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| Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy   |             |         |         |              |   |               |         |         |         | Date: February 2018 |                  |            |
| Appropriation/Budget Activity<br>1319: Research, Development, Test & Evaluation, Navy I BA 7: Operational Systems Development  |             |         |         |              | R-1 Program Element (Number/Name)<br>PE 0303109N I Satellite Communications (Space) |               |         |         |         |                     |                  |            |
| COST (\$ in Millions)  | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO   | FY 2019 Total | FY 2020 | FY 2021 | FY 2022 | FY 2023             | Cost To Complete | Total Cost |
| Total Program Element  | 4,684.176   | 30.826  | 0.000   | 0.000        | -   | 0.000         | 0.000   | 0.000   | 0.000   | 0.000               | 0.000            | 4,715.002  |
| 0728: EHF SATCOM Terminals   | 696.989     | 18.322  | 0.000   | 0.000        | -   | 0.000         | 0.000   | 0.000   | 0.000   | 0.000               | 0.000            | 715.311    |
| 2472: Mobile User Objective Sys (MUOS)   | 3,987.187   | 10.206  | 0.000   | 0.000        | -   | 0.000         | 0.000   | 0.000   | 0.000   | 0.000               | 0.000            | 3,997.393  |
| 3398: Enterprise SATCOM Gateway Modems (ESGMs)   | 0.000       | 2.298   | 0.000   | 0.000        | -   | 0.000         | 0.000   | 0.000   | 0.000   | 0.000               | 0.000            | 2.298      |
| Program MDAP/MAIS Code:  |             |         |         |              |   |               |         |         |         |                     |                  |            |
| Project MDAP/MAIS Code(s): 290, 345  |             |         |         |              |   |               |         |         |         |                     |                  |            |
| A. Mission Description and Budget Item Justification   |             |         |         |              |   |               |         |         |         |                     |                  |            |
| <p>The Navy Multiband Terminal (NMT) Program is the required Navy component to the Advanced Extremely High Frequency (AEHF) program for enhancing protected and survivable satellite communications to Naval forces. The NMT system provides an increase in single service capability from 1.5 Megabits per second (Mbps) to 8 Mbps, increases the number of coverage areas and retains Anti-Jam/Low Probability of Intercept (AJ/LPI) protection characteristics. It is compatible with today's Navy Low Data Rate/Medium Data Rate (LDR/MDR) terminals and will sustain the Military Satellite Communications (MILSATCOM) architecture by providing connectivity across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic nuclear operations, strategic defense, theater missile defense, and space operations and intelligence in support of A2AD initiatives. The NMT system will replenish and improve on Navy terminal capabilities of the Military Strategic, Tactical &amp; Relay System (MILSTAR), Defense Satellite Communications System (DSCS), Wideband Global Satellite (WGS) and Global Broadcast Service (GBS). The new system will equip the warfighters with the assured, jam resistant, secure communications as described in the joint AEHF satellite communications system and WGS Operational Requirements Documents (ORD). The NMT will provide multiband Satellite Communications (SATCOM) capability for ship, submarine, and protected MILSATCOM for shore sites.</p> |             |         |         |              |   |               |         |         |         |                     |                  |            |
| <p>The Joint Ultra-High Frequency (UHF) Military Satellite Communications (MILSATCOM) Network Integrated Control System (JMINI CS) is a legacy system that commenced in 1998. JMINI CS is a Navy-led, Joint-interest program providing integrated, dynamic, and centralized control of non-processed UHF MILSATCOM 5/25 kHz Demand Assigned Multiple Access (DAMA) and Demand Assigned Single Access (DASA) channels to maximize existing highly sought after SATCOM resources. The system also provides decentralized web-based management of those resources for use as a situational awareness tool for Combatant Commanders, Global SATCOM Support Centers, and Regional SATCOM Support Centers. The system is expected to operate well beyond the original 2015 End of Life (EoL) date to 2033. The JMINI CS Program will perform concept development and exploration to identify cost-effective solutions to address multiple life cycle support issues, in order to minimize loss of service to the fleet. The effort will involve evaluation, development, laboratory and integration testing of Commercial Off-The-Shelf (COTS) and Government off-the-shelf (GOTS) hardware and software to replace obsolete components or subsystems while maintaining interoperability with existing systems.</p>  |             |         |         |              |   |               |         |         |         |                     |                  |            |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy   |  |   |         | Date: February 2018 |             |               |
| Appropriation/Budget Activity<br>1319: Research, Development, Test & Evaluation, Navy I BA 7: Operational Systems Development  |  | R-1 Program Element (Number/Name)<br>PE 0303109N I Satellite Communications (Space) |         |                     |             |               |
| The Mobile User Objective System (MUOS) program provides for the development of the next generation Department of Defense (DoD) advanced narrowband communications satellite constellation. The current Ultra-High Frequency (UHF) Follow-On (UFO) constellation relies on the MUOS legacy payload to meet the UHF SATCOM requirement. This MUOS Research Development Test & Evaluation, Navy (RDT&E,N) effort supports Full Operational Capability (FOC) in FY 2020.  |  |   |         |                     |             |               |
| The Navy Global Broadcast Service (GBS) Program is the Navy component of the Joint Military Satellite Communications(MILSATCOM) ACAT IC program that delivers the continuous flow of high-speed, high-volume communication and information flow for deploying, deployed, on the move, and garrisoned forces. The Joint GBS system supports the Navy Strategic Plan and equips warfighters with counter Anti-Access/Area Denial (A2AD) communications in a denied Command, Control, Communications, Computers, and Intelligence (C4I) environment. The Enterprise SATCOM Gateway Modem (ESGM) is the DoD Chief Information Officer directed solution to satisfy the Transmission Security (TRANSEC) requirement in place of the Joint Internet. Testing and fielding of the ESGM is a joint venture, operationally directed by the Defense Information Systems Agency (DISA) and the Air Force as the lead service. GBS augments and interfaces with other communications systems, provides relief to overburdened communications systems already in place, and provides information to previously unsupported users. GBS provides bandwidth five times any other system, up to 45 Mbps of forward link data (shore to ship) per WGS satellite transponder. |  |   |         |                     |             |               |
| Beginning in FY18, the Satellite Communications (Space) funding profiles have moved from PE 0303109N to PE 1203109N.   |  |   |         |                     |             |               |
| B. Program Change Summary (\$ in Millions)   |  | FY 2017   | FY 2018 | FY 2019 Base        | FY 2019 OCO | FY 2019 Total |
| Previous President's Budget  |  | 37.372  | 0.000   | 0.000               | -           | 0.000         |
| Current President's Budget   |  | 30.826  | 0.000   | 0.000               | -           | 0.000         |
| Total Adjustments  |  | -6.546  | 0.000   | 0.000               | -           | 0.000         |
| • Congressional General Reductions   |  | -   | -       |                     |             |               |
| • Congressional Directed Reductions  |  | -   | -       |                     |             |               |
| • Congressional Rescissions  |  | -   | -       |                     |             |               |
| • Congressional Adds   |  | -   | -       |                     |             |               |
| • Congressional Directed Transfers   |  | -   | -       |                     |             |               |
| • Reprogrammings   |  | -   | -       |                     |             |               |
| • SBIR/STTR Transfer   |  | -1.222  | 0.000   |                     |             |               |
| • Rate/Misc Adjustments  |  | 0.000   | 0.000   | 0.000               | -           | 0.000         |
| • Congressional General Reductions Adjustments   |  | -0.068  | -       | -                   | -           | -             |
| • Congressional Directed Reductions Adjustments  |  | -5.256  | -       | -                   | -           | -             |
| Change Summary Explanation   |  |   |         |                     |             |               |
| Decrease in Satellite Communications (Space) by \$0.93M as required for the Department of the Navy to comply with the Bipartisan Budget Act of 2015.   |  |   |         |                     |             |               |
| Schedule:  |  |   |         |                     |             |               |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy  |  | Date: February 2018 |
| Appropriation/Budget Activity   | R-1 Program Element (Number/Name)              |                     |
| 1319: Research, Development, Test & Evaluation, Navy / BA 7: Operational Systems Development  | PE 0303109N / Satellite Communications (Space) |                     |
| <p>EHF SATCOM Terminals (project 0728) - This project has transferred to a new PE 1203109N FY2018-FY2022.</p> <p>Enterprise SATCOM Gateway Modems (ESGMs Project 3398) - This project has been transferred to new PE 1203109N FY2018-FY2022.</p> <p>Funding:</p> <p>0728: FY2018-FY2022 NMT, JALN-M and Technology Insertion funding transferred to a new PE 1203109N.</p> <p>2472: FY2018-FY2022 MUOS funding transferred to a new PE 1203109N.</p> <p>3398: FY2018-FY2022 ESGMs funding transferred to a new PE 1203109N.</p> <p>Technical:</p> <p>EHF SATCOM Terminals (project 0728) and Enterprise SATCOM Gateway Modems (ESGMs) transferred to a new PE 1203109N FY2018-FY2022.</p> |  |                     |

