**Exhibit R-2, RDT&E Budget Item Justification:** PB 2017 Air Force  

**Date:** February 2016

** Appropriation/Budget Activity**  

**R-1 Program Element (Number/Name)**  
PE 0605433F / WIDEBAND GLOBAL SATCOM (SPACE)  

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**Note**  
In FY2014, Project 657102, Command and Control System - Consolidated (CCS-C), efforts were transferred from PE 0603854F, Wideband Global SATCOM (SPACE), Project 644870, CCS-C, in order to transition to Budget Activity 5.

**A. Mission Description and Budget Item Justification**  

The Wideband Global SATCOM (WGS) System provides DoD users with high data rate military satellite communications (MILSATCOM) services in accordance with the Joint Space Management-approved MILSATCOM architecture (Aug 96), the Joint Requirements Oversight Council (JROC)-approved MILSATCOM Capstone Requirements Document (Oct 97), and the JROC-approved WGS Operational Requirements Document (May 00). Dual-frequency WGS satellites augment, then replace the DoD's Defense Satellite Communications System (DSCS) X-band service and augment one-way Global Broadcast Service Ka-band capabilities. In addition, WGS provides a new high capacity two-way Ka-band service.

All WGS Block I (Satellites 1-3) and Block II (Satellites 4-6) have been launched and are operational. With the operation of WGS-5, the constellation has global coverage and Full Operational Capability (FOC) was declared on 12 May 2014. Project 657107, WGS Space Systems Resiliency Upgrade, is an Acquisition Category III (ACAT III) effort. The WGS resiliency upgrade will enable the WGS system to both locate and neutralize ground-based jamming threats, to both X-band and Ka-band.

The Command and Control System-Consolidated (CCS-C) system provides integrated launch and on-orbit command and control (C2) functionality at Schriever AFB and Vandenberg AFB for MILSATCOM satellites. Schriever AFB is used for primary operations and Vandenberg AFB is used for backup operations. CCS-C uses modified commercial off the shelf hardware/software to control emerging and legacy MILSATCOM systems including Milstar, Defense Satellite Communications System (DSCS), Wideband Global SATCOM (WGS) and Advanced Extremely High Frequency (AEHF) satellites.

The CCS-C project 657102 funds system architecture evolution to provide increased performance for additional satellites and to comply with DoD, Air Force, and AFSPC-directed standards for Information Assurance, Satellite Control Standardization, and Net-Readiness. This continuing effort was previously funded in the FY14PB and prior as an ACAT II program. With the 10 October 2013 FOC declaration, the program has transitioned to an ACAT III program, the Command and Control System - Consolidated Assurance and Capability Enhancement (CACE), beginning FY2014. The WGS and AEHF procurement program elements fund the mission unique software and databases for the WGS Block II Follow-On satellites and the AEHF 4-6 satellites, respectively.
This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

<table>
<thead>
<tr>
<th>B. Program Change Summary ($ in Millions)</th>
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Change Summary Explanation
FY15: Net +$1.3M reprogrammings, +$3.2M from Weather System Follow-on for SBIR correction, -$1.9M from CCS-C to Family of Advanced Beyond Line of Sight Terminals (FAB-T)
FY16: -$4.0M Congressional Directed Reduction for WGS excess to need
FY17: Net -$2.484M, -$5.95M reduces System Program Office management oversight of Command and Control System - Consolidated (CCS-C) due to lower risk as the acquisition program ends and sustainment begins in FY19, +$8.0M for a wideband Analysis of Alternatives, -$4.258M to account for availability of prior execution balances, and -$0.276M inflation adjustment
EXHIBIT R-2A, RDT&E PROJECT JUSTIFICATION: PB 2017 AIR FORCE

UNCLASSIFIED

APPROPRIATION/BUDGET ACTIVITY

| 3600 / 5 |

R-1 PROGRAM ELEMENT (NUMBER/NAME) | WIDEBAND GLOBAL SATCOM (SPACE) |

PROJECT (NUMBER/NAME) | Command and Control System-Consolidated (CCS-C) |

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COST TO COMPLETE

657102: Command and Control Sys-Consolidated (CCS-C)

| - | - | - | - | - | - | - | - | - | - | - |

QUANTITY OF RDT&E ARTICLES

| - | - | - | - | - | - | - | - | - | - | - |

NOTE

Additional Prior Years funds for Wideband Global SATCOM (SPACE) are in PE 0603854F, Project 644870, Command and Control System - Consolidated (CCS-C), Budget Activity 4.

