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Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force **Date:** March 2014

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| Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i> | R-1 Program Element (Number/Name) PE 0305164F / NAVSTAR Global Positioning System (User Equipment) (SPACE) |
|--|--|

| COST (\$ in Millions) | Prior Years | FY 2013 | FY 2014 | FY 2015 Base | FY 2015 OCO # | FY 2015 Total | FY 2016 | FY 2017 | FY 2018 | FY 2019 | Cost To Complete | Total Cost |
|----------------------------|-------------|---------|---------|--------------|---------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 1,389.066 | 26.011 | - | - | - | - | - | - | - | - | - | 1,415.077 |
| 673028: Navstar GPS | 1,389.066 | 26.011 | - | - | - | - | - | - | - | - | - | 1,415.077 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | - | - |

MDAP/MAIS Code: 166

The FY 2015 OCO Request will be submitted at a later date.

Note
 No FY2015 funding requested for project 673028 in this Program Element (PE). In FY2013, Navstar GPS Project 673028 is complete. Beginning in FY13, funds for Military GPS User Equipment (MGUE) are transferred to Project 643833 in this PE.

A. Mission Description and Budget Item Justification
 The Navstar Global Positioning System (GPS) is a space-based radio Positioning, Navigation, and Time (PNT) distribution system. GPS User Equipment (UE) consists of standardized receivers, antennas, antenna electronics, etc., grouped together in sets to derive navigation and time information transmitted from GPS satellites. These receiver sets are used by DoD. RDT&E funds UE development, test, and analysis for new PNT receiver capabilities in Navigation Warfare (Navwar) across all military platforms using GPS services.

The Modernized User Equipment (MUE) program serves as a technology demonstration and risk reduction effort to provide the technical foundation for the Military GPS User Equipment (MGUE) program which is the next generation of GPS UE. The objectives of the MUE program are to demonstrate that enhanced modernized capabilities are achievable in ground embedded and aviation form factor solutions, successfully mature the Critical Technologies Elements (CTE), establish a modernized Information Assurance architecture, implement the USD(AT&L) Trusted Foundry process, and subject the receiver prototypes to the Government's pilot Security Certification and Performance Evaluation process.

This program element is in Budget Activity 7 - Operational System Development, because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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| B. Program Change Summary (\$ in Millions) | FY 2013 | FY 2014 | FY 2015 Base | FY 2015 OCO | FY 2015 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 29.621 | - | - | - | - |
| Current President's Budget | 26.011 | - | - | - | - |
| Total Adjustments | -3.610 | - | - | - | - |
| • Congressional General Reductions | -0.039 | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.814 | - | | | |
| • Other Adjustments | -2.757 | - | - | - | - |

Change Summary Explanation

Starting in FY13, MGUE funding is transferred in this PE to Project 643833 in BA-04. Current User Equipment (CUE) including MUE remains in Project 673028 in this PE.

FY13: -\$2.757M sequestration reduction

| C. Accomplishments/Planned Programs (\$ in Millions) | FY 2013 | FY 2014 | FY 2015 |
|---|----------------|----------------|----------------|
| Title: GPS User Equipment | 26.011 | - | - |
| Description: The MUE program serves as a technology demonstration and risk reduction effort to provide the technical foundation for the MGUE program. | | | |
| FY 2013 Accomplishments: Concluded the MUE effort; completed ASIC redesign and deliver to government as tech samples. This effort will conclude shortly before MGUE Increment 1 Preliminary Design Review (PDR) ensuring discovery and risk reduction activities for the MGUE Increment 1 Technology Development phase. | | | |
| Accomplishments/Planned Programs Subtotals | 26.011 | - | - |

| D. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | | |
|--|----------------|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|--|
| Line Item | FY 2013 | FY 2014 | FY 2015 Base | FY 2015 OCO | FY 2015 Total | FY 2016 | FY 2017 | FY 2018 | FY 2019 | Cost To Complete | Total Cost | |
| • APAF: BA07: Line Item # | 0.946 | - | - | - | - | - | - | - | - | - | 0.946 | |
| 000075: Other Production Charges | | | | | | | | | | | | |