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| Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy |             |         |         |              |  |               |         |         |   | Date: February 2018 |                  |            |
| Appropriation/Budget Activity<br>1319 / 7               |             |         |         |              | R-1 Program Element (Number/Name)<br>PE 0303109N / <i>Satellite Communications (Space)</i> |               |         |         | Project (Number/Name)<br>0728 / <i>EHF SATCOM Terminals</i> |                     |                  |            |
| COST (\$ in Millions)                                   | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO  | FY 2019 Total | FY 2020 | FY 2021 | FY 2022   | FY 2023             | Cost To Complete | Total Cost |
| 0728: <i>EHF SATCOM Terminals</i>                       | 696.989     | 18.322  | 0.000   | 0.000        | -  | 0.000         | 0.000   | 0.000   | 0.000   | 0.000               | 0.000            | 715.311    |
| Quantity of RDT&E Articles                              |             | -       | -       | -            | -  | -             | -       | -       | -   | -                   |                  |            |
| Project MDAP/MAIS Code: 290                             |             |         |         |              |  |               |         |         |   |                     |                  |            |

## Note

NMT FY18-FY22 funding profile has moved to PE 1203109N.

## A. Mission Description and Budget Item Justification

The Navy Multiband Terminal (NMT) Program is the required Navy component to the Advanced Extremely High Frequency (AEHF) Program for enhancing protected and survivable satellite communications to Naval forces. The NMT system provides an increase in single service capability from 1.5 Megabits per second (Mbps) to 8 Mbps, increases the number of coverage areas, and retains Anti-Jam/Low Probability of Intercept (AJ/LPI) protection characteristics. It is compatible with today's Navy Low Data Rate/Medium Data Rate (LDR/MDR) terminals and will sustain the Military Satellite Communications (MILSATCOM) architecture by providing connectivity across the spectrum of mission areas, to include land, air and naval warfare, special operations, strategic nuclear operations, strategic defense, theater missile defense, and space operations and intelligence. The NMT system will replenish and improve on Navy Military Strategic, Tactical & Relay System (MILSTAR), Defense Satellite Communications System (DSCS), Wideband Global Satellite (WGS), and Global Broadcast Service (GBS) terminal capabilities. The new system will equip the warfighters with assured, jam resistant, secure communications as described in both the joint AEHF Satellite Communications System and the WGS Operational Requirement Documents (ORD). Mission requirements specific to Navy operations, including threat levels and scenarios, are contained in the ORD. The NMT will provide multiband Satellite Communications (SATCOM) capability for ship, submarine, and protected MILSATCOM for shore sites.

Wideband Anti-Jam Modem Systems (WAMS) enhances communication capability of shipboard and submarine NMTs by providing wideband Anti-Jam (AJ) Satellite Communication throughput over Wideband Global SATCOM (WGS). WAMS enables space segment AJ diversity (EHF/AEHF and WGS), thus enabling NMT ships and submarines equipped with the modem to operate in wideband links closer to threat jammers. WAMS enables the use of WGS X and Ka-band resources to assure access to mission critical communications in the A2AD environment. The use of WAM Protected Tactical Waveform (PTW) on WGS will augment AEHF extended data rate (XDR) services to provide the information throughput capacity necessary to support critical Command and Control capability.

Joint Aerial Layer Network-Maritime (JALN-M) is the Navy implementation of the JALN architecture which provides assured communications in any environment, especially in an Anti-Access Area Denial (A2AD) satellite denied environment. With disruption or loss of Space tier communications, JALN-M establishes and/or restores connectivity within the High Capacity Backbone (HCB) Common Data Link (CDL) tier, the Distribution Access Range Extension (DARE) tier, and the Transition tier in accordance with the JALN-M Initial Capabilities Document and the JALN Analysis of Alternatives (AoA) Final Report. JALN-M is a robust, assured communications capability providing joint connectivity via the HCB and Navy platform connectivity via a pseudo satellite DARE capability. JALN-M will use the Extended Data Rate (XDR) NMT waveform for intra-battle group DARE communications, a Common Data Link (CDL) waveform for the HCB cross-link capability, and intend to develop a pre-planned product improvement to leverage enhanced Ultra High Frequency/High Frequency (UHF/HF) waveforms for coalition connectivity. A critical component of A2AD is Adaptive Coding software development incorporation into the baseline NMT terminal in addition to supporting the JALN-M demonstration. This capability

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| Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy   |  |   |         | Date: February 2018                                  |             |               |
| Appropriation/Budget Activity<br>1319 / 7   |  | R-1 Program Element (Number/Name)<br>PE 0303109N / Satellite Communications (Space) |         | Project (Number/Name)<br>0728 / EHF SATCOM Terminals |             |               |
| autonomously enhances maximum throughput and supports degraded conditions by adjusting End-to-End code rate to provide continuous, mission critical, and protected communications.  |  |   |         |  |             |               |
| Technology Insertion, studies and implementation is necessary for military satellite communications systems development to support emerging technologies for Commercial Broadband Satellite Program (CBSP) and Global Broadcast Service (GBS) Terminals. Efforts will include evaluation of End-to-End performance testing of data rates associated with Broadband and Broadcast transmissions. |  |   |         |  |             |               |
| B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)  |  | FY 2017   | FY 2018 | FY 2019 Base   | FY 2019 OCO | FY 2019 Total |
| Title: NMT Development  |  | 7.438   | 0.000   | 0.000  | 0.000       | 0.000         |
| Articles:   |  | -   | -       | -  | -           | -             |
| Description: Overall program efforts include investigation of emerging technologies through study, development, and associated testing for feasibility of satellite communications-related program insertion.   |  |   |         |  |             |               |
| FY 2018 Plans:<br>NMT Development FY18 funding profile has moved to PE 1203109N.  |  |   |         |  |             |               |
| FY 2019 Base Plans:<br>N/A  |  |   |         |  |             |               |
| FY 2019 OCO Plans:<br>N/A   |  |   |         |  |             |               |
| FY 2018 to FY 2019 Increase/Decrease Statement:<br>NMT Development FY18 funding profile has moved to PE 1203109N.   |  |   |         |  |             |               |
| Title: Joint Aerial Layer Network Maritime (JALN-M)   |  | 10.784  | 0.000   | 0.000  | 0.000       | 0.000         |
| Articles:   |  | -   | -       | -  | -           | -             |
| FY 2018 Plans:<br>Joint Aerial Layer Network Maritime (JALN-M) FY18 funding profile has moved to PE 1203109N.   |  |   |         |  |             |               |
| FY 2019 Base Plans:<br>N/A  |  |   |         |  |             |               |
| FY 2019 OCO Plans:<br>N/A   |  |   |         |  |             |               |
| FY 2018 to FY 2019 Increase/Decrease Statement:   |  |   |         |  |             |               |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy |  |  |  | <b>Date:</b> February 2018   |  |
| <b>Appropriation/Budget Activity</b><br>1319 / 7                   |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications</i><br>(Space) |  | <b>Project (Number/Name)</b><br>0728 / <i>EHF SATCOM Terminals</i> |  |

