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

<table>
<thead>
<tr>
<th>BUDGET ACTIVITY</th>
<th>PE NUMBER AND TITLE</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>07 Operational System Development</td>
<td>0207412F Control and Reporting Center (CRC)</td>
<td>May 2009</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Total Program Element (PE) Cost</td>
<td>24.108</td>
<td>58.894</td>
<td>52.508</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>Continuing</td>
<td>TBD</td>
</tr>
<tr>
<td>485L Theater Air Control System Imp (TACSI)</td>
<td>24.108</td>
<td>58.894</td>
<td>9.989</td>
<td>0.000</td>
<td>0.000</td>
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<td>0.000</td>
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<tr>
<td>5294 Theater Air Control System Improvement - Radar (TACSI-R)</td>
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<td>0.000</td>
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</tr>
</tbody>
</table>

In FY 2008, this PE was renamed Control and Reporting Center (CRC) [formerly Modular Control System (MCS)].

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

This budget activity funds development of mobile ground-based command and control (C2) capabilities of the Control and Reporting Center (CRC) program. The CRC is identified as a component of the Integrated Air Missile Defense Family of Systems that defends the Homeland and US national interests at home and abroad by negating an adversary's ability to achieve adverse effects from their air and missile capabilities. The CRC mission is to provide battlespace awareness and tactical battle management command and control (BMC2) in an assigned area. It is a ground-based theater air control system (TACS) surveillance and BMC2 element. It consists of facilities, equipment, and people and is a tailorable, modular, transportable, sustainable and persistent weapon system employed at the tactical level to support air and surface operations. Currently, the CRCs are fully employed in Operations IRAQI FREEDOM, ENDURING FREEDOM, and NOBLE EAGLE.

The CRC projects include development and modernization of Theater Air Control Systems Improvement (TACSI) capabilities and the Three-Dimensional Expeditionary Long-Range Radar (3DELRR). TACSI efforts include, but are not limited to the AN/TYQ-23 Operations Module (OM), AN/TPS-75 Long-Range Surveillance Radar and the AN/TRC-215 Remote Radio Secure Voice System (RRSVS) that may be tasked across the full range of military operations. AN/TYQ-23 OM is a low source/high demand (LS/HD) deployable ground-based C2 asset. This automated, computer-based information system provides operators the real-time battlespace picture necessary to plan, direct, and control tactical air operations and airspace management tasks. AN/TRC-215 RRSVS is a mobile, vehicle-mounted voice radio and OM-interface unit. The RRSVS allows real-time, secure voice communication between aircraft operating in the battlespace and ground-based BMC2 operators located in the OM of the CRC. The AN/TRC-215 is typically deployed to a remote area which can extend the CRCs radio coverage beyond line of sight (BLOS) using organic SATCOM capabilities.

The 3DELRR program is developing a replacement for the current legacy AN/TPS-75 radar. 3DELRR will be the principal USAF long-range, ground-based sensor for detecting, identifying, tracking, and reporting aircraft and missiles in support of the Joint Forces Air Component Commander (JFACC) through the Ground Theater Air Control System (GTACS). The primary mission of the 3DELRR will be to provide long-range surveillance, control of aircraft, theater ballistic missile detection and Combat Identification (CID). The 3DELRR will respond to the operational need to detect and report highly maneuverable, small radar cross section targets to enable battlespace awareness while at the same time mitigating the reliability, maintainability, and sustainability issues plaguing the AN/TPS-75 radar system. Ongoing planning and associated activities will take place to prevent and overcome diminishing manufacturing sources and obsolescence issues as required.

The program is in Budget Activity 7 because it provides funding for the modernization of currently existing and operating systems.
## B. Program Change Summary ($ in Millions)

<table>
<thead>
<tr>
<th></th>
<th>FY 2008</th>
<th>FY 2009</th>
<th>FY 2010</th>
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<tr>
<td>Previous President's Budget</td>
<td>24.791</td>
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<tr>
<td>Current PBR/President's Budget</td>
<td>24.108</td>
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<td>52.508</td>
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<td>Total Adjustments</td>
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<td>Congressional Program Reductions</td>
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<td>Congressional Increases</td>
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<td>Reprogrammings</td>
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<td>SBIR/STTR Transfer</td>
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<td>-0.683</td>
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</table>

### Significant Program Changes:
- Funding increased from FY08 (PB09/10) to FY09 (PB09/10) in order to start technology development for the Three-Dimensional Expeditionary Long-Range Radar (3DELLR) program. This effort was formerly referred to as the Radar Replacement effort.
- FY10 funding increased from PB09 to PB10 to fully fund 3DELLR technology development.
### A. Mission Description and Budget Item Justification

