.932 |
| SBIR Transfer | -2.319 | -1.728 | | |

Funding:

FY06: Decrease is the result of reprogramming to Special Operations Special Technology for Standoff Precision Guided Munitions technology demonstration shortfall and higher Command priorities (-$7.451 million), a DD 1415-1 Prior Approval Reprogramming (No. FY 06-17 PA) submitted to Congress to support a critical O&M GWOT shortfall (-$5.303 million), Small Business Innovative Research (SBIR) program administration (-$0.500 million) and transfer to the SBIR account (-$2.319 million).

FY07: Decrease is the result of a Congressional mark against the Common Avionics Architecture for Penetration program (-$5.000 million), Section 8106 redution (-$0.297 million) and Section 8106 reduction (-$0.297 million).

FY08: Net increase of $.850 million is due to the Terrain Following/Terrain Avoidance (TF/TA) Radar Program restructure to align the program funds with execution and an increase for an Iridium Global Positioning System (I-GPS) effort ($10.000 million).

FY09: Increase of $9.932 million is due to the TF/TA Radar Program restructure to align the program with execution.

Schedule: None.

Technical: None.

| | Exhibit R-2a, RDT&E Project Justification | Date: FEBRUARY 2007 |
|---|---|---|
| Appropriation/Budget Activity<br>RDT&E BA # 7 | Aviation Systems Advance Development/Project SF100 | |

| Cost ($ in millions) | FY06 | FY07 | FY08 | FY09 | FY10 | FY11 | FY12 | FY13 |
|---|---|---|---|---|---|---|---|---|
| Aviation Sys Adv Dev | 87.267 | 76.679 | 60.750 | 51.529 | 38.343 | 37.674 | 26.656 | 32.578 |
| RDT&E Articles Quantity | | | | | | | | |

A. Mission Description and Budget Item Justification: This project provides for the investigation, evaluation, demonstration and integration of current and maturing technologies for Special Operations Forces (SOF)-unique aviation requirements. Timely application of SOF-unique technology is critical and necessary to meet requirements in such areas as: Low Probability of Intercept/Low Probability of Detection (LPI/LPD) radar; digital terrain elevation data and electronic order of battle; digital maps; enhanced situational awareness; near-real-time intelligence to include data fusion, threat detection and avoidance; electronic support measures for threat geolocation and specific emitter identification; navigation, target detection and identification technologies; aerial refueling; and studies for future SOF aircraft requirements.

- Aviation Engineering Analysis. Provides a rapid response capability to support SOF fixed wing aircraft. The purpose is to correct system deficiencies, improve asset life, and enhance mission capability through the means of feasibility studies and engineering analyses. This sub-project provides the engineering required to improve the design and performance integrity of the aircraft support systems, sub-systems, equipment, and embedded computer software as they relate to the maintenance, overhaul, repair, quality assurance, modifications, materiel improvements and service life extensions.

- Common Avionics Architecture for Penetration (CAAP). This program is joined with the USAF C-130 Avionics Modernization Program (AMP). CAAP provides LPD navigation for MC-130 E/H/P and off-board enhanced situational awareness (ESA), large color displays and a SOF processor for AC-130H/U and MC-130 E/H/P. The Command decided to terminate this effort due to higher command priorities.

- On-Board Enhanced Situational Awareness System (OBESA). This program continues development of OBESA, which consolidates threat data from on and off-board sensors into a single coherent image to the crew. OBESA includes the Below Line-Of-Sight Electronic Support Measures (BLOSEsM) processing software. BLOSEsM is an advanced receiver system which provides geo-location data on threats that are below the line of sight of the current SOF threat warning systems. The Command decided to defer transition from the ACTD due to higher command priorities.

- SOF K-band Terrain Following/Terrain Avoidance (TF/TA) Radar. Continues system design and development of a SOF common K-band LPI/LPD radar (Silent Knight Radar) to defeat advanced passive detection threat while maintaining ability to fly safe TF. This radar is targeted for use on all MH-47Gs, MH-60Ms, MC-130Hs & CV-22 aircraft.

- MC-130H Aerial Refueling (MCAR). Provides 20 MC-130H Combat Talon II aircraft with the capability to air refuel SOF rotary wing aircraft and CV-22. This capability will extend the range of rotary wing and CV-22 aircraft operating in politically sensitive/denied airspace. Elements of the air refueling system include non-developmental item aerial refueling pods and enlarged paratroop door windows.
- Iridium-Global Positioning System (I-GPS). Conducts a proof of concept study of Iridium-Global Positioning System (I-GPS) to evaluate the capability to provide handsets capable of using signals from iridium and global positioning system satellites to provide anti-jam, positioning, and timing accuracy capabilities.