|  |                |                |                     |                    |                      |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| <b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>  | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019 Base</b> | <b>FY 2019 OCO</b> | <b>FY 2019 Total</b> |
| Joint Aerial Layer Network Maritime (JALN-M) FY18 funding profile has moved to PE 1203109N.  |                |                |                     |                    |                      |
| <b>Title:</b> Technology Insertion<br><br><div style="text-align: right;"><b>Articles:</b></div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <span>0.100</span> <span>0.000</span> <span>0.000</span> <span>0.000</span> <span>0.000</span> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <span>-</span> <span>-</span> <span>-</span> <span>-</span> <span>-</span> </div> |                |                |                     |                    |                      |
| <b>Description:</b> Overall program efforts include technology insertion implementation and associated testing required to support satellite communications.   |                |                |                     |                    |                      |
| <b>FY 2018 Plans:</b><br>Technology Insertion FY18 funding has transferred to PE 1203109N.   |                |                |                     |                    |                      |
| <b>FY 2019 Base Plans:</b><br>N/A  |                |                |                     |                    |                      |
| <b>FY 2019 OCO Plans:</b><br>N/A   |                |                |                     |                    |                      |
| <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b><br>Technology Insertion FY18 funding has transferred to PE 1203109N.  |                |                |                     |                    |                      |
| <b>Accomplishments/Planned Programs Subtotals</b>  | 18.322         | 0.000          | 0.000               | 0.000              | 0.000                |

|  |                |                |                     |                    |                      |                |                |                |                |                         |                   |
|--|----------------|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| <b>C. Other Program Funding Summary (\$ in Millions)</b>   |                |                |                     |                    |                      |                |                |                |                |                         |                   |
| <b>Line Item</b>   | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019 Base</b> | <b>FY 2019 OCO</b> | <b>FY 2019 Total</b> | <b>FY 2020</b> | <b>FY 2021</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>Cost To Complete</b> | <b>Total Cost</b> |
| • OPN/3216: Navy<br>Multiband Terminal (NMT)   | 33.992         | 69.764         | 113.885             | -                  | 113.885              | 92.150         | 21.536         | 31.279         | 19.072         | 73.062                  | 1,508.298         |
| <b>Remarks</b>   |                |                |                     |                    |                      |                |                |                |                |                         |                   |
| <b>D. Acquisition Strategy</b>   |                |                |                     |                    |                      |                |                |                |                |                         |                   |
| The NMT Follow-On Full Deployment (FOFD) contract will continue NMT production for Afloat platforms and Shore locations, in support of the Chief of Naval Operations and the Department of the Navy (DON), and will allow the NMT Program to complete Full Operational Capability (FOC). The competitive contract awarded to COMTECH supports the development of Anti-Access Area Denial (A2AD). |                |                |                     |                    |                      |                |                |                |                |                         |                   |
| <b>E. Performance Metrics</b>  |                |                |                     |                    |                      |                |                |                |                |                         |                   |
| The RDT&E goal for the NMT program is to create a military satellite communications system that consolidates capabilities of current and future satellite systems into a single terminal. SATCOM-related technology insertion, studies and associated testing will support the GBS and CBSP Programs.  |                |                |                     |                    |                      |                |                |                |                |                         |                   |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy  |                        |                                |             |         |            |   |            |                 |            |   |            | Date: February 2018 |                  |            |                          |
| Appropriation/Budget Activity<br>1319 / 7   |                        |                                |             |         |            | R-1 Program Element (Number/Name)<br>PE 0303109N / <i>Satellite Communications</i><br>(Space) |            |                 |            | Project (Number/Name)<br>0728 / <i>EHF SATCOM Terminals</i> |            |                     |                  |            |                          |
| Product Development (\$ in Millions)  |                        |                                |             | FY 2017 |            | FY 2018   |            | FY 2019<br>Base |            | FY 2019<br>OCO  |            | FY 2019<br>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 |
| Product Development   | Various                | Various : Various              | 431.733     | 0.000   |            | 0.000   |            | 0.000           |            | -   |            | 0.000               | 0.000            | 431.733    | -                        |
| Software Development  | C/CPAF                 | Raytheon : Marlborough, MA     | 71.425      | 0.000   |            | 0.000   |            | 0.000           |            | -   |            | 0.000               | 12.492           | 83.917     | -                        |
| Systems Engineering   | WR                     | SSC PAC : San Diego, CA        | 22.088      | 2.733   | Jan 2017   | 0.000   |            | 0.000           |            | -   |            | 0.000               | 0.000            | 24.821     | -                        |
| Systems Engineering   | WR                     | NUWC : Newport, RI             | 37.122      | 4.026   | Jan 2017   | 0.000   |            | 0.000           |            | -   |            | 0.000               | 3.000            | 44.148     | -                        |
| Software Development JALN-M   | C/CPAF                 | RAYTHEON : Marlborough, MA     | 12.492      | 0.843   | Mar 2017   | 0.000   |            | 0.000           |            | -   |            | 0.000               | 0.000            | 13.335     | -                        |
| Systems Engineering   | C/CPAF                 | Systech : San Diego, CA        | 5.438       | 0.000   |            | 0.000   |            | 0.000           |            | -   |            | 0.000               | 0.000            | 5.438      | -                        |
| Software Development Time of Day (TOD)  | C/CPAF                 | RAYTHEON : Marlborough, MA     | 0.000       | 0.126   | Jan 2017   | 0.000   |            | 0.000           |            | -   |            | 0.000               | 0.000            | 0.126      | -                        |
| Systems Engineering   | C/CPFF                 | MIT/LL : Marlborough, MA       | 0.400       | 0.250   | May 2017   | 0.000   |            | 0.000           |            | -   |            | 0.000               | 0.400            | 1.050      | -                        |
| Software Development ATIP Adaptive Coding (AC) /Time of Day (TOD)   | C/CPFF                 | COMTECH : Tempe, AZ            | 27.463      | 2.544   | Nov 2016   | 0.000   |            | 0.000           |            | -   |            | 0.000               | 2.867            | 32.874     | -                        |
| Subtotal  |                        |                                | 608.161     | 10.522  |            | 0.000   |            | 0.000           |            | -   |            | 0.000               | 18.759           | 637.442    | N/A                      |
| Remarks   |                        |                                |             |         |            |   |            |                 |            |   |            |                     |                  |            |                          |
| FY17 initiated studies for the Adaptive Coding Time of Day effort. FY18 NMT Product Development focuses on the complexity of software design development across systems and vendors to support Adaptive Coding Time of Day (TOD) Encryption. The program will be performing NMT testing with Enhanced Polar Systems (EPS) and will initiate testing of the PTSFD EDM modems. FY18 funding profile has moved to PE 1203109N. |                        |                                |             |         |            |   |            |                 |            |   |            |                     |                  |            |                          |
| Support (\$ in Millions)  |                        |                                |             | FY 2017 |            | FY 2018   |            | FY 2019<br>Base |            | FY 2019<br>OCO  |            | FY 2019<br>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 |
| Support   | Various                | Various : Various              | 25.722      | 0.000   |            | 0.000   |            | 0.000           |            | -   |            | 0.000               | 0.000            | 25.722     | -                        |
| Software Integration/ Government Oversight  | WR                     | NUWC : Newport, RI             | 2.280       | 1.887   | Nov 2016   | 0.000   |            | 0.000           |            | -   |            | 0.000               | 2.008            | 6.175      | -                        |
|   |                        |                                |             |         |            |   |            |                 |            |   |            |                     |                  |            |                          |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy        |                        |                                |             |         |            |  |            |              |            |   |            | Date: February 2018 |                  |            |                          |
|---|------------------------|--------------------------------|-------------|---------|------------|--|------------|--------------|------------|---|------------|---------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity<br>1319 / 7                     |                        |                                |             |         |            | R-1 Program Element (Number/Name)<br>PE 0303109N / <i>Satellite Communications (Space)</i> |            |              |            | Project (Number/Name)<br>0728 / <i>EHF SATCOM Terminals</i> |            |                     |                  |            |                          |
| Support (\$ in Millions)                                      |                        |                                |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| Software Engineering Support                                  | C/CPAF                 | SYSTECH : San Diego, CA        | 2.559       | 0.660   | Nov 2016   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 1.194            | 4.413      | -                        |
| Software Integration Support                                  | WR                     | SSC PAC : San Diego, CA        | 1.266       | 0.733   | Nov 2016   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 1.266            | 3.265      | -                        |
| Subtotal  |                        |                                | 31.827      | 3.280   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 4.468            | 39.575     | N/A                      |
| Remarks<br>NMT FY18 funding profile has moved to PE 1203109N. |                        |                                |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| Test and Evaluation (\$ in Millions)                          |                        |                                |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| EPS & JALN-M Development                                      | WR                     | SSC PAC : San Diego, CA        | 24.197      | 2.789   | Nov 2016   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 2.000            | 28.986     | -                        |
| Operational Test & Evaluation 1                               | WR                     | COMOPTEVFOR : Norfolk, VA      | 5.969       | 0.139   | Nov 2016   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.100            | 6.208      | -                        |
| Developmental Test & Evaluation                               | C/CPAF                 | Raytheon : Marlborough, MA     | 3.947       | 0.000   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 3.947      | -                        |
| Subtotal  |                        |                                | 34.113      | 2.928   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 2.100            | 39.141     | N/A                      |
| Remarks<br>NMT FY18 funding profile has moved to PE 1203109N. |                        |                                |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| Management Services (\$ in Millions)                          |                        |                                |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| Contract Management   | C/CPFF                 | BAH : San Diego                | 9.445       | 0.200   | Nov 2016   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.220            | 9.865      | -                        |
| Program Management  | C/CPFF                 | BAH : San Diego                | 10.899      | 1.342   | Nov 2016   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 1.654            | 13.895     | -                        |
| Acquisition Management  | WR                     | NCCA : Various                 | 0.653       | 0.000   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.653      | -                        |