The Control and Reporting Center (CRC) program element provides development and modernization of mobile ground-based command and control (C2) capabilities. The CRC is a ground-based theater air control system (TACS) surveillance and battle management command and control (BMC2) element. It consists of facilities, equipment, and people. It is a tailorable, modular, transportable, sustainable, and persistent weapon system employed at the tactical level to support air and surface operations. The CRC projects include development of Theater Air Control Systems Improvement (TACSI) capabilities and the Three-Dimensional Expeditionary Long-Range Radar (3DELRR). Currently USAF CRCs are fully employed in Operations IRAQI FREEDOM, ENDURING FREEDOM, and NOBLE EAGLE.

The TACSI project develops and modernizes software and hardware to make the CRC a viable BMC2 element. These efforts include, but are not limited to, the development and modernization of the AN/TYQ-23 Operations Module (OM) and the AN/TRC-215 Remote Radio Secure Voice System (RRSVS). AN/TYQ-23 OM is a low source/high demand (LS/HD) rapidly deployable ground-based C2 asset. This automated, computer-based information system provides operators the real-time battlespace picture necessary to plan, direct, and control tactical air operations and airspace management tasks. AN/TRC-215 RRSVS is a mobile, vehicle-mounted voice radio and OM-interface unit. The RRSVS allows real-time, secure voice communication between aircraft operating in the battlespace and ground-based battle management C2 operators located in the OM of the CRC. OMs and RRSVS units are currently deployed world-wide in support of ongoing operations.

In the absence of a replacement C2 system, Service Life Extension Program (SLEP) efforts to provide capability upgrades/improvements such as associated Mode 5/Mode S passive and/or active Identify Friend or Foe (IFF), are being developed for the CRC. Beginning in FY10, activities will include, but not be limited to, studies, analysis, design and prototype, documentation, testing, and production to support both current program planning and execution and future program planning.

The program is in Budget Activity 7 because it provides funding for the modernization of currently existing and operating systems.

### B. Accomplishments/Planned Program ($ in Millions)

<table>
<thead>
<tr>
<th></th>
<th>FY 2008</th>
<th>FY 2009</th>
<th>FY 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue development &amp; delivery of evolutionary upgrades to the CRC to include, but not limited to, advanced planning, Modular Control System (MCS) upgrades, enhanced radio/radar/data link remoting, transition of Area Cruise Missile Defense (ACMD) technology into CRC, integrating evolutionary upgrades into CRC, and AN/TPS-75 sensor replacement/upgrade -- known as Three-Dimensional Expeditionary Long-Range Radar (3DELRR).</td>
<td>18.881</td>
<td>52.298</td>
<td>8.525</td>
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<tr>
<td>Test and evaluation support</td>
<td>0.000</td>
<td>0.200</td>
<td>0.322</td>
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The CRC program element provides development and modernization of mobile ground-based command and control (C2) capabilities. The CRC is a ground-based theater air control system (TACS) surveillance and battle management command and control (BMC2) element. It consists of facilities, equipment, and people. It is a tailorable, modular, transportable, sustainable, and persistent weapon system employed at the tactical level to support air and surface operations. The CRC projects include development of Theater Air Control Systems Improvement (TACSI) capabilities and the Three-Dimensional Expeditionary Long-Range Radar (3DELRR). Currently USAF CRCs are fully employed in Operations IRAQI FREEDOM, ENDURING FREEDOM, and NOBLE EAGLE.

The TACSI project develops and modernizes software and hardware to make the CRC a viable BMC2 element. These efforts include, but are not limited to, the development and modernization of the AN/TYQ-23 Operations Module (OM) and the AN/TRC-215 Remote Radio Secure Voice System (RRSVS). AN/TYQ-23 OM is a low source/high demand (LS/HD) rapidly deployable ground-based C2 asset. This automated, computer-based information system provides operators the real-time battlespace picture necessary to plan, direct, and control tactical air operations and airspace management tasks. AN/TRC-215 RRSVS is a mobile, vehicle-mounted voice radio and OM-interface unit. The RRSVS allows real-time, secure voice communication between aircraft operating in the battlespace and ground-based battle management C2 operators located in the OM of the CRC. OMs and RRSVS units are currently deployed world-wide in support of ongoing operations.