B. Accomplishments/Planned Program

| | FY06 | FY07 | FY08 | FY09 |
|---|---|---|---|---|
| Aviation Engineering Analysis | 7.866 | 7.231 | 5.419 | 5.553 |
| RDT&E Articles Quantity | | | | |

FY06 Conducted engineering and analysis for new aircraft and enhancements. Developed a replacement for sensor obsolescence issues.
FY07 Conduct engineering studies and analyses for Fixed Wing aviation SOF unique equipment and missions.
FY08 Conduct engineering studies and analyses for Fixed Wing aviation SOF unique equipment and missions.
FY09 Conduct engineering studies and analyses for Fixed Wing aviation SOF unique equipment and missions.

| | FY06 | FY07 | FY08 | FY09 |
|---|---|---|---|---|
| Common Avionics Architecture for Penetration (CAAP) | 62.769 | 29.961 | | |
| RDT&E Articles Quantity | | | | |

FY06 The C-130 AMP/CAAP program tested the Block 2 hardware and software in the Systems Integration Laboratory (SIL) in preparation for first flight of the DT&E configuration for the MC-130E/H/P Combat Talon aircraft. Additionally, the CAAP ESA capability will complete its SIL evaluations to support a Test Readiness Review. CAAP ESA goes on all AC/MC-130 aircraft. In parallel, design and development for the baseline configuration update to reflect post-contract award avionic modifications (Block 10) progresses.
FY07 Flight testing continues for TF performance at low levels and against passive detection threats.

| | FY06 | FY07 | FY08 | FY09 |
|---|---|---|---|---|
| On-Board ESA | 7.864 | 10.894 | | |
| RDT&E Articles Quantity | | | | |

FY06 Completed final laboratory integration and test of BLOSEsM components including Integrated Processor threat correlation, fusion, and display software; began initial installation of BLOSEsM hardware/software components into test aircraft.
FY07: Perform aircraft integration of BLOSEsM on MC-130 flight test aircraft. Conduct MC-130 BLOSEsM system flight test. Provide

BLOSEsM system transition documentation to USSOCOM to support OBESA legacy APR-46 system replacement on AC/MC-130s.

| | FY06 | FY07 | FY08 | FY09 |
|---|---|---|---|---|
| SOF K-band TF/TA Radar | 8.142 | 28.593 | 45.331 | 45.976 |
| RDT&E Articles Quantity | | | | |

FY06 Complete TF/TA radar technology risk reduction initiated under Project D615 and transferred to SF100 in FY06.
FY07 Award contract for SOF common K-band TF/TA radar System Design and Development. Specific activities include hardware and software development, aircraft integration design, and initiation of developmental test plans for MH-47G platform.
FY08 Continue SDD of SOF common K-Band TF/TA radar. Continue hardware and software design and integration and refinement of developmental test plans for MH-47G platform.
FY09 Continue SDD of SOF common K-Band TF/TA radar. Continue hardware and software design and integration and refinement of developmental test plans for MH-47G platform.

| | FY06 | FY07 | FY08 | FY09 |
|---|---|---|---|---|
| MC-130H Aerial Refueling | .626 | | | |
| RDT&E Articles Quantity | | | | |

FY06 Completed development for tilt rotor aircraft.

| | FY06 | FY07 | FY08 | FY09 |
|---|---|---|---|---|
| Iridium-Global Positioning System (I-GPS) | | | 10.000 | |
| RDT&E Articles Quantity | | | | |

FY08 Conducts a proof of concept study of Iridium-Global Positioning System (I-GPS) to evaluate the capability to provide handsets capable of using signals, from iridium and global positioning system satellites to provide anti-jam, positioning, and timing accuracy capabilities.

C. Other Program Funding Summary:

To Total

| | FY06 | FY07 | FY08 | FY09 | FY10 | FY11 | FY12 | FY13 | Complete | Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Proc, C130 Mods | 31.461 | 47.067 | 133.477 | 45.602 | 19.700 | 16.600 | 23.857 | 43.348 | Cont. | Cont. |

D. Acquisition Strategy :

- Aviation Engineering Analysis. Continue engineering analysis activities to correct system deficiencies, improve asset life, and enhance mission capability of SAF fixed-wing aircraft avionics and sensors.

