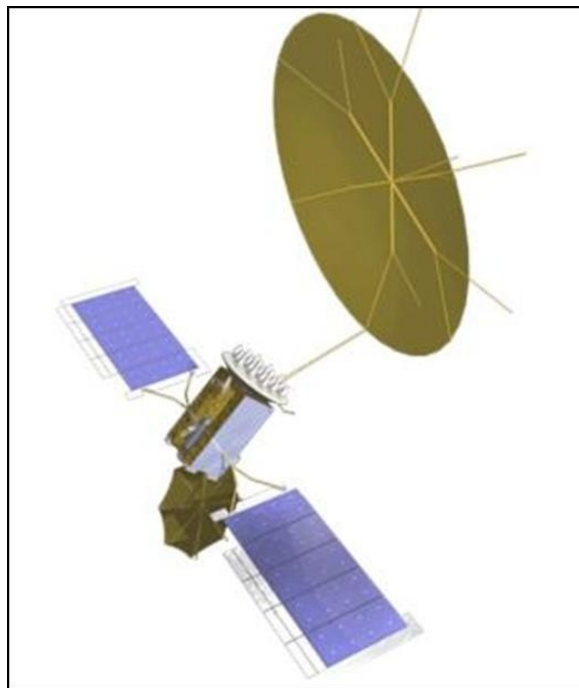




## Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-345



## Mobile User Objective System (MUOS)

As of FY 2015 President's Budget

Defense Acquisition Management  
Information Retrieval  
(DAMIR)

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## Common Acronyms and Abbreviations

Acq O&M - Acquisition-Related Operations and Maintenance  
APB - Acquisition Program Baseline  
APPN - Appropriation  
APUC - Average Procurement Unit Cost  
BA - Budget Authority/Budget Activity  
BY - Base Year  
DAMIR - Defense Acquisition Management Information Retrieval  
Dev Est - Development Estimate  
DoD - Department of Defense  
DSN - Defense Switched Network  
Econ - Economic  
Eng - Engineering  
Est - Estimating  
FMS - Foreign Military Sales  
FY - Fiscal Year  
IOC - Initial Operational Capability  
\$K - Thousands of Dollars  
LRIP - Low Rate Initial Production  
\$M - Millions of Dollars  
MILCON - Military Construction  
N/A - Not Applicable  
O&S - Operating and Support  
Oth - Other  
PAUC - Program Acquisition Unit Cost  
PB - President's Budget  
PE - Program Element  
Proc - Procurement  
Prod Est - Production Estimate  
QR - Quantity Related  
Qty - Quantity  
RDT&E - Research, Development, Test, and Evaluation  
SAR - Selected Acquisition Report  
Sch - Schedule  
Spt - Support  
TBD - To Be Determined  
TY - Then Year  
UCR - Unit Cost Reporting

## Program Information

**Program Name**

Mobile User Objective System (MUOS)

**DoD Component**

Navy

## Responsible Office

**Responsible Office**

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**DSN Fax** --  
**Date Assigned** December 13, 2013

## References

**SAR Baseline (Production Estimate)**

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated March 15, 2008

**Approved APB**

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated July 24, 2012

## Mission and Description

The Mobile User Objective System (MUOS) is a narrowband Military Satellite Communications (MILSATCOM) system that supports a worldwide, multi-Service population of mobile and fixed-site terminal users in the Ultra High Frequency (UHF) band, providing increased communications capabilities to smaller terminal users while still supporting interoperability to legacy terminals.

MUOS adapts a commercial third generation Wideband Code Division Multiple Access (WCDMA) cellular phone network architecture and combines it with geosynchronous satellites (in place of cell towers) to provide a new and more capable UHF MILSATCOM system. The constellation of four operational satellites and ground network control will provide greater than ten times the system capacity of the current UHF Follow-On (UFO) constellation.

MUOS includes the satellite constellation, a ground control and network management system, and a new waveform for user terminals. The space segment is comprised of a constellation of four geosynchronous satellites, plus one on-orbit spare. The ground system includes the ground transport, network management, satellite control, and associated infrastructure to both fly the satellites and manage the users' communications. MUOS is designed to support users that require greater mobility, higher data rates, and improved operational availability. The new waveform is termed the MUOS Common Air Interface (CAI), a Software Communications Architecture compliant modulation technique for the Joint Tactical Radio System terminals.

The flow of information between users when MUOS is operational will be much different than today's systems. Users will communicate with the satellite via UHF WCDMA links and the satellites will relay this to one of four interconnected ground sites located in Wahiawa (Hawaii), Chesapeake (Virginia), Niscemi (Italy), and Geraldton (Australia) via a Ka-band feeder link. These facilities identify the destination of the communications, and route the information to the appropriate ground site for Ka-band uplink to the satellite and UHF WCDMA downlink to the correct users. A network management facility, located at Wahiawa, will feature a government-controlled, priority-based resource management capability that will be adaptable and responsive to changing operational communications requirements. Additionally, MUOS will provide access to select Defense Information System Network services, providing a voice and data capability that has not been available to UHF MILSATCOM users on prior systems. For satellite telemetry, tracking, and commanding, MUOS will use existing control centers operated by the Naval Satellite Operations Center Headquarters at Point Mugu, California, and their detachment at Schriever Air Force Base, Colorado Springs, Colorado.

When MUOS is fielded, it will serve a mixed terminal population. Some users will have terminals only able to support the legacy waveforms while other users will have newer terminals able to support the MUOS CAI. Each MUOS satellite carries a legacy payload similar to that flown on UFO-11. These legacy payloads will continue to support legacy terminals, allowing for a more gradual transition to the MUOS WCDMA waveform.

## Executive Summary

The MUOS program successfully completed significant program milestones in 2013. MUOS-1 is providing reliable ultra-high frequency satellite communications capability to the warfighter. The second satellite, MUOS-2, was successfully launched July 19, 2013, and was handed over to the Navy for further systems integration and test on November 15, 2013. The MUOS Waveform version 3.1.1 was posted to the Joint Tactical Network Information Repository in July 2013 and is available to the radio development community. The National Security Agency MUOS Waveform v3.1.1 Information Assurance Acceptability letter was signed on October 30, 2013, designating the waveform as an acceptable baseline.

The Under Secretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)) issued an Acquisition Decision Memorandum on May 1, 2012, that directed the Navy assume responsibility for integration of the MUOS End-to-End (E2E) Capability. E2E Strategy of Risk Reduction integration and test events were executed in 2013. The first two Risk Reduction 1a and Risk Reduction 1b events were completed in March 2013 and July 2013 respectively, successfully demonstrating functionality of software waveform, ground systems, satellite and terminal during over the air tests. The third event, the Defense Information System Network Services Interface Test, was successfully completed in August 2013 demonstrating the Defense Services Network, secret, and non-secure network functionalities. The final risk reduction events conducting laboratory and reliability testing began in December 2013, with follow-on vendor and Government testing planned for calendar year 2014.

MUOS-3, MUOS-4, and MUOS-5 are satellites in various stages of production being procured via Fixed Price contract line items. The satellite that was closest to completion, and intended to fulfill the 3rd Satellite Ready to Ship milestone, experienced uncommanded shutdowns within the Legacy Payload during Thermal Vacuum testing. The root cause of the failure was identified to be insufficient solder application in the manufacture of the Output Multiplexer (OMUX) Cluster A, one of six OMUX clusters in the legacy payload. It was determined that the affected satellite could no longer meet the "3rd Satellite Ready to Ship" milestone Threshold of June 2014 per the APB. The next satellite in the production line has a Ready to Ship date of October 2014, which will result in a four month schedule breach to the "3rd Satellite Ready to Ship" milestone. Subsequent satellite deliveries are still projected to meet the MUOS APB milestones "4th Satellite Ready to Ship" and "5th Satellite Ready to Ship" Threshold dates. A program deviation report was signed by the Program Manager on December 4, 2013, and was submitted to USD (AT&L) on January 21, 2014.

All MUOS ground sites are complete with the exception of the site in Niscemi, Italy. The Italian Government approved construction of the MUOS site at Navy Radio Transmitter Facility (NRTF) Niscemi on June 1, 2011. However, on April 11, 2013, permission to proceed with construction of the Niscemi site was revoked by the President of Sicily. On July 26, 2013, the Government of Italy approved resuming construction of the MUOS installation at NRTF Niscemi. Assuming continued and assured access to the NRTF, the site will be ready for operations in May 2015.

MUOS met its statutory requirement to conduct a Configuration Steering Board on November 6, 2013.

There are no significant software-related issues with this program at this time.