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The program is in Budget Activity 7 because it provides funding for the modernization of currently existing and operating systems.
### B. Accomplishments/Planned Program ($ in Millions)

<table>
<thead>
<tr>
<th></th>
<th>FY 2008</th>
<th>FY 2009</th>
<th>FY 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue Program Support</td>
<td>0.324</td>
<td>1.141</td>
<td>0.250</td>
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<tr>
<td>Continue Systems Engineering/Technical Support</td>
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<tr>
<td>Total Cost</td>
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<td>58.894</td>
<td>9.989</td>
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</table>

### C. Other Program Funding Summary ($ in Millions)

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<tr>
<td>Actual</td>
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<td>31.190</td>
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<tr>
<td>Estimate</td>
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</tbody>
</table>

### D. Acquisition Strategy

The CRC is utilizing an incremental development and acquisition strategy to further advance C2 capabilities supporting future aerospace operations.
## Exhibit R-3, RDT&E Project Cost Analysis

**Budget Activity**

<table>
<thead>
<tr>
<th>Project Number and Title</th>
<th>Exhibit R-3 (PE 0207412F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>07 Operational System Development</td>
<td>485L Theater Air Control System Imp (TACSI)</td>
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### Cost Categories

<table>
<thead>
<tr>
<th>Cost Categories</th>
<th>Contract Method &amp; Type</th>
<th>Performing Activity &amp; Location</th>
<th>Total Prior to FY 2008 Cost</th>
<th>FY 2008 Award Date</th>
<th>FY 2009 Award Date</th>
<th>FY 2010 Award Date</th>
<th>FY 2010 Cost</th>
<th>FY 2010 Award Date</th>
<th>Cost to Complete Total Cost</th>
<th>Target Value of Contract</th>
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</thead>
<tbody>
<tr>
<td>(U) Tailor to WBS, or System/Item Requirements</td>
<td></td>
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</tr>
</tbody>
</table>

#### Product Development

<p>| Development of Evolutionary Upgrades - Integration, contractor testing &amp; system delivery, BCC | MIPR | NAWC/Aircr ft Division, St. Inigoes, MD | 16.907 | 5.528 | Oct-07 | 22.435 | 22.570 |
| Development of Evolutionary Upgrades - BCS-F | CPIF | Raytheon Systems, Brea, CA | 0.000 | 4.958 | Nov-08 | 4.958 | 23.640 |
| Development of Evolutionary Upgrades - Remote Radio Spiral 3 | MIPR | AFRL, Rome, NY | 2.931 | 0.470 | Jan-08 | 0.525 | Nov-09 | Continuing TBD TBD |
| Development of Evolutionary Upgrades - Mode 5/S, Study | MIPR | 84TH SCSG, Hill AFB, UT | 0.323 | Feb-08 | 0.323 | 0.323 |
| Development of Evolutionary Upgrades - Mode 5/S | TBD | TBD | 3.500 | Mar-10 | 3.500 |
| Development of Evolutionary Upgrades - Operations Modules (OMs) V5 Service Life Extension Program (SLEP) | T&amp;M | CSC Corp, Falls Church, VA | 0.308 | Mar-09 | Continuing TBD TBD |
| Development of Evolutionary Upgrades - Operations Modules (OMs) V5 Service Life Extension Program (SLEP) | FFP | Maintenance Wing, Ogden ALC, UT | 0.956 | Jun-09 | 4.000 | Mar-10 | 4.956 |
| Development of Evolutionary Upgrades - Analysis of Alternatives Study | T&amp;M | Booz Allen Hamilton, Inc., McLean, VA | 0.300 | Nov-08 | 0.300 | 0.300 |
| Development of Evolutionary Upgrades - Analysis of Alternatives | T&amp;M | Booz Allen Hamilton, Inc., McLean, VA | 1.900 | May-09 | 0.500 | Nov-09 | 2.400 | 1.300 |
| Development of Evolutionary Upgrades - Analysis of Alternatives, 3DELRR | T&amp;M | Booz Allen Hamilton, Inc., McLean, VA | 0.562 | Nov-08 | 0.562 |
| Development of Evolutionary Upgrades - Risk Reduction, 3DELRR | MIPR | WPAFB, OH | 2.593 | Mar-08 | Continuing TBD TBD |
| Development of Evolutionary Upgrades - Risk Reduction, 3DELRR | MIPR | Naval Research | 0.305 | Aug-08 | 0.150 | Nov-08 | Continuing TBD TBD |</p>
<table>
<thead>
<tr>
<th>BUDGET ACTIVITY</th>
<th>PE NUMBER AND TITLE</th>
<th>PROJECT NUMBER AND TITLE</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>07 Operational System Development</td>
<td>0207412F Control and Reporting Center (CRC)</td>
<td>485L Theater Air Control System Imp (TACSI)</td>
<td>May 2009</td>
</tr>
</tbody>
</table>

| Development of Evolutionary Upgrades - Risk Reduction, 3DELRR | FFP MIT/Lincoln Laboratory, Washington, DC | 0.350 Aug-08 2.318 Dec-08 | Continuing TBD TBD |
| Development of Evolutionary Upgrades - Test Planning, 3DELRR | MIPR 46TH TS, EGLIN AFB, FL | 0.037 Jun-08 0.308 Dec-08 | Continuing TBD TBD |
| Development of Evolutionary Upgrades - Technology Demonstration, 3DELRR | TBD TBD | 19.791 May-09 | Continuing TBD TBD |