- SOF K-band TF/TA Radar. A contract will be awarded 1Q FY07 for System Design and Development (SDD) based upon full and open competition. SDD will include radar development, integration onto an MH-47G, and system qualification/operation testing. The SDD contract includes a procurement option for six Low Rate Initial Production (LRIP) units.

| Exhibit R-3 RDT&E Project Cost Analysis | | | | | | DATE: FEBRUARY 2007 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| APPROPRIATION / BUDGET ACTIVITY<br>RDT&E DEFENSE-WIDE / 7 | | | Special Operations Aviation Systems Advanced Development/PE1160403BB<br>Aviation Systems Advance Development/SF100 | | | | | | | | |
| Actual or Budget Value ($ in millions) | | | | | | | | | | | |
| Cost Categories<br>(Tailor to WBS, or System/<br>Item Requirements) | Contract<br>Method<br>& Type | Performing Activity & Location | Total<br>PYs<br>Cost | Budget<br>Cost<br>FY07 | Award<br>Date<br>FY07 | Budget<br>Cost<br>FY08 | Award<br>Date<br>FY08 | Budget<br>Cost<br>FY09 | Award<br>Date<br>FY09 | To<br>Complete | Total<br>Program |
| Primary Hardware Development | | | | | | | | | | | |
| CAAP | C/CPAF | Boeing, Long Beach, CA | 235.278 | 29.961 | Various | | | | | | 265.239 |
| Award Fees | | | 2.081 | | | | | | | | 2.081 |
| MC-130 Air Ref | CPAF | Boeing, Ft. Walton Beach, FL | 38.815 | | | | | | | | 38.815 |
| TF/TA Radar Risk Reduction | CPIF | Raytheon, McKinney TX and Northrop Grumman, Baltimore, MD | 8.142 | | | | | | | | 8.142 |
| TF/TA Radar SDD | CPIF | Raytheon, McKinney TX | | 28.593 | Dec-06 | 45.331 | Various | 45.976 | Various | 112.857 | 232.757 |
| OBESA | CPIF | Northrop Grumman, Dayton, Ohio | 39.817 | 10.894 | Various | | | | | | 50.711 |
| Subtotal Product Dev | | | 324.133 | 69.448 | | 45.331 | | 45.976 | | 112.857 | 597.745 |
| Remarks: | | | | | | | | | | | |
| Development Support | | | | | | | | | | | |
| Engineering/Studies | | | | | | | | | | | |
| Aviation Engineering Analysis | Various | Various | 24.020 | 7.231 | Various | 5.419 | Various | 5.553 | Various | Cont | Cont |
| Iridium-Global Pos Syst (I-GPS) | TBD | TBD | | | | 10.000 | TBD | | | | 10.000 |
| Subtotal Spt | | | 24.020 | 7.231 | | 15.419 | | 5.553 | | 22.445 | 74.668 |
| Remarks: | | | | | | | | | | | |
| Total Cost | | | 348.153 | 76.679 | | 60.750 | | 51.529 | | 135.302 | 672.413 |
| Remarks: | | | | | | | | | | | |

| **Exhibit R-4, RDT&E Program Schedule Profile** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | Date: FEBRUARY 2007 | | | | | | | | | | | | | | | | |
| Appropriation/Budget Activity<br>RDT&E/7 | | | | | Program Element Number and Name<br>PE1160403BB/Special Operations Aviation Systems Advanced Dev | | | | | | | | | | | | Project Number and Name<br>SF100/Aviation System Advance Development | | | | | | | | | | | | | | | | |
| Fiscal Year | 2006 | | | | 2007 | | | | 2008 | | | | 2009 | | | | 2010 | | | | 2011 | | | | 2012 | | | | 2013 | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Aviation Engineering Analysis - System Design Development (SDD) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C-130 CAAP/USAF AMP Development/Test | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MC-130H Aerial Refueling Dev/Integration/Test | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| On-Board Enhanced Situational Awareness System | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TF/TA Radar System Design and Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Iridium-Global Pos System (I-GPS) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| **Exhibit R-4a, RDT&E Program Schedule Detail** | | | Date: FEBRUARY 2007 | | | | | |
|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>RDT&E/7 | Program Element Number and Name<br>PE1160403BB/Special Operations Aviationl Systems Adv Dev | | Project Number and Name<br>Project SF100/Aviation Systems Advance Development | | | | | |
| Schedule Profile | FY2006 | FY2007 | FY2008 | FY2009 | FY2010 | FY2011 | FY2012 | FY2013 |
| Aviation Engineering Analysis - System Design Development (SDD) | 1-4Q | 1-4Q | 1-4Q | 1-4Q | 1-4Q | 1-4Q | 1-4Q | 1-4Q |
| C-130 CAAP/USAF AMP Development/Test | 1-4Q | 1-4Q | | | | | | |
| MC-130H Aerial Refueling Dev/Integration/Test | 1-4Q | | | | | | | |
| On-Board Enhanced Situational Awareness System | 1-4Q | 1-4Q | | | | | | |
| Terrain Following/Terrain Avoidance Radar Dev | | 1-4Q | 1-4Q | 1-4Q | 1-4Q | 1-4Q | 1-4Q | 1-4Q |
| Iridium-Global Positioning System (I-GPS) | | | 2-4Q | 1-2Q | | | | |