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D. Other Program Funding Summary (\$ in Millions)

| <u>Line Item</u> | <u>FY 2013</u> | <u>FY 2014</u> | <u>FY 2015</u> <u>Base</u> | <u>FY 2015</u> <u>OCO</u> | <u>FY 2015</u> <u>Total</u> | <u>FY 2016</u> | <u>FY 2017</u> | <u>FY 2018</u> | <u>FY 2019</u> | <u>Cost To</u> <u>Complete</u> | <u>Total Cost</u> |
|---|----------------|----------------|-------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------|----------------|-----------------------------------|-------------------|
| • OPAF: BA03: Line Item # 836730: <i>Navstar GPS Space</i> | 2.028 | 2.053 | 2.075 | - | 2.075 | 2.119 | 2.158 | 2.196 | 2.235 | - | 14.864 |
| • RDTE: BA04: PE 0305164F: <i>NAVSTAR Global Positioning System (User Equipment) (SPACE)</i> | 63.687 | 127.172 | 156.659 | - | 156.659 | 152.011 | 155.335 | 97.590 | 99.506 | 227.500 | 1,079.460 |

Remarks

E. Acquisition Strategy

The MUE program awarded three competitive MUE technology demonstration contracts to develop and produce Ground-Based GPS Receiver Application Module (GB-GRAM-M) (ground) and GRAM-S/M (aviation) receiver form factors to mature the five critical technology elements (CTEs), test and demonstrate these CTEs in a relevant environment to achieve Technology Readiness Level (TRL) 6, and subject the prototypes to the Government's pilot security certification and performance evaluation processes. To further reduce technology and manufacturing risk in MGUE Increment 1, the three contractors will continue risk reduction activities under the MUE completion effort. This activity is a two part effort: (1) Refining software to resolve any deficiencies revealed during Functional Qualification Testing (FQT) and independent government test & evaluation, and (2) Initiating ASIC modifications to accommodate new updates to GPS system ICDs. This effort will conclude shortly before MGUE Increment 1 PDR, ensuring each contractor has completed discovery and technology maturation in preparation for entry into the Engineering, Manufacturing, and Development phase.

F. 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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Exhibit R-3, RDT&E Project Cost Analysis: PB 2015 Air Force **Date:** March 2014

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| Appropriation/Budget Activity 3600 / 7 | R-1 Program Element (Number/Name) PE 0305164F / NAVSTAR Global Positioning System (User Equipment) (SPACE) | Project (Number/Name) 673028 / Navstar GPS |
|--|--|--|