**Threshold Breaches**

**APB Breaches**

|                     |             |                                     |
|---------------------|-------------|-------------------------------------|
| <b>Schedule</b>     |             | <input checked="" type="checkbox"/> |
| <b>Performance</b>  |             | <input type="checkbox"/>            |
| <b>Cost</b>         | RDT&E       | <input type="checkbox"/>            |
|                     | Procurement | <input type="checkbox"/>            |
|                     | MILCON      | <input type="checkbox"/>            |
|                     | Acq O&M     | <input type="checkbox"/>            |
| <b>O&amp;S Cost</b> |             | <input type="checkbox"/>            |
| <b>Unit Cost</b>    | PAUC        | <input type="checkbox"/>            |
|                     | APUC        | <input type="checkbox"/>            |

**Explanation of Breach**

Scheduled milestone "3rd Satellite Ready to Ship" Objective date September 2013/Threshold date June 2014 will not be met. The satellite that was closest to completion, and intended to fulfill the "3rd Satellite Ready to Ship" milestone, has experienced uncommanded shutdowns within the Legacy Payload during Thermal Vacuum testing. The root cause of the failure was identified to be insufficient solder application in the manufacture of the Output Multiplexer. It was determined that the affected satellite could no longer meet the "3rd Satellite Ready to Ship" milestone Threshold date of June 2014 per the APB.

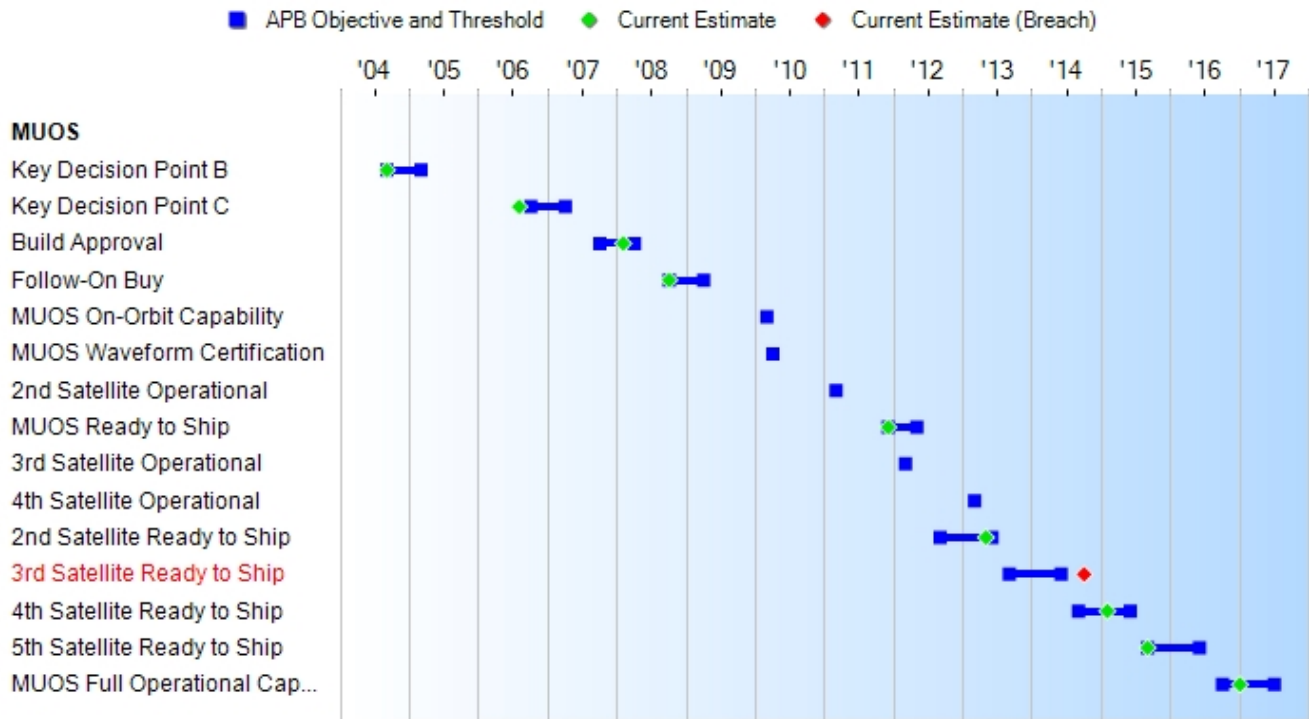
**Nunn-McCurdy Breaches**

|                              |      |      |
|------------------------------|------|------|
| <b>Current UCR Baseline</b>  |      |      |
|                              | PAUC | None |
|                              | APUC | None |
| <b>Original UCR Baseline</b> |      |      |
|                              | PAUC | None |
|                              | APUC | None |

Subsequent satellite deliveries are still projected to meet the MUOS APB milestones "4th Satellite Ready to Ship" and "5th Satellite Ready to Ship" Threshold dates.

A program deviation report was signed by the Program Manager on December 4, 2013, and was submitted to the Under Secretary of Defense (Acquisition, Technology and Logistics) on January 21, 2014.

### Schedule



| Milestones                       | SAR Baseline Prod Est | Current APB Production Objective/Threshold |          | Current Estimate                    |
|----------------------------------|-----------------------|--|----------|-------------------------------------|
| Key Decision Point B             | SEP 2004              | SEP 2004                                   | MAR 2005 | SEP 2004                            |
| Key Decision Point C             | OCT 2006              | OCT 2006                                   | APR 2007 | AUG 2006                            |
| Build Approval                   | OCT 2007              | OCT 2007                                   | APR 2008 | FEB 2008                            |
| Follow-On Buy                    | OCT 2008              | OCT 2008                                   | APR 2009 | OCT 2008                            |
| MUOS On-Orbit Capability         | MAR 2010              | N/A  | N/A      | N/A                                 |
| MUOS Waveform Certification      | APR 2010              | N/A  | N/A      | N/A                                 |
| 2nd Satellite Operational        | MAR 2011              | N/A  | N/A      | N/A                                 |
| MUOS Ready to Ship               | N/A                   | DEC 2011                                   | MAY 2012 | DEC 2011                            |
| 3rd Satellite Operational        | MAR 2012              | N/A  | N/A      | N/A                                 |
| 4th Satellite Operational        | MAR 2013              | N/A  | N/A      | N/A                                 |
| 2nd Satellite Ready to Ship      | N/A                   | SEP 2012                                   | JUN 2013 | MAY 2013                            |
| 3rd Satellite Ready to Ship      | N/A                   | SEP 2013                                   | JUN 2014 | <b>OCT 2014</b> <sup>1</sup> (Ch-1) |
| 4th Satellite Ready to Ship      | N/A                   | SEP 2014                                   | JUN 2015 | FEB 2015 (Ch-2)                     |
| 5th Satellite Ready to Ship      | N/A                   | SEP 2015                                   | JUN 2016 | SEP 2015                            |
| MUOS Full Operational Capability | MAR 2014              | OCT 2016                                   | JUL 2017 | JAN 2017                            |

<sup>1</sup>APB Breach



**Change Explanations**

(Ch-1) The "3rd Satellite Ready to Ship" current estimate changed from September 2013 to October 2014. The satellite that was closest to completion has experienced uncommanded shutdowns within the Legacy Payload during Thermal Vacuum (TVAC) testing. The root cause of the failure was identified to be insufficient solder application in the manufacture of the Output Multiplexer (OMUX).

(Ch-2) The "4th Satellite Ready to Ship" current estimate changed from September 2014 to February 2015 due to delays in the OMUX delivery.

**Memo**

It was determined that the affected satellite could no longer meet the "3rd Satellite Ready to Ship" milestone Threshold date of June 2014 per the APB; therefore this schedule milestone is now in breach.

Subsequent satellite deliveries are still projected to meet the MUOS APB milestones "4th Satellite Ready to Ship" and "5th Satellite Ready to Ship" Threshold dates.

A program deviation report was signed by the Program Manager on December 4, 2013, and was submitted to the Under Secretary of Defense (Acquisition, Technology and Logistics) on January 21, 2014.

**Performance**

| Characteristics | SAR Baseline Prod Est  | Current APB Production Objective/Threshold   |   | Demonstrated Performance   | Current Estimate  |
|-----------------|--|--|---|--|---|
| Coverage        | 24 hours/day communications services at all latitudes and longitudes                         | 24 hours/day communications services at all latitudes and longitudes                         | 24 hours/day communications services from 65 degrees North to 65 degrees South latitude at all longitudes | Demonstrated via analysis that each MUOS satellite always has optical line of site to one MUOS RAF and there is at least one MUOS satellite accessible from any point within the coverage area from 65 degrees North to 65 degrees South measured at every 0.1 degree increments of longitude over the worst case 24 hour orbital period | 24 hours/day communications services from 65 degrees North to 65 degrees South latitude at all longitudes |
| Capacity        | 300% worldwide simultaneous accesses (5,991 at 117.6 Mbps) associated with the CMTW scenario | 300% worldwide simultaneous accesses (5,991 at 117.6 Mbps) associated with the CMTW scenario | 1,997 worldwide simultaneous accesses (39.2 Mbps) with 502 simultaneous theater accesses (3 Mbps)         | Demonstrated via analysis that threshold capacity requirement is met while simultaneously meeting all other service requirements, such   | 1,997 worldwide simultaneous accesses (39.2 Mbps) with 502 simultaneous theater accesses (3 Mbps)         |