Subtotal Product Development 40.910 18.880 52.298 8.525 Continuing TBD TBD

Remarks:
(U) Support
Program Office Support Various Various 1.117 0.324 Oct-07 1.141 Oct-08 0.250 Oct-09 Continuing TBD TBD
Systems Engineering FFP MITRE, Bedford MA 4.113 1.748 Dec-07 1.705 Dec-08 0.322 Oct-09 Continuing TBD TBD
Technical Support T&M Various 3.027 3.156 Dec-07 3.550 Dec-08 0.570 Dec-09 Continuing TBD TBD
Subtotal Support 8.257 5.228 6.396 1.142 Continuing TBD TBD
Remarks:
(U) Test & Evaluation
46th Test Wing/Other Test Activity Various Various 0.538 0.200 Dec-08 0.322 Dec-09 1.060 0.591
Subtotal Test & Evaluation 0.538 0.000 0.200 0.322 0.000 1.060 0.591
Remarks:
(U) Total Cost 49.705 24.108 58.894 9.989 Continuing TBD TBD
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<tr>
<th>BUDGET ACTIVITY</th>
<th>PE NUMBER AND TITLE</th>
<th>PROJECT NUMBER AND TITLE</th>
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<tr>
<td>07 Operational System Development</td>
<td>0207412F Control and Reporting Center (CRC)</td>
<td>485L Theater Air Control System Imp (TACSI)</td>
</tr>
</tbody>
</table>

**Control Reporting Center (CRC)**

- **Remote Radio**
  - Spiral 3 Fielding
  - Spiral 3 Updates
  - Remote HF/SATCOM

- **Operations Module (OM)**
  - IFF Mode 5/S Study
  - V(5) SLEP w/ Mode 5/S

- **C2 Engine Analysis of Alternatives (AoA)**

- **Common Software**

- **Battle Control Center**

- **3DELRR**
  - Risk Reduction Activities System Development
  - Covered under Project #485L
  - MS A
  - TD Contract Award
  - Continued under Project #5294

---

**Legend**

- Major Event/Milestone
- Design/Development
- Production/Fielding
- Development Test/Operational Test (DT/OT)

**3DELRR**

- Expeditionary Long-Range Radar
- Command and Control
- Critical Design Review
- Full Operational Capability
- High Frequency
- Identification Friend or Foe

**Abbreviations**

- IOC: Initial Operational Capability
- JTRS: Joint Tactical Radio System
- MS: Milestone
- PDR: Preliminary Design Review
- SLEP: Service Life Extension Program
- SATCOM: Satellite Communication
- TD: Technology Demonstration
- TIM: Technical Interchange Meeting

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As of Apr 2009
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<td>1-4Q</td>
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<td>OM IFF Mode 5/S Study</td>
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<td>2-4Q</td>
<td>1-4Q</td>
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<td>1-4Q</td>
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<tr>
<td>BCC Design/Development</td>
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<td>1-4Q</td>
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<tr>
<td>3DELRR Risk Reduction</td>
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<tr>
<td>3DELRR Milestone A</td>
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<td>3Q</td>
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</table>
In FY08 & FY09, the Theater Air Control System Improvement - Radar (TACSI-R) Project, also known as Three Dimensional Expeditionary Long Range Radar (3DELRR), continues under Project 485L, Theater Air Control System Imp (TACSI).

Beginning in FY10, within PE 0207412F, partial funding was transferred from Project Number 485L, Project Title Control and Reporting Center (CRC), to Project Number 5294, Project Title Theater Air Control System Improvement - Radar (TACSI-R), to continue development of the AN/TPS-75 sensor replacement/upgrade, known as Three Dimensional Expeditionary Long Range Radar (3DELRR).