| Product Development (\$ in Millions) | | | | FY 2013 | | FY 2014 | | FY 2015 Base | | FY 2015 OCO | | FY 2015 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|------------------------|---|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | | | |
| Navstar GPS Receiver Technology | Various | Various : Various, | 34.706 | - | | - | | - | | - | | - | - | 34.706 | - |
| Navstar GPS Advanced Antenna Technology | C/CPAF | Various : Various, | 98.941 | - | | - | | - | | - | | - | - | 98.941 | - |
| Navstar GPS Selective Availability Anti-Spoofing Module (SAASM) | MIPR | Sandia National Labs : Kirtland AFB, NM | 57.142 | - | | - | | - | | - | | - | - | 57.142 | - |
| Navstar GPS SAASM/GB-GRAM | Various | Various : Various, | 34.669 | - | | - | | - | | - | | - | - | 34.669 | - |
| Navstar GPS Modernized User Equipment (MUE) | C/CPAF | Rockwell Collins : Cedar Rapids, IA | 204.743 | 8.202 | Nov 2012 | - | | - | | - | | - | - | 212.945 | - |
| Navstar GPS MUE (Raytheon) | C/CPAF | Raytheon : Garland, TX | 223.771 | 1.882 | Nov 2012 | - | | - | | - | | - | - | 225.653 | - |
| Navstar GPS MUE (L-3) | C/CPAF | L-3 : Anaheim, CA | 208.621 | 8.843 | Nov 2012 | - | | - | | - | | - | - | 217.464 | - |
| Navstar GPS Integration | PO | 46th Test Group : Holloman AFB, NM | 12.651 | - | | - | | - | | - | | - | - | 12.651 | - |
| MGUE Inc 1 (Rockwell) | C/CPIF | Rockwell Collins : Cedar Rapids, IA | 5.760 | - | | - | | - | | - | | - | - | 5.760 | - |
| MGUE Inc 1 (Raytheon) | C/CPIF | Raytheon : El Segundo, CA | 5.760 | - | | - | | - | | - | | - | - | 5.760 | - |
| MGUE Inc 1 (L3) | C/CPIF | L3 : Anaheim, CA | 5.760 | - | | - | | - | | - | | - | - | 5.760 | - |
| Navstar GPS Performance Certification | Various | Various : Various, | 0.290 | - | | - | | - | | - | | - | - | 0.290 | - |
| Navstar GPS Information Assurance and Testing | Various | Various : Various, | 3.904 | - | | - | | - | | - | | - | - | 3.904 | - |
| Navstar GPS SE&I | C/CPAF | SAIC : Various, CA | 5.328 | - | | - | | - | | - | | - | - | 5.328 | - |
| Navstar GPS Completed UE Product Development Efforts | Various | Various : Various, | 35.633 | 1.642 | Mar 2013 | - | | - | | - | | - | - | 37.275 | - |
| Subtotal | | | 937.679 | 20.569 | | - | | - | | - | | - | - | 958.248 | - |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2015 Air Force | | | | | | | | | | | | Date: March 2014 | | | |
|---|------------------------|------------------------------------|-------------|--|------------|---------|------------|-----------------------|------------|-------------|------------|------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity | | | | R-1 Program Element (Number/Name) | | | | Project (Number/Name) | | | | | | | |
| 3600 / 7 | | | | PE 0305164F / NAVSTAR Global Positioning System (User Equipment) (SPACE) | | | | 673028 / Navstar GPS | | | | | | | |
| Support (\$ in Millions) | | | | FY 2013 | | FY 2014 | | FY 2015 Base | | FY 2015 OCO | | FY 2015 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Subtotal | | | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Test and Evaluation (\$ in Millions) | | | | FY 2013 | | FY 2014 | | FY 2015 Base | | FY 2015 OCO | | FY 2015 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Navstar GPS User Equipment Development Testing | PO | 46th Test Group : Holloman AFB, NM | 70.875 | 3.055 | Nov 2012 | - | | - | | - | | - | - | 73.930 | - |
| Subtotal | | | 70.875 | 3.055 | | - | | - | | - | | - | - | 73.930 | - |
| Management Services (\$ in Millions) | | | | FY 2013 | | FY 2014 | | FY 2015 Base | | FY 2015 OCO | | FY 2015 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Navstar GPS Program Office Support (PMA) | Various | Various : Various, | 129.057 | 1.550 | Nov 2012 | - | | - | | - | | - | - | 130.607 | - |
| Navstar GPS FFRDC | Various | Various : Various, | 41.530 | 0.837 | Mar 2013 | - | | - | | - | | - | - | 42.367 | - |
| Navstar GPS SE/Program Spt/Joint Navwar Center (JNWC) | Various | Various : Various, | 147.435 | - | | - | | - | | - | | - | - | 147.435 | - |
| Navstar GPS Completed Support Efforts | Various | Various : Various, | 62.490 | - | | - | | - | | - | | - | - | 62.490 | - |
| Subtotal | | | 380.512 | 2.387 | | - | | - | | - | | - | - | 382.899 | - |
| Project Cost Totals | | | 1,389.066 | 26.011 | | - | | - | | - | | - | - | 1,415.077 | - |
| Remarks | | | | | | | | | | | | | | | |

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| Exhibit R-4A, RDT&E Schedule Details: PB 2015 Air Force | | Date: March 2014 |
| Appropriation/Budget Activity 3600 / 7 | R-1 Program Element (Number/Name) PE 0305164F / NAVSTAR Global Positioning System (User Equipment) (SPACE) | Project (Number/Name) 673028 / Navstar GPS |

Schedule Details

| Events | Start | | End | |
|---------------|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| MUE Tech Demo | 2 | 2013 | 4 | 2013 |