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| <b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b> |  |  |  |  |  |   |  |  |  |  |  | <b>Date:</b> February 2018   |  |  |  |
| <b>Appropriation/Budget Activity</b><br>1319 / 7                  |  |  |  |  |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications (Space)</i> |  |  |  |  |  | <b>Project (Number/Name)</b><br>0728 / <i>EHF SATCOM Terminals</i> |  |  |  |

| <b>Management Services (\$ in Millions)</b> |                                   |   |                    | <b>FY 2017</b> |                   | <b>FY 2018</b> |                   | <b>FY 2019 Base</b> |                   | <b>FY 2019 OCO</b> |                   | <b>FY 2019 Total</b> |                         |                   |                                 |
|---|-----------------------------------|---|--------------------|----------------|-------------------|----------------|-------------------|---------------------|-------------------|--------------------|-------------------|----------------------|-------------------------|-------------------|---------------------------------|
| <b>Cost Category Item</b>                   | <b>Contract Method &amp; Type</b> | <b>Performing Activity &amp; Location</b> | <b>Prior Years</b> | <b>Cost</b>    | <b>Award Date</b> | <b>Cost</b>    | <b>Award Date</b> | <b>Cost</b>         | <b>Award Date</b> | <b>Cost</b>        | <b>Award Date</b> | <b>Cost</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> | <b>Target Value of Contract</b> |
| Travel                                      | Reqn                              | SPAWAR : Various                          | 1.891              | 0.050          | Nov 2016          | 0.000          |                   | 0.000               |                   | -                  |                   | 0.000                | 0.040                   | 1.981             | -                               |
| <b>Subtotal</b>                             |                                   |   | 22.888             | 1.592          |                   | 0.000          |                   | 0.000               |                   | -                  |                   | 0.000                | 1.914                   | 26.394            | N/A                             |

**Remarks**  
NMT FY18 funding profile has moved to PE 1203109N.


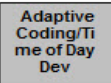



  

|                            | <b>Prior Years</b> | <b>FY 2017</b> |  | <b>FY 2018</b> |  | <b>FY 2019 Base</b> |  | <b>FY 2019 OCO</b> |  | <b>FY 2019 Total</b> | <b>Cost To Complete</b> | <b>Total Cost</b> | <b>Target Value of Contract</b> |
|----------------------------|--------------------|----------------|--|----------------|--|---------------------|--|--------------------|--|----------------------|-------------------------|-------------------|---------------------------------|
| <b>Project Cost Totals</b> | 696.989            | 18.322         |  | 0.000          |  | 0.000               |  | -                  |  | 0.000                | 27.241                  | 742.552           | N/A                             |

**Remarks**  
NMT FY18 funding profile has moved to PE 1203109N.

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| <b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Navy</b>       |   |                |  |                |                | <b>Date:</b> February 2018   |                |
| <b>Appropriation/Budget Activity</b><br>1319 / 7                   |   |                | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications</i><br>(Space) |                |                | <b>Project (Number/Name)</b><br>0728 / <i>EHF SATCOM Terminals</i> |                |
|  | <b>FY 2017</b>  | <b>FY 2018</b> | <b>FY 2019</b>   | <b>FY 2020</b> | <b>FY 2021</b> | <b>FY 2022</b>   | <b>FY 2023</b> |
| <b>SATELLITE LAUNCHES</b> AEHF Launches                            |    |                |  |                |                |  |                |
|  | SV-4  |                |  |                |                |  |                |
| <b>MILESTONES</b>  |   |                |  |                |                |  |                |
| <b>DEVELOPMENT</b>   | A2AD Adaptive   |                |  |                |                |  |                |
|  |    |                |  |                |                |  |                |
| <b>TESTING</b>   | A2AD Wideband AJ Modem System   |                |  |                |                |  |                |
|  | A2AD Adaptive Coding/JALN-M Demo  |                |  |                |                |  |                |
|  |    |                |  |                |                |  |                |
|  | XDR FOT&E   |                |  |                |                |  |                |
| <b>PROCUREMENTS</b>  | PYBY7   |                |  |                |                |  |                |
|  |  |                |  |                |                |  |                |
|  | PY6   |                |  |                |                |  |                |
| <b>NMT DELIVERIES</b>  |  |                |  |                |                |  |                |
| <b>INSTALLATIONS</b>   |   |                |  |                |                |  |                |
|  |   |                |  |                |                |  |                |
| <b>Note:</b> FY18-FY23 NMT funding profile resides in PE 1203109N. |   |                |  |                |                |  |                |