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION

The Military Satellite Communications (MILSATCOM) Command and Control System-Consolidated (CCS-C) system provides integrated launch and on-orbit command and control (C2) functionality at Schriever AFB and Vandenberg AFB for MILSATCOM satellites. Schriever AFB is used for primary operations and Vandenberg AFB is used for backup operations. CCS-C uses modified commercial off the shelf hardware/software to control emerging and legacy MILSATCOM systems including Milstar, Defense Satellite Communications System (DSCS), Wideband Global SATCOM (WGS) and Advanced Extremely High Frequency (AEHF) satellites.

The CCS-C project 657102 funds system architecture evolution to provide increased performance for additional satellites and to comply with DoD, Air Force, and AFSPC-directed standards for Information Assurance, Satellite Control Standardization, and Net-Readiness. This continuing effort was previously funded in the FY14PB and prior as an Acquisition Category II (ACAT II) program. With the 10 October 2013 Final Operational Capability (FOC) declaration, the program has transitioned to an ACAT III program, the Command and Control System-Consolidated Assurance and Capability Enhancement (CACE), beginning FY2014. The WGS and AEHF procurement program elements fund the mission unique software and databases for the WGS Block II Follow-On satellites and the AEHF 4-6 satellites, respectively.

B. ACCOMPLISHMENTS/PLANNED PROGRAMS ($ IN MILLIONS)

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<thead>
<tr>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
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<tbody>
<tr>
<td>14.095</td>
<td>8.646</td>
<td>12.248</td>
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</tbody>
</table>

DESCRIPTION: Develop system architecture to provide enhanced C2 of MILSATCOM satellites.

FY 2015 ACCOMPLISHMENTS:
Continued CCS-C contract to implement new Cross-Domain Solution and Host Based Security System to enhance Information Assurance posture; upgraded, integrated, and tested new cryptologic equipment; and implemented new architecture changes to increase WGS capacity, reduce system downtime, and decrease O&M costs. Conducted Preliminary Design Review (PDR).

FY 2016 PLANS:
### B. Accomplishments/Planned Programs ($ in Millions)

Execute CCS-C modifications to implement new Cross-Domain Solution and Host Based Security System to enhance Information Assurance posture; upgrade, integrate, and test new cryptologic equipment; and implement new architecture changes to increase WGS capacity, reduce system downtime, and decrease O&M costs. Conduct Critical Design Review (CDR).

**FY 2017 Plans:** Continue to execute implementation, integration, and begin test verification activities for all CCS-C modifications. Manage both the operational CCS-C baseline and the new CCS-C Assurance and Capacity Enhancement (CACE) upgraded baseline throughout testing activities.

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

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**Remarks**

**D. Acquisition Strategy**

Competitive contract was awarded in November 2012 and began performance in January 2013. The CCS-C Production and Sustainment Contract (CPASC) includes effort to increase the capability of the CCS-C system to provide ongoing C2, launch readiness support, and anomaly resolution for MILSATCOM satellite families.
### E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.
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<th>PE 0605433F / WIDEBAND GLOBAL SATCOM (SPACE)</th>
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<td>657102 / Command and Control Sys-Consolidated (CCS-C)</td>
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Remarks
### Exhibit R-4, RDT&E Schedule Profile: PB 2017 Air Force

#### Appropriation/Budget Activity

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<td>Capacity Upgrade: &quot;Wideband Capacity Capability Improvement.&quot;</td>
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<td>Cryptography Upgrade: &quot;Replace CCS-C KI-17 with KS-252&quot;</td>
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<td>Secure FTP: &quot;Cross-Domain Capability Improvement for secure data transfer&quot;</td>
<td>1</td>
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<td>IA Controls: &quot;8500 Compliance Capability Improvement for security.&quot;</td>
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<td>Conduct CACE Preliminary Design Review</td>
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<td>Interoperability: &quot;Interoperability Capability Improvement to Migrate to USB standard&quot;</td>
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</table>
A. Mission Description and Budget Item Justification