|                    |  |  |  |  |   |
|--------------------|--|--|--|--|---|
|                    |  |  |  | as link availability.  |   |
| Access and Control | Resources planned, allocated, prioritized, and dynamically configured or reconfigured in less than 5 minutes for all networks; and priority-based access is provided or the request is queued and feedback provided to the user within 3 seconds 90% of the time and 6 seconds 99% of the time | Resources planned, allocated, prioritized, and dynamically configured or reconfigured in less than 5 minutes for all networks; and priority-based access is provided or the request is queued and feedback provided to the user within 3 seconds 90% of the time and 6 seconds 99% of the time | Resources planned, allocated, prioritized, and dynamically configured or reconfigured within 15 minutes and for selected high priority networks within 5 minutes; and priority-based access is provided or the request is queued and feedback provided to the user within 6 seconds 90% of the time and 10 seconds 99% of the time | Automated functionality for resource planning, allocation and prioritization have been demonstrated via test and analysis; network configuration/reconfiguration was demonstrated via Ground System test and analysis to be accomplished in 4.7 seconds Priority-based access was demonstrated via Ground System test and system-level analysis coincident with the Capacity KPP demonstration showing that access is provided within 6 seconds (90%) and 10 seconds (99%) | Resources planned, allocated, prioritized, and dynamically configured or reconfigured in less than 5 minutes for all networks; and priority-based access is provided or the request is queued and feedback provided to the user within 6 seconds 90% of the time and 10 seconds 99% of the time |
| Net Ready          | Fully support  | Fully support  | Fully support  | Letter from  | Fully support   |

|  |  |  |   |   |   |
|--|--|--|---|---|---|
|  | <p>execution of all operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for Net-Centric military operations to include 1) DISR mandated GIG IT standards and profiles identified in the TV-1, 2) DISR mandated GIG KIPs identified in the KIP declaration table, 3) NCOW RM Enterprise Services 4) Information assurance requirements including availability, integrity, authentication, confidentiality, and nonrepudiation, and issuance of</p> | <p>execution of all operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for Net-Centric military operations to include 1) DISR mandated GIG IT standards and profiles identified in the TV-1, 2) DISR mandated GIG KIPs identified in the KIP declaration table, 3) NCOW RM Enterprise Services 4) Information assurance requirements including availability, integrity, authentication, confidentiality, and nonrepudiation, and issuance of</p> | <p>execution of joint critical operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for transition to Net-Centric military operations to include 1) DISR mandated GIG IT standards and profiles identified in the TV-1, 2) DISR mandated GIG KIPs identified in the KIP declaration table, 3) NCOW RM Enterprise Services 4) Information assurance requirements including availability, integrity, authentication, confidentiality, and nonrepudiation, and</p> | <p>Joint Staff J6, dated October 30, 2007, grants interoperability and supportability certification of the Net Ready Key Performance Parameter Interoperability test certification by DISA Joint Interoperability Test Command is will conclude following on-orbit testing of MUOS Satellite #2</p> | <p>execution of joint critical operational activities identified in the applicable joint and system integrated architectures and the system must satisfy the technical requirements for transition to Net-Centric military operations to include 1) DISR mandated GIG IT standards and profiles identified in the TV-1, 2) DISR mandated GIG KIPs identified in the KIP declaration table, 3) NCOW RM Enterprise Services 4) Information assurance requirements including availability, integrity, authentication, confidentiality, and nonrepudiation, and</p> |
|--|--|--|---|---|---|

|                            |  |  |   |  |   |
|----------------------------|--|--|---|--|---|
|                            | an ATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and information assurance attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views | an ATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and information assurance attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views | issuance of an IATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and information assurance attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views |  | issuance of an IATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and information assurance attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views |
| Types of Service           | Support synchronous and asynchronous broadcast, point-to-point, and netted communications topologies plus support an asymmetrical multicast communications topology  | Threshold plus support an asymmetrical multicast communications topology   | Support synchronous and asynchronous broadcast, point-to-point, and netted communications topologies  | Demonstrated via Ground System test that both voice and data were communicated via broadcast, point-to-point and netted topologies | Support synchronous and asynchronous broadcast, point-to-point, and netted communications topologies  |
| Communications on the Move | Support communicat-  | Support communicat-  | Support communicat-   | Demonstrated via   | Support communica-  |

|              | ions on the move when and where needed in all environments while engaged in combat operations   | ions on the move when and where needed in all environments while engaged in combat operations   | ions on the move when and where needed in all environments while engaged in combat operations   | analysis that service requirements can be met in all required environments  | tions on the move when and where needed in all environments while engaged in combat operations  |
|--------------|---|---|---|---|---|
| Availability | Provide an operational link availability of at least 99% averaged over any year of operation and a constellation availability over the required length of service of at least 90% | Provide an operational link availability of at least 99% averaged over any year of operation and a constellation availability over the required length of service of at least 90% | Provide an operational link availability of at least 97% averaged over any year of operation and a constellation availability over the required length of service of at least 70% | Link availability was demonstrated via analysis and showed that all MUOS users will have at least 97% link availability averaged over a year. Constellation availability was demonstrated via analysis, with results showing that the probability of 4 operational satellites on orbit over the required length of service is 87% | Provide an operational link availability of at least 97% averaged over any year of operation and a constellation availability over the required length of service of at least 70% |

**Requirements Source**

Capability Production Document (CPD) dated January 15, 2008

**Change Explanations**

None

**Acronyms and Abbreviations**

ATO - Approval to Operate  
CMTW - Combined Major Theater War  
DAA - Designated Approval Authority  
DISA - Defense Information Systems Agency  
DISR - DOD Informational Technology Standards Region  
GIG - Global Information Grid  
IATO - Interim Approval to Operate  
IT - Information Technology  
KIPs - Key Interface Profiles  
KPP - Key Performance Parameter  
Mbps - megabits per second  
NCOW RM - Net-Centric Operations and Warfare Reference Model  
RAF - Radio Access Facility  
TV-1 - Technical View 1

### Track to Budget

**RDT&E**

| Appn | BA | PE |
|------|----|----|
|------|----|----|

Navy 1319 07 0303109N

| Project | Name |
|---------|------|
|---------|------|

2472 Satellite Communications (SPACE)/Mobile User Objective System (Shared)

**Procurement**

| Appn | BA | PE |
|------|----|----|
|------|----|----|

Navy 1507 02 0303109N

| Line Item | Name |
|-----------|------|
|-----------|------|

243300 Fleet Satellite Communications Follow-On

**MILCON**

| Appn | BA | PE |
|------|----|----|
|------|----|----|

Navy 1205 01 0301376N

| Project | Name |
|---------|------|
|---------|------|

P131 Facilities Restoration & Mod - Communication (Shared) (Sunk)

**Acq O&M**

| Appn | BA | PE |
|------|----|----|
|------|----|----|

Navy 1804 04 0303109N

| Project | Name |
|---------|------|
|---------|------|

6M Satellite Communications (SPACE) (Shared) (Sunk)



## Cost and Funding

### Cost Summary

#### Total Acquisition Cost and Quantity

| Appropriation  | BY2004 \$M            |  |                  | BY2004 \$M       | TY \$M                |                                  |                  |
|----------------|-----------------------|--|------------------|------------------|-----------------------|----------------------------------|------------------|
|                | SAR Baseline Prod Est | Current APB Production Objective/Threshold | Current Estimate | Current Estimate | SAR Baseline Prod Est | Current APB Production Objective | Current Estimate |
| RDT&E          | 3245.2                | 3684.0                                     | 4052.4           | 3751.2           | 3636.2                | 4138.2                           | 4270.7           |
| Procurement    | 2460.3                | 2354.2                                     | 2589.6           | 2323.2           | 3104.1                | 2896.3                           | 2932.9           |
| Flyaway        | --                    | --   | --               | 2323.2           | --                    | --                               | 2932.9           |
| Recurring      | --                    | --   | --               | 2323.2           | --                    | --                               | 2932.9           |
| Non Recurring  | --                    | --   | --               | 0.0              | --                    | --                               | 0.0              |
| Support        | --                    | --   | --               | 0.0              | --                    | --                               | 0.0              |
| Other Support  | --                    | --   | --               | 0.0              | --                    | --                               | 0.0              |
| Initial Spares | --                    | --   | --               | 0.0              | --                    | --                               | 0.0              |
| MILCON         | 30.7                  | 30.8                                       | 33.9             | 30.8             | 34.5                  | 34.6                             | 34.6             |
| Acq O&M        | 32.7                  | 25.2                                       | 27.7             | 25.2             | 35.8                  | 26.8                             | 26.8             |
| Total          | 5768.9                | 6094.2                                     | N/A              | 6130.4           | 6810.6                | 7095.9                           | 7265.0           |

Confidence Level for Current APB Cost 50% -

This cost estimate incorporates the 2011 Director, Cost Assessment and Program Evaluation (D,CAPE) Research, Development, Test and Evaluation (RDT&E) estimate (April 2011) which, like all CAPE estimates, carries a confidence level of 50%. The development estimate presented by the CAPE in April 2011, as a result of Acquisition Decision Memorandum (ADM) direction January 2011, like all life-cycle cost estimates previously performed by the CAPE, is built upon a product-oriented work breakdown structure, based on historical actual cost information to the maximum extent possible, and, most importantly, based on conservative assumptions that are consistent with actual demonstrated contractor and government performance for a series of acquisition programs in which the Department has been successful.