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| <b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy |  |  | <b>Date:</b> February 2018 |
| <b>Appropriation/Budget Activity</b><br>1319 / 7              | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications</i><br>(Space) | <b>Project (Number/Name)</b><br>0728 / <i>EHF SATCOM Terminals</i> |                            |

**Schedule Details**

| Events by Sub Project                               | Start   |      | End     |      |
|---|---------|------|---------|------|
|   | Quarter | Year | Quarter | Year |
| <b>Proj 0728</b>                                    |         |      |         |      |
| Procurement Year 6 (PY6)                            | 1       | 2017 | 1       | 2017 |
| AEHF Launch SV-4                                    | 3       | 2017 | 3       | 2017 |
| A2AD Adaptive Coding & JALN-M Development           | 1       | 2017 | 4       | 2017 |
| A2AD Wideband AJ Modem Development                  | 1       | 2017 | 4       | 2017 |
| XDR FOT&E   | 4       | 2017 | 4       | 2017 |
| A2AD Wideband AJ Modem System (WAMS) Development    | 1       | 2017 | 4       | 2017 |
| Procurement Year 7 (PY7)                            | 1       | 2017 | 1       | 2017 |
| FRP PY6 Delivery                                    | 3       | 2017 | 3       | 2017 |
| A2AD Adaptive Coding/Time of Day                    | 3       | 2017 | 4       | 2017 |
| A2AD Adaptive Coding/JALN-M Demo Integration & Test | 1       | 2017 | 4       | 2017 |

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|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|---------------------|------------------|------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy   |             |         |         |              |  |               |         |         |   | Date: February 2018 |                  |            |
| Appropriation/Budget Activity<br>1319 / 7   |             |         |         |              | R-1 Program Element (Number/Name)<br>PE 0303109N / <i>Satellite Communications (Space)</i> |               |         |         | Project (Number/Name)<br>2472 / <i>Mobile User Objective Sys (MUOS)</i> |                     |                  |            |
| COST (\$ in Millions)   | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO  | FY 2019 Total | FY 2020 | FY 2021 | FY 2022   | FY 2023             | Cost To Complete | Total Cost |
| 2472: <i>Mobile User Objective Sys (MUOS)</i>   | 3,987.187   | 10.206  | 0.000   | 0.000        | -  | 0.000         | 0.000   | 0.000   | 0.000   | 0.000               | 0.000            | 3,997.393  |
| Quantity of RDT&E Articles  |             | -       | -       | -            | -  | -             | -       | -       | -   | -                   |                  |            |
| Project MDAP/MAIS Code: 345   |             |         |         |              |  |               |         |         |   |                     |                  |            |
| <b>Note</b><br>Project 2472 will be realigned to PE 1203109N FY2018-FY2022  |             |         |         |              |  |               |         |         |   |                     |                  |            |
| <b>A. Mission Description and Budget Item Justification</b><br>The Mobile User Objective System (MUOS) provides a worldwide, multi-service population of mobile and fixed-site terminal users with Ultra-High Frequency (UHF), narrowband, beyond line of sight satellite communications (SATCOM). MUOS significantly increases performance and capacity in support of critical Combatant Command SATCOM priorities. MUOS is the replacement system for the UHF Follow-on (UFO) system, which is currently beyond its design life. MUOS consists of Space, Ground, and User Entry Segments. The Space Segment consists of 5 geosynchronous satellites, one which is an on-orbit spare, and provides both a legacy UHF payload, which is backward compatible with UFO, and a Wideband Code Division Multiple Access (WCDMA) payload, which provides 3G cellular-like capability. The Ground Segment consists of four world-wide Radio Access Facilities (RAFTs) and two satellite control facilities. Each RAF includes three 60 ft. antennas, and numerous racks of equipment. The RAF in Hawaii includes a Network Management Facility (NMF). The RAFs in Hawaii and Virginia each include a Switching Facility (SF). The User Entry Segment consists of the MUOS waveform that is ultimately integrated into MUOS-capable terminals. The MUOS legacy capability has been in operational use since 2012, and the WCDMA capability transitioned to Early Combatant Command Use in July 2016.<br><br>In addition to providing UHF SATCOM for the Department of Defense (DoD), the Navy has the overall responsibility to deliver the End-to-End (E2E) MUOS capability to the warfighter. This responsibility involves systems engineering, integration, and test management of all MUOS system of system activities, to include the integration of the MUOS waveform into MUOS-capable terminals and the subsequent terminal certification testing.<br><br>In June 2016 based on the results of the Multi-Service Operational Test and Evaluation-2 (MOT&E-2), Director, Operational Test & Evaluation (DOT&E) assessed MUOS not operationally effective or suitable. As a result of the program addressing findings and preparing for MOT&E-2B in FY19, Full Operational Capability (FOC) has been moved to FY20.<br><br>The budget line beginning in FY17 is dedicated to completion of the MOT&E-2B activities, system optimization to address the dynamic, worldwide electromagnetic and cybersecurity environment in which MUOS operates, and testing to support certification of MUOS-capable terminals.<br><br>Funding moved from PE 0303109N to 1203109N starting in FY18. |             |         |         |              |  |               |         |         |   |                     |                  |            |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy |  |  |  | <b>Date:</b> February 2018   |  |
| <b>Appropriation/Budget Activity</b><br>1319 / 7                   |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications</i><br>(Space) |  | <b>Project (Number/Name)</b><br>2472 / <i>Mobile User Objective Sys (MUOS)</i> |  |

|   |                |                |                     |                    |                      |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| <b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>   | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019 Base</b> | <b>FY 2019 OCO</b> | <b>FY 2019 Total</b> |
| <b>Title:</b> Mobile User Objective Sys (MUOS)<br><br><div style="text-align: right;"><b>Articles:</b></div><br><b>FY 2018 Plans:</b><br>N/A<br><br><b>FY 2019 Base Plans:</b><br>N/A<br><br><b>FY 2019 OCO Plans:</b><br>N/A | 10.206<br>-    | 0.000<br>-     | 0.000<br>-          | 0.000<br>-         | 0.000<br>-           |
| <b>Accomplishments/Planned Programs Subtotals</b>   | 10.206         | 0.000          | 0.000               | 0.000              | 0.000                |

