PE NUMBER: 0305940F
PE TITLE: Space Situation Awareness Operations

# Exhibit R-2, RDT&E Budget Item Justification

DATE: February 2006

BUDGET ACTIVITY: 07 Operational System Development

PE NUMBER AND TITLE: 0305940F Space Situation Awareness Operations

| Cost ($ in Millions) | | FY 2005 Actual | FY 2006 Estimate | FY 2007 Estimate | FY 2008 Estimate | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | Cost to Complete | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total Program Element (PE) Cost | 0.000 | 0.000 | 31.401 | 10.778 | 0.505 | 0.264 | 0.236 | 0.000 | 43.184 |
| A017 | Sensor Service Life Extension Programs | 0.000 | 0.000 | 31.401 | 10.778 | 0.505 | 0.264 | 0.236 | 0.000 | 43.184 |

In FY 2007 this is a new PE. This project transferred from PE 0305910F, Spacetrack, to reflect evolution of space surveillance to the new Space Situation Awareness construct.

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

Space Situation Awareness (SSA) is knowledge of all aspects of space related to operations. The foundation for space control, it encompasses intelligence on adversary space operations; surveillance of all space objects and activities; detailed reconnaissance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities. This program element fields, upgrades, operates, and sustains Air Force sensors within the SSA network while companion program element 0604425F, Space Situation Awareness Systems, develops new network sensors and improves information integration across the network. Activities funded in this program element focus on surveillance of objects in Earth orbit to aid tasks including satellite tracking; space object identification, tracking, and cataloging; satellite attack warning; notification of satellite flyovers to U.S. forces; space treaty monitoring; and technical intelligence gathering.

The Sensor Service Life Extension Programs (SLEPs) project funds efforts to upgrade and extend the lifetime of operational SSA sensors. The first of these, the Eglin SLEP, extends the lifetime of the one-of-a-kind AN/FPS-85 phased array radar at Eglin Air Force Base, Florida, dedicated to finding and tracking near Earth and deep space objects. Operational since 1968, this radar is the SSA network's largest tracker of objects in the manned flight region, and it tracks over half the objects in the Air Force space object catalog. The SLEP effort will replace its aging, increasingly unsupportable radar processing components and establish a modern software architecture to enable radar operations, sustainment, and technology refreshes through 2028.

The second effort in this project, the Haystack Ultra-Wideband Satellite Imaging Radar, upgrades the X-band Haystack radar at the Lincoln Space Surveillance Complex in Westford, Massachusetts. Haystack provides space object identification and metric data to the Air Force to aid SSA operations. The upgrade effort will build a W-band high-power transmitter enabling object imaging with resolution significantly greater than the X-band system's 25-centimeter resolution; it will also replace the existing antenna and processing equipment with more modern hardware and software compatible with W-band operations in an architecture that also supports year-round X-band surveillance for the Air Force. Greater radar resolution is necessary to maintain current levels of space object identification intelligence since satellites are becoming smaller than ever, making X-band characterization of them increasingly difficult.

Both these efforts are in Budget Activity 7, Operational System Development, because they develop modifications for operational SSA sensors.

| Exhibit R-2, RDT&E Budget Item Justification | DATE February 2006 |
|---|---|
| BUDGET ACTIVITY<br>**07 Operational System Development** | PE NUMBER AND TITLE<br>**0305940F Space Situation Awareness Operations** |

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

| | | FY 2005 | FY 2006 | FY 2007 |
|---|---|---|---|---|
| (U) | Previous President's Budget | 0.000 | 0.000 | 0.000 |
| (U) | Current PBR/President's Budget | 0.000 | 0.000 | 31.401 |
| (U) | Total Adjustments | 0.000 | 0.000 | |
| (U) | Congressional Program Reductions | | | |
| | Congressional Rescissions | | | |
| | Congressional Increases | | | |
| | Reprogrammings | | | |
| | SBIR/STTR Transfer | | | |

(U) Significant Program Changes:

FY 2007: Funding transferred from PE 0305910F

| Exhibit R-2a, RDT&E Project Justification | | DATE: February 2006 |
|---|---|---|
| BUDGET ACTIVITY: 07 Operational System Development | PE NUMBER AND TITLE: 0305940F Space Situation Awareness Operations | PROJECT NUMBER AND TITLE: A017 Sensor Service Life Extension Programs |

| Cost ($ in Millions) | | FY 2005 Actual | FY 2006 Estimate | FY 2007 Estimate | FY 2008 Estimate | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | Cost to Complete | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| A017 | Sensor Service Life Extension Programs | 0.000 | 0.000 | 31.401 | 10.778 | 0.505 | 0.264 | 0.236 | 0.000 | 43.184 |
| | Quantity of RDT&E Articles | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |

In FY 2007 this project transferred from Project 67A008, Sensor Service Life Extension Programs, in PE 0305910F, Spacetrack, to reflect the evolution of space surveillance to the Space Situation Awareness construct. The full FY 2005 - FY 2011 schedule for this project is included here for clarity, but refer to the RDT&E Budget Item Justification for that PE for further information on pre-FY 2007 activities.

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

Space Situation Awareness (SSA) is knowledge of all aspects of space related to operations. The foundation for space control, it encompasses intelligence on adversary space operations; surveillance of all space objects and activities; detailed reconnaissance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities. This program element fields, upgrades, operates, and sustains Air Force sensors within the SSA network while companion program element 0604425F, Space Situation Awareness Systems, develops new network sensors and improves information integration across the network. Activities funded in this program element focus on surveillance of objects in Earth orbit to aid tasks including satellite tracking; space object identification, tracking, and cataloging; satellite attack warning; notification of satellite flyovers to U.S. forces; space treaty monitoring; and technical intelligence gathering.

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| Exhibit R-2a, RDT&E Project Justification | | DATE February 2006 |
|---|---|---|
| BUDGET ACTIVITY<br>07 Operational System Development | PE NUMBER AND TITLE<br>0305940F Space Situation Awareness Operations | PROJECT NUMBER AND TITLE<br>A017 Sensor Service Life Extension Programs |

**(U) B. Accomplishments/Planned Program ($ in Millions)**

| | | FY 2005 | FY 2006 | FY 2007 |
|---|---|---|---|---|
| (U) | Eglin radar life extension engineering design, development, and support | 0.000 | 0.000 | 24.825 |
| (U) | Haystack radar upgrade engineering design, development, and support | 0.000 | 0.000 | 6.576 |
| (U) | Total Cost | 0.000 | 0.000 | 31.401 |

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

| | FY 2005 Actual | FY 2006 Estimate | FY 2007 Estimate | FY 2008 Estimate | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | Cost to Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|
| (U) RDT&E, Air Force (PE 0305190F, Spacetrack) | 29.322 | 25.022 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 77.037 |

**(U) D. Acquisition Strategy**

The Eglin life extension effort utilizes an option on the System Engineering, Sustainment, and Modernization (SENSOR) contract competitively awarded to ITT Industries for sustaining and upgrading various Air Force radars, including the Eglin radar, in February 2002.

The Massachusetts Institute of Technology's Lincoln Laboratory (MIT/LL), a non-profit Federally-Funded Research & Development Center, performs the Haystack upgrade effort under a master contract with the Electronics System Center. This effort is classified as applied research under that contract. MIT/LL owns the radar, which it operates as part of its Lincoln Space Surveillance Complex.