It is difficult to calculate mathematically the precise confidence levels associated with life-cycle cost estimates prepared for Major Defense Acquisition Programs (MDAPs). Based on the rigor in methods used in building estimates, the strong adherence to the collection and use of historical cost information, and the review of applied assumptions, we project that it is about equally likely that the estimate will prove too low or too high for execution of the program described. The program office's estimate for Procurement and Sustainment activities (December 2011), like the RDT&E estimate, was completed with a 50% confidence level.

| Quantity    | SAR Baseline<br>Prod Est | Current APB<br>Production | Current Estimate |
|-------------|--------------------------|---------------------------|------------------|
| RDT&E       | 2                        | 2                         | 2                |
| Procurement | 4                        | 4                         | 4                |
| Total       | 6                        | 6                         | 6                |

The units of measure for the MUOS program consist of six satellites, six launch vehicles, the entire ground system, and the associated support.

## Cost and Funding

### Funding Summary

#### Appropriation and Quantity Summary FY2015 President's Budget / December 2013 SAR (TY\$ M)

| Appropriation | Prior  | FY2014 | FY2015 | FY2016 | FY2017 | FY2018 | FY2019 | To Complete | Total  |
|---------------|--------|--------|--------|--------|--------|--------|--------|-------------|--------|
| RDT&E         | 3924.9 | 35.9   | 12.3   | 10.7   | 11.7   | 12.5   | 12.8   | 249.9       | 4270.7 |
| Procurement   | 1807.4 | 16.9   | 208.7  | 40.1   | 10.3   | 10.4   | 10.8   | 828.3       | 2932.9 |
| MILCON        | 34.6   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0         | 34.6   |
| Acq O&M       | 26.8   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0         | 26.8   |
| PB 2015 Total | 5793.7 | 52.8   | 221.0  | 50.8   | 22.0   | 22.9   | 23.6   | 1078.2      | 7265.0 |
| PB 2014 Total | 5819.9 | 59.0   | 261.5  | 48.1   | 17.8   | 17.8   | 26.9   | 882.8       | 7133.8 |
| Delta         | -26.2  | -6.2   | -40.5  | 2.7    | 4.2    | 5.1    | -3.3   | 195.4       | 131.2  |

| Quantity      | Undistributed | Prior | FY2014 | FY2015 | FY2016 | FY2017 | FY2018 | FY2019 | To Complete | Total |
|---------------|---------------|-------|--------|--------|--------|--------|--------|--------|-------------|-------|
| Development   | 2             | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0           | 2     |
| Production    | 0             | 3     | 0      | 0      | 0      | 0      | 0      | 0      | 1           | 4     |
| PB 2015 Total | 2             | 3     | 0      | 0      | 0      | 0      | 0      | 0      | 1           | 6     |
| PB 2014 Total | 2             | 3     | 0      | 0      | 0      | 0      | 0      | 0      | 1           | 6     |
| Delta         | 0             | 0     | 0      | 0      | 0      | 0      | 0      | 0      | 0           | 0     |

## Cost and Funding

### Annual Funding By Appropriation

#### Annual Funding TY\$

#### 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy

| Fiscal Year | Quantity | End Item Recurring Flyaway TY \$M | Non End Item Recurring Flyaway TY \$M | Non Recurring Flyaway TY \$M | Total Flyaway TY \$M | Total Support TY \$M | Total Program TY \$M |
|-------------|----------|-----------------------------------|---------------------------------------|------------------------------|----------------------|----------------------|----------------------|
| 2000        | --       | --                                | --                                    | --                           | --                   | --                   | 8.6                  |
| 2001        | --       | --                                | --                                    | --                           | --                   | --                   | 27.1                 |
| 2002        | --       | --                                | --                                    | --                           | --                   | --                   | 32.5                 |
| 2003        | --       | --                                | --                                    | --                           | --                   | --                   | 67.0                 |
| 2004        | --       | --                                | --                                    | --                           | --                   | --                   | 84.4                 |
| 2005        | --       | --                                | --                                    | --                           | --                   | --                   | 375.2                |
| 2006        | --       | --                                | --                                    | --                           | --                   | --                   | 449.5                |
| 2007        | --       | --                                | --                                    | --                           | --                   | --                   | 637.2                |
| 2008        | --       | --                                | --                                    | --                           | --                   | --                   | 591.3                |
| 2009        | --       | --                                | --                                    | --                           | --                   | --                   | 497.0                |
| 2010        | --       | --                                | --                                    | --                           | --                   | --                   | 398.3                |
| 2011        | --       | --                                | --                                    | --                           | --                   | --                   | 391.4                |
| 2012        | --       | --                                | --                                    | --                           | --                   | --                   | 224.2                |
| 2013        | --       | --                                | --                                    | --                           | --                   | --                   | 141.2                |
| 2014        | --       | --                                | --                                    | --                           | --                   | --                   | 35.9                 |
| 2015        | --       | --                                | --                                    | --                           | --                   | --                   | 12.3                 |
| 2016        | --       | --                                | --                                    | --                           | --                   | --                   | 10.7                 |
| 2017        | --       | --                                | --                                    | --                           | --                   | --                   | 11.7                 |
| 2018        | --       | --                                | --                                    | --                           | --                   | --                   | 12.5                 |
| 2019        | --       | --                                | --                                    | --                           | --                   | --                   | 12.8                 |
| 2020        | --       | --                                | --                                    | --                           | --                   | --                   | 40.1                 |
| 2021        | --       | --                                | --                                    | --                           | --                   | --                   | 98.5                 |
| 2022        | --       | --                                | --                                    | --                           | --                   | --                   | 20.1                 |
| 2023        | --       | --                                | --                                    | --                           | --                   | --                   | 20.4                 |
| 2024        | --       | --                                | --                                    | --                           | --                   | --                   | 20.8                 |
| 2025        | --       | --                                | --                                    | --                           | --                   | --                   | 21.2                 |

|                 |          |           |           |           |           |           |               |
|-----------------|----------|-----------|-----------|-----------|-----------|-----------|---------------|
| 2026            | --       | --        | --        | --        | --        | --        | 21.5          |
| 2027            | --       | --        | --        | --        | --        | --        | 7.3           |
| <b>Subtotal</b> | <b>2</b> | <b>--</b> | <b>--</b> | <b>--</b> | <b>--</b> | <b>--</b> | <b>4270.7</b> |

**Annual Funding BY\$**  
**1319 | RDT&E | Research, Development, Test, and Evaluation, Navy**

| Fiscal Year     | Quantity | End Item Recurring Flyaway BY 2004 \$M | Non End Item Recurring Flyaway BY 2004 \$M | Non Recurring Flyaway BY 2004 \$M | Total Flyaway BY 2004 \$M | Total Support BY 2004 \$M | Total Program BY 2004 \$M |
|-----------------|----------|--|--|-----------------------------------|---------------------------|---------------------------|---------------------------|
| 2000            | --       | --                                     | --   | --                                | --                        | --                        | 9.0                       |
| 2001            | --       | --                                     | --   | --                                | --                        | --                        | 28.0                      |
| 2002            | --       | --                                     | --   | --                                | --                        | --                        | 33.2                      |
| 2003            | --       | --                                     | --   | --                                | --                        | --                        | 67.5                      |
| 2004            | --       | --                                     | --   | --                                | --                        | --                        | 82.7                      |
| 2005            | --       | --                                     | --   | --                                | --                        | --                        | 358.3                     |
| 2006            | --       | --                                     | --   | --                                | --                        | --                        | 416.3                     |
| 2007            | --       | --                                     | --   | --                                | --                        | --                        | 576.0                     |
| 2008            | --       | --                                     | --   | --                                | --                        | --                        | 524.9                     |
| 2009            | --       | --                                     | --   | --                                | --                        | --                        | 435.6                     |
| 2010            | --       | --                                     | --   | --                                | --                        | --                        | 344.0                     |
| 2011            | --       | --                                     | --   | --                                | --                        | --                        | 329.9                     |
| 2012            | --       | --                                     | --   | --                                | --                        | --                        | 185.8                     |
| 2013            | --       | --                                     | --   | --                                | --                        | --                        | 115.2                     |
| 2014            | --       | --                                     | --   | --                                | --                        | --                        | 28.8                      |
| 2015            | --       | --                                     | --   | --                                | --                        | --                        | 9.7                       |
| 2016            | --       | --                                     | --   | --                                | --                        | --                        | 8.3                       |
| 2017            | --       | --                                     | --   | --                                | --                        | --                        | 8.9                       |
| 2018            | --       | --                                     | --   | --                                | --                        | --                        | 9.3                       |
| 2019            | --       | --                                     | --   | --                                | --                        | --                        | 9.3                       |
| 2020            | --       | --                                     | --   | --                                | --                        | --                        | 28.6                      |
| 2021            | --       | --                                     | --   | --                                | --                        | --                        | 68.9                      |
| 2022            | --       | --                                     | --   | --                                | --                        | --                        | 13.8                      |
| 2023            | --       | --                                     | --   | --                                | --                        | --                        | 13.7                      |
| 2024            | --       | --                                     | --   | --                                | --                        | --                        | 13.7                      |
| 2025            | --       | --                                     | --   | --                                | --                        | --                        | 13.7                      |
| 2026            | --       | --                                     | --   | --                                | --                        | --                        | 13.6                      |
| 2027            | --       | --                                     | --   | --                                | --                        | --                        | 4.5                       |
| <b>Subtotal</b> | <b>2</b> | --                                     | --   | --                                | --                        | --                        | <b>3751.2</b>             |