|   |                |                |                     |                    |                      |                |                |                |                |                         |                   |
|---|----------------|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| <b>C. Other Program Funding Summary (\$ in Millions)</b>  |                |                |                     |                    |                      |                |                |                |                |                         |                   |
| <b>Line Item</b>  | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019 Base</b> | <b>FY 2019 OCO</b> | <b>FY 2019 Total</b> | <b>FY 2020</b> | <b>FY 2021</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>Cost To Complete</b> | <b>Total Cost</b> |
| • WPN/2433: <i>Mobile User Objective System (MUOS)</i>  | 33.723         | 46.357         | 66.779              | -                  | 66.779               | 67.380         | 53.460         | 45.985         | 46.907         | 617.197                 | 3,044.814         |
| <b>Remarks</b>  |                |                |                     |                    |                      |                |                |                |                |                         |                   |
| <b>D. Acquisition Strategy</b><br>Currently sustainment and engineering activities are procured via the baseline MUOS Risk Reduction and Design Development contract. The program is working to transition these activities to dedicated sustainment contracts for the Ground/User Entry and Space Segments. Integration of the MUOS waveform into MUOS-capable terminals and execution of certification testing of MUOS-capable terminals are executed primarily by the Navy Working Capital Funded SPAWAR Systems Center Pacific. |                |                |                     |                    |                      |                |                |                |                |                         |                   |
| <b>E. Performance Metrics</b><br>MUOS Goal: Achieve Full Operational Capability in FY 2020.<br><br>Metric: Successfully complete 5 developmental test assist events in FY18, and Multi-Service Operational Test and Evaluation-2B FY19.   |                |                |                     |                    |                      |                |                |                |                |                         |                   |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy   |                        |                                      |             |         |            |  |            |              |            |   |            | Date: February 2018 |                  |            |                          |
|--|------------------------|--------------------------------------|-------------|---------|------------|--|------------|--------------|------------|---|------------|---------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity<br>1319 / 7  |                        |                                      |             |         |            | R-1 Program Element (Number/Name)<br>PE 0303109N / <i>Satellite Communications (Space)</i> |            |              |            | Project (Number/Name)<br>2472 / <i>Mobile User Objective Sys (MUOS)</i> |            |                     |                  |            |                          |
| Product Development (\$ in Millions)   |                        |                                      |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| RRDD AOS Contract  | C/CPAF                 | Lockheed Martin (LM) : Sunnyvale, CA | 3,550.527   | 3.306   | Oct 2016   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 3,553.833  | -                        |
| Product Development PY   | Various                | Various : Various                    | 133.670     | 0.000   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 133.670    | -                        |
| Subtotal   |                        |                                      | 3,684.197   | 3.306   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 3,687.503  | N/A                      |
| Remarks  |                        |                                      |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| In accordance with Program Office's Acquisition Strategy, engineering services will be continued and negotiated on a new contract vehicle to be awarded in FY18. Increase of ~\$600K in RRDD AOS Contract (Engineering Contract) from FY17 to FY18 due to increased efforts to address Operational Test deficiencies. Funding moved from PE 0303109N to 1203109N starting in FY18. |                        |                                      |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| Support (\$ in Millions)   |                        |                                      |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| Support PY   | Various                | Various : Various                    | 38.378      | 0.000   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 38.378     | -                        |
| Subtotal   |                        |                                      | 38.378      | 0.000   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 38.378     | N/A                      |
| Remarks  |                        |                                      |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| Funding moved from PE 0303109N to 1203109N starting in FY18.   |                        |                                      |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| Test and Evaluation (\$ in Millions)   |                        |                                      |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| Test & Evaluation  | WR                     | Various : Various                    | 31.269      | 0.000   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 31.269     | -                        |
| Subtotal   |                        |                                      | 31.269      | 0.000   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 31.269     | N/A                      |
| Remarks  |                        |                                      |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| Increase of \$1.765M in Test and Evaluation efforts from FY17 to FY18 due to Test Assist Events in preparation for MOT&E-2B. Funding moved from PE 0303109N to 1203109N starting in FY18.  |                        |                                      |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |

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| <b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b> |  |  |  |  |  |   |  |  |  |  |  | <b>Date:</b> February 2018 |  |  |  |
| <b>Appropriation/Budget Activity</b><br>1319 / 7                  |  |  |  |  |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications (Space)</i> |  |  |  | <b>Project (Number/Name)</b><br>2472 / <i>Mobile User Objective Sys (MUOS)</i> |  |                            |  |  |  |

| <b>Management Services (\$ in Millions)</b> |                                   |   |                    | <b>FY 2017</b> |                   | <b>FY 2018</b> |                   | <b>FY 2019 Base</b> |                   | <b>FY 2019 OCO</b> |                   | <b>FY 2019 Total</b> |                         |                   |                                 |
|---|-----------------------------------|---|--------------------|----------------|-------------------|----------------|-------------------|---------------------|-------------------|--------------------|-------------------|----------------------|-------------------------|-------------------|---------------------------------|
| <b>Cost Category Item</b>                   | <b>Contract Method &amp; Type</b> | <b>Performing Activity &amp; Location</b> | <b>Prior Years</b> | <b>Cost</b>    | <b>Award Date</b> | <b>Cost</b>    | <b>Award Date</b> | <b>Cost</b>         | <b>Award Date</b> | <b>Cost</b>        | <b>Award Date</b> | <b>Cost</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> | <b>Target Value of Contract</b> |
| Contractor Engineering Support              | Various                           | Various : Various                         | 145.363            | 3.000          | Nov 2016          | 0.000          |                   | 0.000               |                   | -                  |                   | 0.000                | 0.000                   | 148.363           | -                               |
| Government Engineering                      | Various                           | Various : Various                         | 38.444             | 3.900          | Oct 2016          | 0.000          |                   | 0.000               |                   | -                  |                   | 0.000                | 0.000                   | 42.344            | -                               |
| Management Services PY including Travel     | Various                           | Various : Various                         | 49.536             | 0.000          |                   | 0.000          |                   | 0.000               |                   | -                  |                   | 0.000                | 0.000                   | 49.536            | -                               |
| <b>Subtotal</b>                             |                                   |   | 233.343            | 6.900          |                   | 0.000          |                   | 0.000               |                   | -                  |                   | 0.000                | 0.000                   | 240.243           | N/A                             |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>Remarks</b><br>Funding moved from PE 0303109N to 1203109N starting in FY18. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

|                            | <b>Prior Years</b> | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019 Base</b> | <b>FY 2019 OCO</b> | <b>FY 2019 Total</b> | <b>Cost To Complete</b> | <b>Total Cost</b> | <b>Target Value of Contract</b> |
|----------------------------|--------------------|----------------|----------------|---------------------|--------------------|----------------------|-------------------------|-------------------|---------------------------------|
| <b>Project Cost Totals</b> | 3,987.187          | 10.206         | 0.000          | 0.000               | -                  | 0.000                | 0.000                   | 3,997.393         | N/A                             |

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
| <b>Remarks</b><br>Funding moved from PE 0303109N to 1203109N starting in FY18. |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity  
1319 / 7