# Exhibit R-3, RDT&E Project Cost Analysis

DATE: **February 2006**

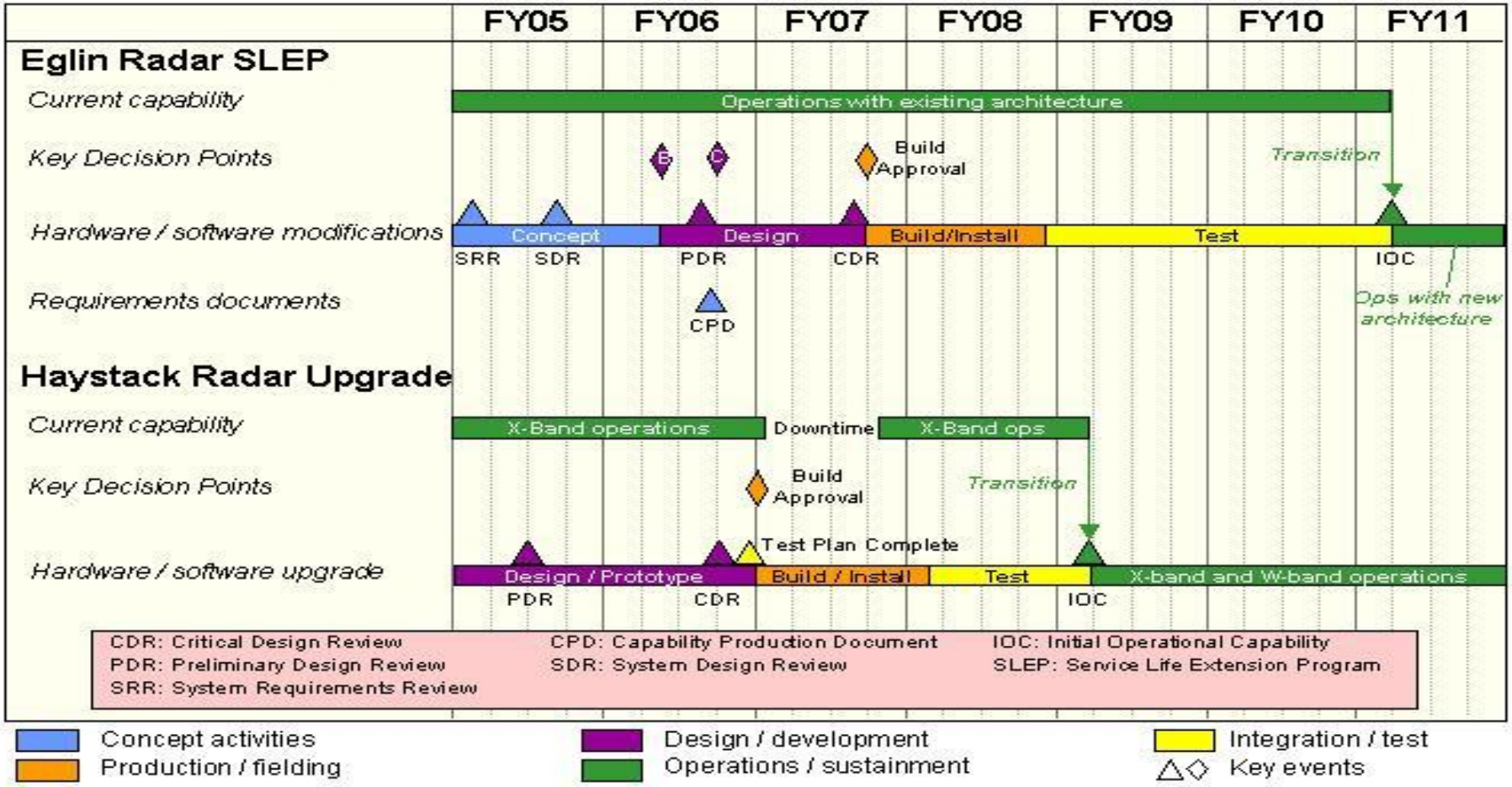
BUDGET ACTIVITY: **07 Operational System Development**