**Annual Funding TY\$**  
**1507 | Procurement | Weapons Procurement, Navy**

| <b>Fiscal Year</b> | <b>Quantity</b> | <b>End Item Recurring Flyaway TY \$M</b> | <b>Non End Item Recurring Flyaway TY \$M</b> | <b>Non Recurring Flyaway TY \$M</b> | <b>Total Flyaway TY \$M</b> | <b>Total Support TY \$M</b> | <b>Total Program TY \$M</b> |
|--------------------|-----------------|--|--|-------------------------------------|-----------------------------|-----------------------------|-----------------------------|
| 2008               | --              | 203.7                                    | --   | --                                  | 203.7                       | --                          | 203.7                       |
| 2009               | 1               | 339.5                                    | --   | --                                  | 339.5                       | --                          | 339.5                       |
| 2010               | 1               | 509.9                                    | --   | --                                  | 509.9                       | --                          | 509.9                       |
| 2011               | 1               | 494.7                                    | --   | --                                  | 494.7                       | --                          | 494.7                       |
| 2012               | --              | 238.2                                    | --   | --                                  | 238.2                       | --                          | 238.2                       |
| 2013               | --              | 21.4                                     | --   | --                                  | 21.4                        | --                          | 21.4                        |
| 2014               | --              | 16.9                                     | --   | --                                  | 16.9                        | --                          | 16.9                        |
| 2015               | --              | 208.7                                    | --   | --                                  | 208.7                       | --                          | 208.7                       |
| 2016               | --              | 40.1                                     | --   | --                                  | 40.1                        | --                          | 40.1                        |
| 2017               | --              | 10.3                                     | --   | --                                  | 10.3                        | --                          | 10.3                        |
| 2018               | --              | 10.4                                     | --   | --                                  | 10.4                        | --                          | 10.4                        |
| 2019               | --              | 10.8                                     | --   | --                                  | 10.8                        | --                          | 10.8                        |
| 2020               | --              | 10.4                                     | --   | --                                  | 10.4                        | --                          | 10.4                        |
| 2021               | --              | 65.9                                     | --   | --                                  | 65.9                        | --                          | 65.9                        |
| 2022               | 1               | 682.0                                    | --   | --                                  | 682.0                       | --                          | 682.0                       |
| 2023               | --              | 16.5                                     | --   | --                                  | 16.5                        | --                          | 16.5                        |
| 2024               | --              | 17.1                                     | --   | --                                  | 17.1                        | --                          | 17.1                        |
| 2025               | --              | 16.0                                     | --   | --                                  | 16.0                        | --                          | 16.0                        |
| 2026               | --              | 10.6                                     | --   | --                                  | 10.6                        | --                          | 10.6                        |
| 2027               | --              | 9.8                                      | --   | --                                  | 9.8                         | --                          | 9.8                         |
| <b>Subtotal</b>    | <b>4</b>        | <b>2932.9</b>                            | <b>--</b>                                    | <b>--</b>                           | <b>2932.9</b>               | <b>--</b>                   | <b>2932.9</b>               |

**Annual Funding BY\$**  
**1507 | Procurement | Weapons Procurement, Navy**

| <b>Fiscal Year</b> | <b>Quantity</b> | <b>End Item Recurring Flyaway BY 2004 \$M</b> | <b>Non End Item Recurring Flyaway BY 2004 \$M</b> | <b>Non Recurring Flyaway BY 2004 \$M</b> | <b>Total Flyaway BY 2004 \$M</b> | <b>Total Support BY 2004 \$M</b> | <b>Total Program BY 2004 \$M</b> |
|--------------------|-----------------|---|---|--|----------------------------------|----------------------------------|----------------------------------|
| 2008               | --              | 179.0   | --  | --                                       | 179.0                            | --                               | 179.0                            |
| 2009               | 1               | 294.1   | --  | --                                       | 294.1                            | --                               | 294.1                            |
| 2010               | 1               | 434.1   | --  | --                                       | 434.1                            | --                               | 434.1                            |
| 2011               | 1               | 413.0   | --  | --                                       | 413.0                            | --                               | 413.0                            |
| 2012               | --              | 195.7   | --  | --                                       | 195.7                            | --                               | 195.7                            |
| 2013               | --              | 17.3  | --  | --                                       | 17.3                             | --                               | 17.3                             |
| 2014               | --              | 13.4  | --  | --                                       | 13.4                             | --                               | 13.4                             |
| 2015               | --              | 162.6   | --  | --                                       | 162.6                            | --                               | 162.6                            |
| 2016               | --              | 30.6  | --  | --                                       | 30.6                             | --                               | 30.6                             |
| 2017               | --              | 7.7   | --  | --                                       | 7.7                              | --                               | 7.7                              |
| 2018               | --              | 7.6   | --  | --                                       | 7.6                              | --                               | 7.6                              |
| 2019               | --              | 7.8   | --  | --                                       | 7.8                              | --                               | 7.8                              |
| 2020               | --              | 7.3   | --  | --                                       | 7.3                              | --                               | 7.3                              |
| 2021               | --              | 45.6  | --  | --                                       | 45.6                             | --                               | 45.6                             |
| 2022               | 1               | 462.5   | --  | --                                       | 462.5                            | --                               | 462.5                            |
| 2023               | --              | 11.0  | --  | --                                       | 11.0                             | --                               | 11.0                             |
| 2024               | --              | 11.1  | --  | --                                       | 11.1                             | --                               | 11.1                             |
| 2025               | --              | 10.2  | --  | --                                       | 10.2                             | --                               | 10.2                             |
| 2026               | --              | 6.6   | --  | --                                       | 6.6                              | --                               | 6.6                              |
| 2027               | --              | 6.0   | --  | --                                       | 6.0                              | --                               | 6.0                              |
| <b>Subtotal</b>    | <b>4</b>        | <b>2323.2</b>                                 | <b>--</b>   | <b>--</b>                                | <b>2323.2</b>                    | <b>--</b>                        | <b>2323.2</b>                    |



**Cost Quantity Information**  
**1507 | Procurement | Weapons Procurement, Navy**

| Fiscal Year     | Quantity | End Item Recurring Flyaway (Aligned with Quantity) BY 2004 \$M |
|-----------------|----------|--|
| 2008            | --       | --   |
| 2009            | 1        | 446.4  |
| 2010            | 1        | 433.2  |
| 2011            | 1        | 437.0  |
| 2012            | --       | --   |
| 2013            | --       | --   |
| 2014            | --       | --   |
| 2015            | --       | --   |
| 2016            | --       | --   |
| 2017            | --       | --   |
| 2018            | --       | --   |
| 2019            | --       | --   |
| 2020            | --       | --   |
| 2021            | --       | --   |
| 2022            | 1        | 1006.6   |
| 2023            | --       | --   |
| 2024            | --       | --   |
| 2025            | --       | --   |
| 2026            | --       | --   |
| 2027            | --       | --   |
| <b>Subtotal</b> | <b>4</b> | <b>2323.2</b>  |

**Annual Funding TY\$**  
**1205 | MILCON | Military Construction,**  
**Navy and Marine Corps**

| <b>Fiscal Year</b> | <b>Total Program TY \$M</b> |
|--------------------|-----------------------------|
| 2007               | 26.1                        |
| 2008               | 8.5                         |
| <b>Subtotal</b>    | <b>34.6</b>                 |

**Annual Funding BY\$**  
**1205 | MILCON | Military Construction,**  
**Navy and Marine Corps**

| <b>Fiscal Year</b> | <b>Total Program BY 2004 \$M</b> |
|--------------------|----------------------------------|
| 2007               | 23.3                             |
| 2008               | 7.5                              |
| <b>Subtotal</b>    | <b>30.8</b>                      |

**Annual Funding TY\$**  
**1804 | Acq O&M | Operation and**  
**Maintenance, Navy**

| <b>Fiscal Year</b> | <b>Total Program TY \$M</b> |
|--------------------|-----------------------------|
| 2002               | 4.2                         |
| 2003               | 4.6                         |
| 2004               | 4.5                         |
| 2005               | --                          |
| 2006               | --                          |
| 2007               | --                          |
| 2008               | 4.6                         |
| 2009               | 5.0                         |
| 2010               | 3.9                         |
| <b>Subtotal</b>    | <b>26.8</b>                 |

**Annual Funding BY\$**  
**1804 | Acq O&M | Operation and**  
**Maintenance, Navy**

| Fiscal Year     | Total Program BY 2004 \$M |
|-----------------|---------------------------|
| 2002            | 4.3                       |
| 2003            | 4.6                       |
| 2004            | 4.4                       |
| 2005            | --                        |
| 2006            | --                        |
| 2007            | --                        |
| 2008            | 4.1                       |
| 2009            | 4.4                       |
| 2010            | 3.4                       |
| <b>Subtotal</b> | <b>25.2</b>               |

## Low Rate Initial Production

There is no LRIP for this program.