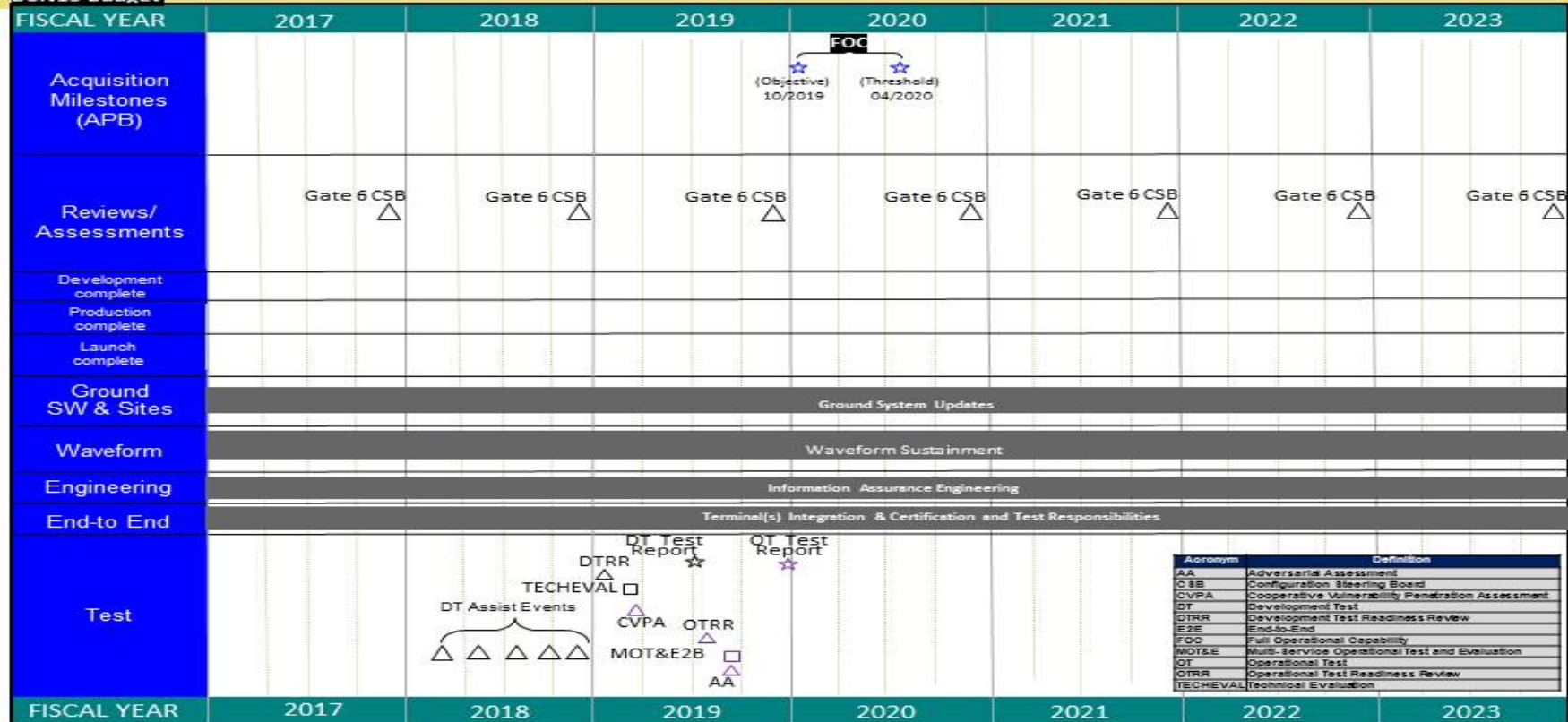
R-1 Program Element (Number/Name)  
PE 0303109N / Satellite Communications  
(Space)

Project (Number/Name)  
2472 / Mobile User Objective Sys (MUOS)

# MUOS Program Schedule



DoN19 Budget





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|   |  |  |                            |
|---|--|--|----------------------------|
| <b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy |  |  | <b>Date:</b> February 2018 |
| <b>Appropriation/Budget Activity</b><br>1319 / 7              | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications</i><br>(Space) | <b>Project (Number/Name)</b><br>2472 / <i>Mobile User Objective Sys (MUOS)</i> |                            |

Schedule Details

| Events by Sub Project                         | Start   |      | End     |      |
|---|---------|------|---------|------|
|   | Quarter | Year | Quarter | Year |
| <b><i>Proj 2472</i></b>                       |         |      |         |      |
| Gate 6/CSB FY17                               | 4       | 2017 | 4       | 2017 |
| Ground System Updates                         | 1       | 2017 | 4       | 2017 |
| Waveform Sustainment                          | 1       | 2017 | 4       | 2017 |
| Information Assurance Engineering             | 1       | 2017 | 4       | 2017 |
| Terminal Integration, Certification, and Test | 1       | 2017 | 4       | 2017 |

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| Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy |             |         |         |              |  |               |         |         |   | Date: February 2018 |                  |            |
|---|-------------|---------|---------|--------------|--|---------------|---------|---------|---|---------------------|------------------|------------|
| Appropriation/Budget Activity<br>1319 / 7               |             |         |         |              | R-1 Program Element (Number/Name)<br>PE 0303109N / <i>Satellite Communications (Space)</i> |               |         |         | Project (Number/Name)<br>3398 / <i>Enterprise SATCOM Gateway Modems (ESGMs)</i> |                     |                  |            |
| COST (\$ in Millions)                                   | Prior Years | FY 2017 | FY 2018 | FY 2019 Base | FY 2019 OCO  | FY 2019 Total | FY 2020 | FY 2021 | FY 2022   | FY 2023             | Cost To Complete | Total Cost |
| 3398: <i>Enterprise SATCOM Gateway Modems (ESGMs)</i>   | 0.000       | 2.298   | 0.000   | 0.000        | -  | 0.000         | 0.000   | 0.000   | 0.000   | 0.000               | 0.000            | 2.298      |
| Quantity of RDT&E Articles                              |             | -       | -       | -            | -  | -             | -       | -       | -   | -                   |                  |            |

**Note**

ESGM's FY18-FY19 funding profile has moved to PE 1203109N.

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

The Navy Global Broadcast Service (GBS) Program is the Navy component of the Joint Military Satellite Communications (MILSATCOM) program that delivers the continuous flow of high-speed, high-volume communication and information flow for deploying, deployed, on the move, and garrisoned forces. The GBS system supports the Navy Strategic Plan and equips warfighters with counter Anti-Access/Area Denial (A2AD) communications in a denied Command, Control, Communications, Computers, and Intelligence (C4I) environment. GBS provides Satellite Communications (SATCOM) capability for forces afloat, ashore, and Naval Special Warfare Command.

The Enterprise SATCOM Gateway Modem (ESGM) is the DoD Chief Information Officer directed solution to satisfy the Transmission Security (TRANSEC) requirement. This modem will replace the existing modem in the GBS System. Testing and fielding of the ESGM is a joint venture, operationally directed by the Defense Information Systems Agency (DISA) and the Air Force as the lead service. Additionally, the ESGM will continue to enable GBS reception of the Digital Video Broadcast - Satellite 2nd Generation (DVB-S2).