(U) A. Mission Description and Budget Item Justification

The 3DELRR program is developing a replacement for the current legacy AN/TPS-75 radar. 3DELRR will be the principal USAF long-range, ground-based sensor for detecting, identifying, tracking, and reporting aircraft and missiles in support of the Joint Forces Air Component Commander (JFACC) through the Ground Theater Air Control System (GTACS).  The primary mission of the 3DELRR will be to provide long-range surveillance, control of aircraft, and theater ballistic missile detection and Combat Identification (CID).  The 3DELRR will respond to the operational need to detect and report highly maneuverable, small radar cross section targets to enable battle space awareness while at the same time mitigating the reliability, maintainability, and sustainability issues plaguing the AN/TPS-75 radar system. The 3DELRR will provide air controllers with a precise, real-time air picture of sufficient quality to conduct close control of individual aircraft under a wide range of environmental and operational conditions. In the case of theater missile defense operations, the 3DELRR will have the capability to detect, track, and disseminate target information to respective command and control nodes such as the CRC to disseminate for warning and engagement. Similarly, the joint targeting process will benefit from trajectory information provided by the 3DELRR, which will include launch and impact location.

In FY10, the 3DELRR Project Office will continue its contracted Technology Development (TD) phase efforts. 3DELRR acquisition activities include, but are not limited to, system requirements analysis, modeling and simulation, risk reduction, acquisition planning, capability demonstrations, preliminary design development, software and hardware component-level development, test and evaluation, and program protection planning. The TD phase will also produce the 3DELRR operational and technical requirements baseline and one or more preliminary system designs. Capability Demonstrations will verify that all component technologies meet Defense Department readiness requirements and technical reviews will appraise the design approach and verify it responds to the requirements baseline. Following the TD phase, emphasis will then shift toward system-level development and risk reduction work leading to a single, mature system design. Activities also include studies and analysis to support both current program planning and execution and future program planning.
### B. Accomplishments/Planned Program ($ in Millions)

<table>
<thead>
<tr>
<th></th>
<th>FY 2008</th>
<th>FY 2009</th>
<th>FY 2010</th>
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<td><strong>continued</strong></td>
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</table>

(U) Continue development of AN/TPS-75 sensor replacement -- known as 3DELRR. Operational and technical requirements will be baselined, and emphasis will shift toward development and risk reduction work leading toward a system design. 3DELRR acquisition activities during this phase include, but are not limited to, system requirements analysis, modeling and simulation, risk reduction, acquisition planning, capability demonstrations, preliminary design development, software and hardware component-level development, program protection planning and maturing the life-cycle cost estimate. Capability Demonstrations will verify that all technologies meet readiness requirements and technical reviews will mature the design solution and verify it satisfies requirements.

(U) Continue Program Support (i.e., travel, supplies, equipment, miscellaneous)

(U) Continue Systems Engineering/Technical Support

(U) Total Cost

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

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</table>

(U) D. Acquisition Strategy

The Three Dimensional Expeditionary Long Range Radar (3DELRR) Project is using multiple full and open competitions to further advance C2 capabilities supporting battlefield command and control.
<table>
<thead>
<tr>
<th>Cost Categories</th>
<th>Contract Method &amp; Type</th>
<th>Performing Activity &amp; Location</th>
<th>Total Prior to FY 2008 Cost</th>
<th>FY 2008 Cost</th>
<th>FY 2008 Award Date</th>
<th>FY 2008 Cost</th>
<th>FY 2008 Award Date</th>
<th>FY 2009 Cost</th>
<th>FY 2009 Award Date</th>
<th>FY 2010 Cost</th>
<th>FY 2010 Award Date</th>
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<th>Target Value of Contract</th>
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<td>(U) Product Development</td>
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Remarks:

Total Cost: 36.424

Target Value of Contract: TBD

Project 5294

R-1 Line Item No. 146
Page-11 of 13

Exhibit R-3 (PE 0207412F)
### Three-Dimensional Expeditionary Long-Range Radar (3DELRR)

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In FY08 & FY09, Three-Dimensional Expeditionary Long-Range Radar (3DELRR) was included as part of Project 485L, Theater Air Control System Improvement (TACSI).

Beginning in FY10, within PE 0207412F, partial funding was transferred from Project Number 485L, Project Title Control and Reporting Center (CRC), to Project Number 5294, Project Title Theater Air Control System Improvement - Radar (TACSI-R), to continue development of the AN/TPS-75 sensor replacement/upgrade, known as Three-Dimensional Expeditionary Long-Range Radar (3DELRR).

- **Major Event/Milestone**
- **Design/Development**
- **Development Test/Operational Test (DT/OT)**

**EMD:** Engineering and Manufacturing Development  
**Ktr:** Contractor  
**MS:** Milestone  
**TD:** Technology Development  
**TRR:** Test Readiness Review

*As of Apr 2009*
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