## **Foreign Military Sales**

None

## **Nuclear Costs**

None

## Unit Cost

### Unit Cost Report

|           | BY2004 \$M                                | BY2004 \$M                         |                |
|-----------|---|------------------------------------|----------------|
| Unit Cost | Current UCR<br>Baseline<br>(JUL 2012 APB) | Current Estimate<br>(DEC 2013 SAR) | BY<br>% Change |

#### Program Acquisition Unit Cost (PAUC)

|           |          |          |       |
|-----------|----------|----------|-------|
| Cost      | 6094.2   | 6130.4   |       |
| Quantity  | 6        | 6        |       |
| Unit Cost | 1015.700 | 1021.733 | +0.59 |

#### Average Procurement Unit Cost (APUC)

|           |         |         |       |
|-----------|---------|---------|-------|
| Cost      | 2354.2  | 2323.2  |       |
| Quantity  | 4       | 4       |       |
| Unit Cost | 588.550 | 580.800 | -1.32 |

|           | BY2004 \$M                                 | BY2004 \$M                         |                |
|-----------|--|------------------------------------|----------------|
| Unit Cost | Original UCR<br>Baseline<br>(DEC 2004 APB) | Current Estimate<br>(DEC 2013 SAR) | BY<br>% Change |

#### Program Acquisition Unit Cost (PAUC)

|           |         |          |       |
|-----------|---------|----------|-------|
| Cost      | 5738.0  | 6130.4   |       |
| Quantity  | 6       | 6        |       |
| Unit Cost | 956.333 | 1021.733 | +6.84 |

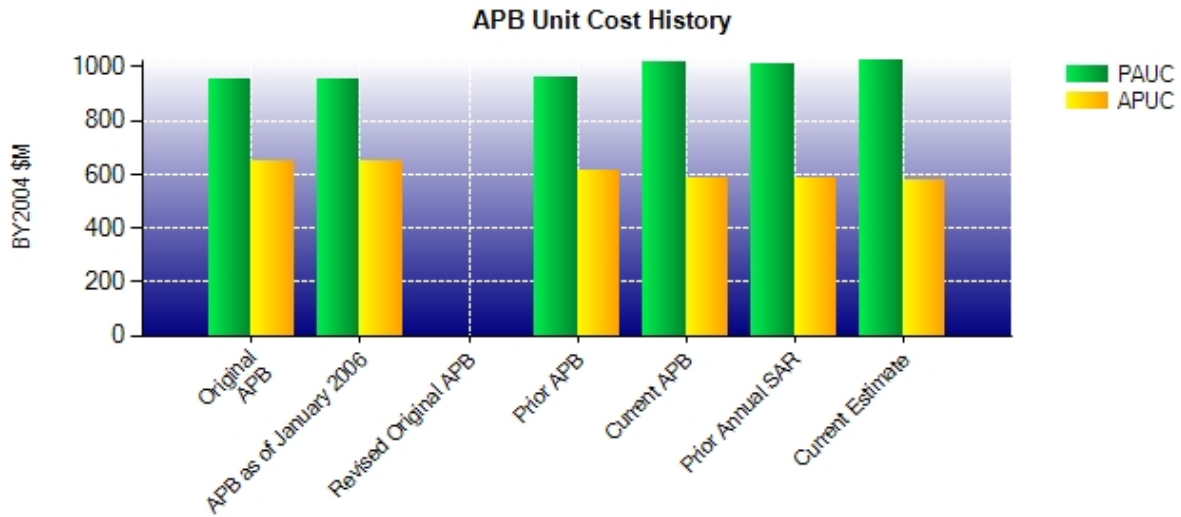
#### Average Procurement Unit Cost (APUC)

|           |         |         |        |
|-----------|---------|---------|--------|
| Cost      | 2591.0  | 2323.2  |        |
| Quantity  | 4       | 4       |        |
| Unit Cost | 647.750 | 580.800 | -10.34 |

PAUC reflects the sum of six satellites, six launch vehicles, the entire ground segment, and the associated support, divided by the total quantity of six. APUC reflects the sum of four satellites and six launch vehicles, divided by a procurement quantity of four.



### Unit Cost History



|                               | Date     | BY2004 \$M |         | TY \$M   |         |
|-------------------------------|----------|------------|---------|----------|---------|
|                               |          | PAUC       | APUC    | PAUC     | APUC    |
| <b>Original APB</b>           | DEC 2004 | 956.333    | 647.750 | 1080.183 | 776.025 |
| <b>APB as of January 2006</b> | DEC 2004 | 956.333    | 647.750 | 1080.183 | 776.025 |
| <b>Revised Original APB</b>   | N/A      | N/A        | N/A     | N/A      | N/A     |
| <b>Prior APB</b>              | MAR 2008 | 961.483    | 615.075 | 1135.100 | 776.025 |
| <b>Current APB</b>            | JUL 2012 | 1015.700   | 588.550 | 1182.650 | 724.075 |
| <b>Prior Annual SAR</b>       | DEC 2012 | 1007.600   | 581.875 | 1188.967 | 733.075 |
| <b>Current Estimate</b>       | DEC 2013 | 1021.733   | 580.800 | 1210.833 | 733.225 |

### SAR Unit Cost History

#### Initial SAR Baseline to Current SAR Baseline (TY \$M)

| Initial PAUC<br>Dev Est | Changes |       |       |       |       |       |       |        | PAUC<br>Prod Est |
|-------------------------|---------|-------|-------|-------|-------|-------|-------|--------|------------------|
|                         | Econ    | Qty   | Sch   | Eng   | Est   | Oth   | Spt   | Total  |                  |
| 1080.183                | 49.000  | 0.000 | 2.750 | 0.000 | 3.167 | 0.000 | 0.000 | 54.917 | 1135.100         |

#### Current SAR Baseline to Current Estimate (TY \$M)

| PAUC<br>Prod Est | Changes |       |       |        |        |       |       |        | PAUC<br>Current Est |
|------------------|---------|-------|-------|--------|--------|-------|-------|--------|---------------------|
|                  | Econ    | Qty   | Sch   | Eng    | Est    | Oth   | Spt   | Total  |                     |
| 1135.100         | -12.117 | 0.000 | 4.550 | 33.450 | 49.850 | 0.000 | 0.000 | 75.733 | 1210.833            |

## Initial SAR Baseline to Current SAR Baseline (TY \$M)

| Initial APUC<br>Dev Est | Changes |       |       |       |         |       |       |       | APUC<br>Prod Est |
|-------------------------|---------|-------|-------|-------|---------|-------|-------|-------|------------------|
|                         | Econ    | Qty   | Sch   | Eng   | Est     | Oth   | Spt   | Total |                  |
| 776.025                 | 39.100  | 0.000 | 4.125 | 0.000 | -43.225 | 0.000 | 0.000 | 0.000 | 776.025          |

## Current SAR Baseline to Current Estimate (TY \$M)

| APUC<br>Prod Est | Changes |       |       |       |         |       |       |         | APUC<br>Current Est |
|------------------|---------|-------|-------|-------|---------|-------|-------|---------|---------------------|
|                  | Econ    | Qty   | Sch   | Eng   | Est     | Oth   | Spt   | Total   |                     |
| 776.025          | -16.150 | 0.000 | 6.825 | 0.000 | -33.475 | 0.000 | 0.000 | -42.800 | 733.225             |

## SAR Baseline History

| Item/Event                  | SAR<br>Planning<br>Estimate (PE) | SAR<br>Development<br>Estimate (DE) | SAR<br>Production<br>Estimate (PdE) | Current<br>Estimate |
|-----------------------------|----------------------------------|-------------------------------------|-------------------------------------|---------------------|
| Milestone A                 | N/A                              | N/A                                 | N/A                                 | N/A                 |
| Milestone B                 | N/A                              | SEP 2004                            | SEP 2004                            | SEP 2004            |
| Milestone C                 | N/A                              | OCT 2006                            | OCT 2006                            | AUG 2006            |
| IOC                         | N/A                              | N/A                                 | N/A                                 | N/A                 |
| Total Cost (TY \$M)         | N/A                              | 6481.1                              | 6810.6                              | 7265.0              |
| Total Quantity              | N/A                              | 6                                   | 6                                   | 6                   |
| Prog. Acq. Unit Cost (PAUC) | N/A                              | 1080.183                            | 1135.100                            | 1210.833            |

Milestone (MS) B and C dates reflect National Security Space Acquisition Policy 03-01 dates for Key Decision Point B and C, not MS B and C as specified in DoD 5000.