The Wideband Global SATCOM (WGS) System provides the DoD with high data rate military satellite communications (MILSATCOM) services in accordance with the Joint Space Management Board-approved MILSATCOM architecture (August 1996), the Joint Requirements Oversight Council (JROC)-approved MILSATCOM Capstone Requirements Document (October 1997), and JROC-approved WGS Operational Requirements Document (May 2000). This program was originally conceived to augment the near-term "bandwidth gap" in warfighter communications needs. Dual-frequency WGS satellites augment, then replace the DoD's Defense Satellite Communications System X-band service and augment one-way Global Broadcast Service Ka-band capabilities. In addition, WGS provides a high capacity two-way Ka-band service.

All WGS Block I (Satellites 1-3), Block II (Satellites 4-6), and the first Block II Follow-on (Satellite 7) have been launched and are operational. With the operation of WGS-5, the constellation has global coverage and Full Operational Capability (FOC) was declared on 12 May 2014. Project 657107, WGS Space Systems Resiliency Upgrade, is an Acquisition Category III (ACAT III) effort. The WGS resiliency upgrade will enable the WGS system to both locate and neutralize ground-based jamming threats, to both X-band and Ka-band. FY17 PB continues X-band anti-jam enhancement and initiates Ka-band ground based anti-jam development.

The FY17 PB includes funding to conduct an Analysis of Alternatives (AoA) on a future Wideband System to determine the next wideband satellite communications architecture.

B. Accomplishments/Planned Programs ($ in Millions)

<table>
<thead>
<tr>
<th>Title: WGS Upgrade</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description: Upgrade WGS system to both locate and neutralize ground-based jamming threats.</td>
<td>14.250</td>
<td>43.539</td>
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</table>

**FY 2015 Accomplishments:**
Completed Request For Proposal release, receipt of proposal, and technical evaluation of proposal.

**FY 2016 Plans:**

**FY 2017 Plans:**
B. Accomplishments/Planned Programs ($ in Millions)

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<thead>
<tr>
<th></th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
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<tbody>
<tr>
<td><strong>X-band:</strong></td>
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<tr>
<td><strong>Ka-band:</strong></td>
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</table>

**Title:** Wideband AoA

**Description:** Analysis of alternatives for a follow-on wideband communications system to the WGS system.

**FY 2015 Accomplishments:**

N/A

**FY 2016 Plans:**

N/A

**FY 2017 Plans:**

Support the Principal DoD Space Advisor (PDSA) in the conduct of a wideband Analysis of Alternatives to determine the appropriate mix of military and commercial wideband satellite communications.

Accomplishments/Planned Programs Subtotals 14.250 43.539 29.384

C. Other Program Funding Summary ($ in Millions)

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Remarks

Remarks

Remarks

Remarks
### D. Acquisition Strategy

The Wideband Global SATCOM (WGS) Space Systems Resiliency Upgrade will be accomplished by modifying the WGS Block II Follow-On (B2FO) Firm Fixed Price (FFP) contract definitized in August 2010. The B2FO contract currently provides development, production, and deployment of WGS satellites 7 and beyond.

### E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.
## Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force

#### Date: February 2016

### Appropriation/Budget Activity

| 3600 / 5 |

### R-1 Program Element (Number/Name)

PE 0605433F / WIDEBAND GLOBAL SATCOM (SPACE)

### Project (Number/Name)

657107 / WGS Space Systems Resiliency Upgrade

### Product Development ($ in Millions)

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<th>Award Date</th>
<th>Cost</th>
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<th>Award Date</th>
<th>Cost</th>
<th>FY 2017 Base</th>
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<th>Cost</th>
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<th>Target Value of Contract</th>
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<th>Cost</th>
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### Management Services ($ in Millions)

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<tr>
<td>GSCCE Software Development (GBAN)</td>
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<tr>
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<tr>
<td>System Integration &amp; Test and IA Certification</td>
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