PE NUMBER AND TITLE: **0305940F Space Situation Awareness Operations**

PROJECT NUMBER AND TITLE: **A017 Sensor Service Life Extension Programs**

| (U) Cost Categories (Tailor to WBS, or System/Item Requirements) ($ in Millions) | Contract Method & Type | Performing Activity & Location | Total Prior to FY 2005 Cost | FY 2005 Cost | FY 2005 Award Date | FY 2006 Cost | FY 2006 Award Date | FY 2007 Cost | FY 2007 Award Date | Cost to Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (U) Product Development | | | | | | | | | | | | |
| Eglin architecture development and life extension | C/CPAF | ITT Industries, Colorado Springs, CO | 0.000 | 0.000 | | 0.000 | | 20.645 | Nov-06 | 7.949 | 28.594 | |
| Eglin design evaluation | SS/FP-LOE | MIT Lincoln Laboratory, Lexington, MA | 0.000 | 0.000 | | 0.000 | | 0.100 | Nov-06 | 0.100 | 0.200 | |
| Eglin design evaluation | C/FP-LOE | L-3 Titan, Billerica, MA | 0.000 | 0.000 | | 0.000 | | 1.705 | Nov-06 | 0.620 | 2.325 | |
| Haystack radar upgrade design and build | SS/FP-LOE | MIT Lincoln Laboratory, Lexington, MA | 0.000 | 0.000 | | 0.000 | | 6.141 | Nov-06 | 1.371 | 7.512 | |
| Haystack design evaluation | C/FP-LOE | L-3 Titan, Billerica, MA | 0.000 | 0.000 | | 0.000 | | 0.275 | Nov-06 | 0.225 | 0.500 | |
| Subtotal Product Development | | | 0.000 | 0.000 | | 0.000 | | 28.866 | | 10.265 | 39.131 | 0.000 |
| Remarks: | | | | | | | | | | | | |
| (U) Support | | | | | | | | | | | | |
| Development review and management | C/FP-LOE | L-3 Titan, Billerica, MA | 0.000 | 0.000 | | 0.000 | | 0.643 | Nov-06 | 0.793 | 1.436 | |
| Development review and management | Various | Electronic Systems Center, Hanscom AFB, MA | 0.000 | 0.000 | | 0.000 | | 1.892 | Nov-06 | 0.725 | 2.617 | |
| Subtotal Support | | | 0.000 | 0.000 | | 0.000 | | 2.535 | | 1.518 | 4.053 | 0.000 |
| Remarks: | | | | | | | | | | | | |
| (U) Test & Evaluation | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | 0.000 | |
| Subtotal Test & Evaluation | | | 0.000 | 0.000 | | 0.000 | | 0.000 | | 0.000 | 0.000 | 0.000 |
| Remarks: | | | | | | | | | | | | |
| (U) Management | | | | | | | | | | | | |
| Not applicable | | | | | | | | | | | 0.000 | |
| Subtotal Management | | | 0.000 | 0.000 | | 0.000 | | 0.000 | | 0.000 | 0.000 | 0.000 |
| Remarks: | | | | | | | | | | | | |
| (U) Total Cost | | | 0.000 | 0.000 | | 0.000 | | 31.401 | | 11.783 | 43.184 | 0.000 |

| Exhibit R-4, RDT&E Schedule Profile | | DATE<br>February 2006 |
|---|---|---|
| BUDGET ACTIVITY<br>07 Operational System Development | PE NUMBER AND TITLE<br>0305940F Space Situation Awareness Operations | PROJECT NUMBER AND TITLE<br>A017 Sensor Service Life Extension Programs |



| Exhibit R-4a, RDT&E Schedule Detail | | DATE February 2006 |
|---|---|---|
| BUDGET ACTIVITY<br>**07 Operational System Development** | PE NUMBER AND TITLE<br>**0305940F Space Situation Awareness Operations** | PROJECT NUMBER AND TITLE<br>**A017 Sensor Service Life Extension Programs** |

| **(U) Schedule Profile** | FY 2005 | FY 2006 | FY 2007 |
|---|---|---|---|
| (U) Eglin life extension Critical Design Review | | | 3Q |
| (U) Eglin life extension Build Approval decision | | | 3Q |
| (U) Haystack upgrade Build Approval decision | | | 1Q |
| (U) Haystack W-band antenna installation | | | 2Q |
| (U) Haystack W-band antenna subsystem calibration and testing | | | 3-4Q |