IOC is synonymous with the term On-Orbit Capability, which is referenced by the MUOS Program.

**Cost Variance**

| <b>Summary Then Year \$M</b> |                  |             |               |                    |              |
|------------------------------|------------------|-------------|---------------|--------------------|--------------|
|                              | <b>RDT&amp;E</b> | <b>Proc</b> | <b>MILCON</b> | <b>Acq O&amp;M</b> | <b>Total</b> |
| SAR Baseline (Prod Est)      | 3636.2           | 3104.1      | 34.5          | 35.8               | 6810.6       |
| Previous Changes             |                  |             |               |                    |              |
| Economic                     | -4.3             | -52.4       | +0.1          | +0.1               | -56.5        |
| Quantity                     | --               | --          | --            | --                 | --           |
| Schedule                     | --               | +7.0        | --            | --                 | +7.0         |
| Engineering                  | +41.0            | --          | --            | --                 | +41.0        |
| Estimating                   | +467.2           | -126.4      | --            | -9.1               | +331.7       |
| Other                        | --               | --          | --            | --                 | --           |
| Support                      | --               | --          | --            | --                 | --           |
| Subtotal                     | +503.9           | -171.8      | +0.1          | -9.0               | +323.2       |
| Current Changes              |                  |             |               |                    |              |
| Economic                     | -4.0             | -12.2       | --            | --                 | -16.2        |
| Quantity                     | --               | --          | --            | --                 | --           |
| Schedule                     | --               | +20.3       | --            | --                 | +20.3        |
| Engineering                  | +159.7           | --          | --            | --                 | +159.7       |
| Estimating                   | -25.1            | -7.5        | --            | --                 | -32.6        |
| Other                        | --               | --          | --            | --                 | --           |
| Support                      | --               | --          | --            | --                 | --           |
| Subtotal                     | +130.6           | +0.6        | --            | --                 | +131.2       |
| Total Changes                | +634.5           | -171.2      | +0.1          | -9.0               | +454.4       |
| CE - Cost Variance           | 4270.7           | 2932.9      | 34.6          | 26.8               | 7265.0       |
| CE - Cost & Funding          | 4270.7           | 2932.9      | 34.6          | 26.8               | 7265.0       |

| Summary Base Year 2004 \$M |        |        |        |         |        |
|----------------------------|--------|--------|--------|---------|--------|
|                            | RDT&E  | Proc   | MILCON | Acq O&M | Total  |
| SAR Baseline (Prod Est)    | 3245.2 | 2460.3 | 30.7   | 32.7    | 5768.9 |
| Previous Changes           |        |        |        |         |        |
| Economic                   | --     | --     | --     | --      | --     |
| Quantity                   | --     | --     | --     | --      | --     |
| Schedule                   | --     | +2.5   | --     | --      | +2.5   |
| Engineering                | +31.5  | --     | --     | --      | +31.5  |
| Estimating                 | +385.4 | -135.3 | +0.1   | -7.5    | +242.7 |
| Other                      | --     | --     | --     | --      | --     |
| Support                    | --     | --     | --     | --      | --     |
| Subtotal                   | +416.9 | -132.8 | +0.1   | -7.5    | +276.7 |
| Current Changes            |        |        |        |         |        |
| Economic                   | --     | --     | --     | --      | --     |
| Quantity                   | --     | --     | --     | --      | --     |
| Schedule                   | --     | --     | --     | --      | --     |
| Engineering                | +108.7 | --     | --     | --      | +108.7 |
| Estimating                 | -19.6  | -4.3   | --     | --      | -23.9  |
| Other                      | --     | --     | --     | --      | --     |
| Support                    | --     | --     | --     | --      | --     |
| Subtotal                   | +89.1  | -4.3   | --     | --      | +84.8  |
| Total Changes              | +506.0 | -137.1 | +0.1   | -7.5    | +361.5 |
| CE - Cost Variance         | 3751.2 | 2323.2 | 30.8   | 25.2    | 6130.4 |
| CE - Cost & Funding        | 3751.2 | 2323.2 | 30.8   | 25.2    | 6130.4 |

Previous Estimate: December 2012

| <b>RDT&amp;E</b>  | <b>\$M</b>       |                  |
|---|------------------|------------------|
| <b>Current Change Explanations</b>                                  | <b>Base Year</b> | <b>Then Year</b> |
| Revised escalation indices. (Economic)                              | N/A              | -4.0             |
| Adjustment for current and prior escalation. (Estimating)           | +2.7             | +3.3             |
| Increased Information Assurance Requirements. (Engineering)         | +108.7           | +159.7           |
| Revised estimate for miscellaneous budget adjustments. (Estimating) | -22.3            | -28.4            |
| <b>RDT&amp;E Subtotal</b>   | <b>+89.1</b>     | <b>+130.6</b>    |

| <b>Procurement</b>   | <b>\$M</b>       |                  |
|--|------------------|------------------|
| <b>Current Change Explanations</b>   | <b>Base Year</b> | <b>Then Year</b> |
| Revised escalation indices. (Economic)   | N/A              | -12.2            |
| Adjustment for current and prior escalation. (Estimating)  | +4.5             | +5.3             |
| Stretch out of Procurement buy profile from FY 2021 to FY 2022 for the 6th Satellite due to program development delays. (Schedule) | 0.0              | +20.3            |
| Revised estimate for miscellaneous budget adjustments. (Estimating)  | -8.8             | -12.8            |
| <b>Procurement Subtotal</b>  | <b>-4.3</b>      | <b>+0.6</b>      |

**Contracts**

**Appropriation: RDT&E**

Contract Name **MUOS RRDD AOS Contract - Contract Line Item Number (CLIN) 1**  
 Contractor Lockheed Martin (LMSSC)  
 Contractor Location 1111 Lockheed Martin Way  
 Sunnyvale, CA 94089-1212  
 Contract Number, Type N00039-04-C-2009, CPAF/CPIF  
 Award Date September 24, 2004  
 Definitization Date September 24, 2004

| Initial Contract Price (\$M) |         |     | Current Contract Price (\$M) |         |     | Estimated Price at Completion (\$M) |                 |
|------------------------------|---------|-----|------------------------------|---------|-----|-------------------------------------|-----------------|
| Target                       | Ceiling | Qty | Target                       | Ceiling | Qty | Contractor                          | Program Manager |
| 2097.9                       | N/A     | 2   | 2280.1                       | N/A     | 2   | 3462.9                              | 3474.1          |

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the incorporation of the Secure Communications Engineering Change Proposal (ECP), and the Enhanced Digital Receiver Unit ECP.

| Variance                                  | Cost Variance | Schedule Variance |
|---|---------------|-------------------|
| Cumulative Variances To Date (11/24/2013) | -372.0        | -0.9              |
| Previous Cumulative Variances             | -292.3        | -11.8             |
| Net Change                                | -79.7         | +10.9             |

**Cost and Schedule Variance Explanations**

The unfavorable net change in the cost variance is due to technical issues primarily in the Ground Segment and Satellite Assembly, Integration, and Test Segment. MUOS-2 experienced cost inefficiencies as a result of issues with Single Line Flow testing. The inefficiencies resulted in schedule delays which have driven the overall extension of the Contract Line Item Number (CLIN) 0001 Period of Performance.

The favorable net change in the schedule variance is due to successful Launch, On-Orbit Testing, and On-Orbit System Validation for MUOS-2. Subsequently, handover of MUOS-2 from the contractor to the Government completed on November 15, 2013.

**General Contract Variance Explanation**

The CLIN is more than 90% complete, and handover of the satellites (quantity of two) to the government has occurred. The final Contract Performance Report for this CLIN was submitted November 24, 2013.

**Contract Comments**

This contract is more than 90% complete; therefore, this is the final report for this contract.

The difference between the Contract Price and both the Contractor's Estimated Price at Completion, and the Program Manager's Price at Completion, is driven by adjustments made for Over Target Baseline (OTB) #1 and OTB #2.

**Appropriation: Procurement**

Contract Name **MUOS RRDD AOS Contract - Contract Line Item Number (CLIN) 3**  
 Contractor Lockheed Martin (LMSSC)  
 Contractor Location 1111 Lockheed Martin Way  
 Sunnyvale, CA 94089-1212  
 Contract Number, Type N00039-04-C-2009/3, FPIF  
 Award Date September 24, 2004  
 Definitization Date September 24, 2004

| Initial Contract Price (\$M) |         |     | Current Contract Price (\$M) |         |     | Estimated Price at Completion (\$M) |                 |
|------------------------------|---------|-----|------------------------------|---------|-----|-------------------------------------|-----------------|
| Target                       | Ceiling | Qty | Target                       | Ceiling | Qty | Contractor                          | Program Manager |
| 279.0                        | 298.5   | 1   | 282.5                        | 332.5   | 1   | 332.6                               | 332.5           |

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the inclusion of a contract Engineering Change Proposal.

| Variance                                 | Cost Variance | Schedule Variance |
|--|---------------|-------------------|
| Cumulative Variances To Date (1/26/2014) | -5.5          | -27.6             |
| Previous Cumulative Variances            | +3.6          | -15.1             |
| Net Change                               | -9.1          | -12.5             |

**Cost and Schedule Variance Explanations**

The unfavorable net change in the cost variance is due to post-mate testing inefficiencies realized in Satellite Assembly, Integration, and Test Segment for the 3rd Satellite Output Multiplexer (OMUX).