**B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)**

|  | <b>FY 2017</b> | <b>FY 2018</b> | <b>FY 2019 Base</b> | <b>FY 2019 OCO</b> | <b>FY 2019 Total</b> |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| <b>Title:</b> Enterprise SATCOM Gateway Modems (ESGMs)   | 2.298          | 0.000          | 0.000               | 0.000              | 0.000                |
| <b>Articles:</b>   | -              | -              | -                   | -                  | -                    |
| <b>FY 2018 Plans:</b><br>Enterprise SATCOM Gateway Modems (ESGMs) FY18 funding profile resides in PE 1203109N. |                |                |                     |                    |                      |
| <b>FY 2019 Base Plans:</b><br>N/A  |                |                |                     |                    |                      |
| <b>FY 2019 OCO Plans:</b><br>N/A   |                |                |                     |                    |                      |
| <b>Accomplishments/Planned Programs Subtotals</b>  | 2.298          | 0.000          | 0.000               | 0.000              | 0.000                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2019 Navy   |   | <b>Date:</b> February 2018   |
| <b>Appropriation/Budget Activity</b><br>1319 / 7   | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications (Space)</i> | <b>Project (Number/Name)</b><br>3398 / <i>Enterprise SATCOM Gateway Modems (ESGMs)</i> |
| <b>C. Other Program Funding Summary (\$ in Millions)</b><br>N/A  |   |  |
| <b>Remarks</b>   |   |  |
| <b>D. Acquisition Strategy</b><br>The GBS program reached a Full Rate Production Decision on 24 Oct 2008 and is in sustainment. The Enterprise Satellite Communications (SATCOM) Gateway Modem (ESGM), the Commercial Off-The-Shelf (COTS) Internet Protocol (IP) modem, provides Transmission Security functionality in support of DoD CIO direction to implement Information Assurance for all transmission media. |   |  |
| <b>E. Performance Metrics</b><br>The RDT&E goal for the GBS program is to create a military satellite communications system that supports current and future requirements for Anti-Access/Area Denial and Information Assurance.   |   |  |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy           |                        |                                |             |         |            |  |            |              |            |   |            | Date: February 2018 |                  |            |                          |
|--|------------------------|--------------------------------|-------------|---------|------------|--|------------|--------------|------------|---|------------|---------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity<br>1319 / 7                        |                        |                                |             |         |            | R-1 Program Element (Number/Name)<br>PE 0303109N / <i>Satellite Communications (Space)</i> |            |              |            | Project (Number/Name)<br>3398 / <i>Enterprise SATCOM Gateway Modems (ESGMs)</i> |            |                     |                  |            |                          |
| Support (\$ in Millions)   |                        |                                |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| Systems Engineering  | WR                     | SSC PAC : San Diego, CA        | 0.000       | 0.559   | May 2017   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.559      | -                        |
| Systems Engineering  | WR                     | NUWC : Newport, RI             | 0.000       | 0.280   | May 2017   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.280      | -                        |
| Systems Engineering  | WR                     | SSC LANT : Charleston, SC      | 0.000       | 0.754   | May 2017   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.754      | -                        |
| Subtotal   |                        |                                | 0.000       | 1.593   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 1.593      | N/A                      |
| Remarks<br>ESGM's FY18 funding profile has moved to PE 1203109N. |                        |                                |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| Test and Evaluation (\$ in Millions)                             |                        |                                |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| Developmental Test & Evaluation                                  | WR                     | SYSTECH : San Diego, CA        | 0.000       | 0.200   | May 2017   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.200      | -                        |
| Developmental Test & Evaluation                                  | WR                     | COMOPTEVFOR : Norfolk, VA      | 0.000       | 0.370   | May 2017   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.370      | -                        |
| Subtotal   |                        |                                | 0.000       | 0.570   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.570      | N/A                      |
| Remarks<br>ESGM's FY18 funding profile has moved to PE 1203109N. |                        |                                |             |         |            |  |            |              |            |   |            |                     |                  |            |                          |
| Management Services (\$ in Millions)                             |                        |                                |             | FY 2017 |            | FY 2018  |            | FY 2019 Base |            | FY 2019 OCO   |            | FY 2019 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 |
| Program Management   | C/CPFF                 | BAH : San Diego                | 0.000       | 0.120   | May 2017   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.120      | -                        |
| Travel   | Reqn                   | SPAWAR : Various               | 0.000       | 0.015   | May 2017   | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.015      | -                        |
| Subtotal   |                        |                                | 0.000       | 0.135   |            | 0.000  |            | 0.000        |            | -   |            | 0.000               | 0.000            | 0.135      | N/A                      |


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|---|--|--|--|--|---|--|--|--|--|--|--|----------------------------|--|--|
| <b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2019 Navy |  |  |  |  |   |  |  |  |  |  |  | <b>Date:</b> February 2018 |  |  |
| <b>Appropriation/Budget Activity</b><br>1319 / 7                  |  |  |  |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications (Space)</i> |  |  |  |  | <b>Project (Number/Name)</b><br>3398 / <i>Enterprise SATCOM Gateway Modems (ESGMs)</i> |  |                            |  |  |

| <b>Management Services (\$ in Millions)</b>                             |                                   |   |                    | <b>FY 2017</b> |                   | <b>FY 2018</b> |                   | <b>FY 2019 Base</b> |                   | <b>FY 2019 OCO</b> |                   | <b>FY 2019 Total</b> |                         |                   |                                 |
|---|-----------------------------------|---|--------------------|----------------|-------------------|----------------|-------------------|---------------------|-------------------|--------------------|-------------------|----------------------|-------------------------|-------------------|---------------------------------|
| <b>Cost Category Item</b>   | <b>Contract Method &amp; Type</b> | <b>Performing Activity &amp; Location</b> | <b>Prior Years</b> | <b>Cost</b>    | <b>Award Date</b> | <b>Cost</b>    | <b>Award Date</b> | <b>Cost</b>         | <b>Award Date</b> | <b>Cost</b>        | <b>Award Date</b> | <b>Cost</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> | <b>Target Value of Contract</b> |
| <b>Remarks</b><br>ESGM's FY18 funding profile has moved to PE 1203109N. |                                   |   |                    |                |                   |                |                   |                     |                   |                    |                   |                      |                         |                   |                                 |
|   |                                   |   | <b>Prior Years</b> | <b>FY 2017</b> |                   | <b>FY 2018</b> |                   | <b>FY 2019 Base</b> |                   | <b>FY 2019 OCO</b> |                   | <b>FY 2019 Total</b> | <b>Cost To Complete</b> | <b>Total Cost</b> | <b>Target Value of Contract</b> |
| <b>Project Cost Totals</b>  |                                   |   |                    | 0.000          | 2.298             |                | 0.000             |                     | 0.000             |                    | -                 | 0.000                | 0.000                   | 2.298             | N/A                             |
| <b>Remarks</b><br>ESGM's FY18 funding profile has moved to PE 1203109N. |                                   |   |                    |                |                   |                |                   |                     |                   |                    |                   |                      |                         |                   |                                 |

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|--|---|-------------|---|-------------|-------------|--|-------------|
| <b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Navy</b> |   |             |   |             |             | <b>Date:</b> February 2018   |             |
| <b>Appropriation/Budget Activity</b><br>1319 / 7             |   |             | <b>R-1 Program Element (Number/Name)</b><br>PE 0303109N / <i>Satellite Communications (Space)</i> |             |             | <b>Project (Number/Name)</b><br>3398 / <i>Enterprise SATCOM Gateway Modems (ESGMs)</i> |             |
|  | <b>2017</b>   | <b>2018</b> | <b>2019</b>   | <b>2020</b> | <b>2021</b> | <b>2022</b>  | <b>2023</b> |
| <b>DEVELOPMENT and INTEGRATION</b>                           | <br>ESGM Development & Integration |             |   |             |             |  |             |
| <b>TESTING</b>   |   |             |   |             |             |  |             |
| <b>PROCUREMENT</b>   |   |             |   |             |             |  |             |

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|--|--|---|
| Exhibit R-4A, RDT&E Schedule Details: PB 2019 Navy |  | Date: February 2018   |
| Appropriation/Budget Activity<br>1319 / 7          | R-1 Program Element (Number/Name)<br>PE 0303109N / <i>Satellite Communications (Space)</i> | Project (Number/Name)<br>3398 / <i>Enterprise SATCOM Gateway Modems (ESGMs)</i> |

Schedule Details

| Events by Sub Project            | Start   |      | End     |      |
|----------------------------------|---------|------|---------|------|
|                                  | Quarter | Year | Quarter | Year |
| <i>Proj 3398</i>                 |         |      |         |      |
| ESGM Development and Integration | 4       | 2017 | 4       | 2017 |