The unfavorable net change in the schedule variance is due to a result of the 3rd Satellite OMUX issue investigation and on-going resolution. The 3rd Satellite OMUX issues have resulted in the delayed launch and handover to the Navy.

**Contract Comments**

This contract is more than 90% complete; therefore, this is the final report for this contract.

Although this CLIN is more than 90% complete, we will continue to report in the SAR until the full quantity (one satellite) has been delivered to the Government.

The Program Manager's Estimated Price at Completion is equal to the current Contract Ceiling Price.

**Appropriation: Procurement**

Contract Name **MUOS RRDD AOS Contract – Contract Line Item Number (CLIN) 5**  
 Contractor Lockheed Martin (LMSSC)  
 Contractor Location 1111 Lockheed Martin Way  
 Sunnyvale, CA 94089-1212  
 Contract Number, Type N00039-04-C-2009/5, FPIF  
 Award Date September 24, 2004  
 Definitization Date September 24, 2004

| Initial Contract Price (\$M) |         |     | Current Contract Price (\$M) |         |     | Estimated Price at Completion (\$M) |                 |
|------------------------------|---------|-----|------------------------------|---------|-----|-------------------------------------|-----------------|
| Target                       | Ceiling | Qty | Target                       | Ceiling | Qty | Contractor                          | Program Manager |
| 287.7                        | 307.7   | 1   | 277.8                        | 324.7   | 1   | 325.2                               | 324.7           |

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the change in methodology to align the target price to the Contract Performance Report data reported by the Prime Contractor, which excludes \$9.9M Mission Success Fee. In previous SAR submissions, the Mission Success Fee was included in the target price. In accordance with guidance, the Original Target Price remains unchanged, and continues to include the \$9.9M of Fee.

| Variance                                 | Cost Variance | Schedule Variance |
|--|---------------|-------------------|
| Cumulative Variances To Date (1/26/2014) | +26.1         | -12.3             |
| Previous Cumulative Variances            | +25.0         | -11.7             |
| Net Change                               | +1.1          | -0.6              |

**Cost and Schedule Variance Explanations**

The favorable net change in the cost variance is due to cost efficiencies in the Program Management and Payload Segments. The favorable net change is also attributable to labor rates and efficiencies realized as a result of having multiple spacecraft in production.

The unfavorable net change in the schedule variance is due to the delayed shipment of the System Module. Single Line Flow assembly, integration, and test activities were delayed, resulting in the late start of Launch Base and Systems Engineering and Integration Team launch preparation tasks.

**Contract Comments**

The Program Manager’s Estimated Price at Completion is equal to the current Contract Ceiling Price.



**Appropriation: Procurement**

Contract Name **MUOS RRDD AOS Contract – Contract Line Item Number (CLIN) 7**  
 Contractor Lockheed Martin (LMSSC)  
 Contractor Location 1111 Lockheed Martin Way  
 Sunnyvale, CA 94089-1212  
 Contract Number, Type N00039-04-C-2009/7, FPIF  
 Award Date September 24, 2004  
 Definitization Date September 24, 2004

| Initial Contract Price (\$M) |         |     | Current Contract Price (\$M) |         |     | Estimated Price at Completion (\$M) |                 |
|------------------------------|---------|-----|------------------------------|---------|-----|-------------------------------------|-----------------|
| Target                       | Ceiling | Qty | Target                       | Ceiling | Qty | Contractor                          | Program Manager |
| 288.5                        | 339.6   | 1   | 288.5                        | 339.6   | 1   | 327.5                               | 339.6           |

| Variance                                 | Cost Variance | Schedule Variance |
|--|---------------|-------------------|
| Cumulative Variances To Date (1/26/2014) | +24.1         | -9.3              |
| Previous Cumulative Variances            | +18.7         | -3.7              |
| Net Change                               | +5.4          | -5.6              |

**Cost and Schedule Variance Explanations**

The favorable net change in the cost variance is due to labor efficiencies experienced in Legacy Subsystem, Base to User, Program Management, and Space Segment Engineering.

The unfavorable net change in the schedule variance is due to the delayed start of Single Line Flow, delayed manufacturing of trim tabs and thermal blankets, and the late completion of antenna diplex feeds.

**Contract Comments**

The Program Manager's Estimated Price at Completion is equal to the current Contract Ceiling Price.

## Deliveries and Expenditures

| Delivered to Date                | Plan to Date | Actual to Date | Total Quantity | Percent Delivered |
|----------------------------------|--------------|----------------|----------------|-------------------|
| Development                      | 2            | 2              | 2              | 100.00%           |
| Production                       | 0            | 0              | 4              | 0.00%             |
| Total Program Quantity Delivered | 2            | 2              | 6              | 33.33%            |

### Expended and Appropriated (TY \$M)

|                        |        |                            |        |
|------------------------|--------|----------------------------|--------|
| Total Acquisition Cost | 7265.0 | Years Appropriated         | 15     |
| Expended to Date       | 5231.0 | Percent Years Appropriated | 53.57% |
| Percent Expended       | 72.00% | Appropriated to Date       | 5846.5 |
| Total Funding Years    | 28     | Percent Appropriated       | 80.47% |

The above data is current as of 2/28/2014.

## Operating and Support Cost

### MUOS

#### Assumptions and Ground Rules

##### Cost Estimate Reference:

Current program office estimate reviewed with the Office of the Secretary of Defense, Cost Assessment and Program Evaluation, December 2012, based on the approved Logistics Requirements Funding Summary (LRFS) dated November 8, 2012.

##### Sustainment Strategy:

The MUOS constellation consists of five satellites, four operational and one on-orbit spare. In addition, the APB includes procurement of a sixth satellite to replace the first satellite at end-of-life. MUOS O&S costs include sustainment of all satellites and four ground sites located in Wahiawa (Hawaii), Chesapeake (Virginia), Niscemi (Italy), and Geraldton (Australia).

##### Antecedent Information:

The antecedent system to MUOS was the Ultra High Frequency (UHF) Follow-on (UFO) satellite communications program. Comparisons of O&S costs for UFO are not provided. Although the MUOS system continues to support UHF capabilities, the infrastructure of MUOS and its sustainment are not comparable to UFO.

| Unitized O&S Costs BY2004 \$M  |                                     |   |       |
|--------------------------------|-------------------------------------|---|-------|
| Cost Element                   | MUOS<br>Cost Per Satellite Per Year | UFO (Antecedent)<br>Cost Per Satellite Per Year |       |
| Unit-Level Manpower            | 0.000                               |   | 0.000 |
| Unit Operations                | 0.000                               |   | 0.000 |
| Maintenance                    | 0.463                               |   | 0.000 |
| Sustaining Support             | 3.158                               |   | 0.000 |
| Continuing System Improvements | 0.000                               |   | 0.000 |
| Indirect Support               | 0.178                               |   | 0.000 |
| Other                          | 0.000                               |   | 0.000 |
| Total                          | 3.799                               |   | --    |

##### Unitized Cost Comments:

O&S costs include maintenance and sustainment of the entire MUOS system, including the space and ground segments. The unitized annual costs reflect the total O&S cost divided by six satellites and 17 years (FY 2011 - FY 2027).

|                  | Total O&S Cost \$M                            |       |                  |                  |
|------------------|---|-------|------------------|------------------|
|                  | Current Production APB<br>Objective/Threshold |       | Current Estimate |                  |
|                  | MUOS  |       | MUOS             | UFO (Antecedent) |
| <b>Base Year</b> | 379.9   | 417.9 | 387.5            | N/A              |
| <b>Then Year</b> | 508.2   | N/A   | 535.9            | N/A              |

Total O&S Costs Comments:

The total O&S estimate increased from \$368.4M BY 2004 in the 2012 SAR to \$387.5M BY 2004 in the 2013 SAR due to the addition of FY 2027 in the sustainment strategy.

| <b>O&amp;S Cost Variance</b>                  |                               |  |
|---|-------------------------------|--|
| <b>Category</b>                               | <b>Base Year<br/>2004 \$M</b> | <b>Change Explanation</b>                      |
| Prior SAR Total O&S Estimate<br>December 2012 | 368.340                       |  |
| Cost Estimating Methodology                   | 0.000                         |  |
| Cost Data Update                              | 0.000                         |  |
| Labor Rate                                    | 0.000                         |  |
| Energy Rate                                   | 0.000                         |  |
| Technical Input                               | 0.000                         |  |
| Programmatic/Planning Factors                 | +19.213                       | Due to the extension of operations to FY 2027. |
| Other   | 0.000                         |  |
| Total Changes                                 | +19.213                       |  |
| Current Estimate                              | 387.553                       |  |

**Disposal Costs:**

Disposal costs are excluded from the O&S estimate. Satellites will be disposed on-orbit using on-board fuel paid for during the procurement phase of the program.