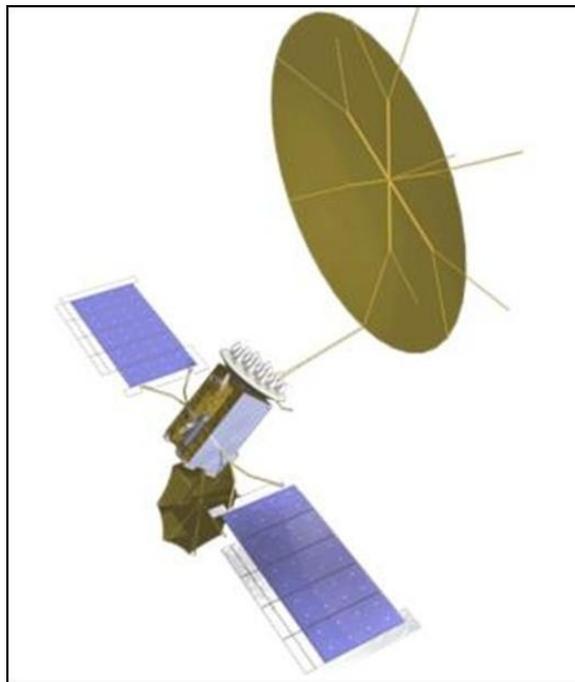




Selected Acquisition Report (SAR)

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



Mobile User Objective System (MUOS)

As of FY 2016 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

Common Acronyms and Abbreviations for MDAP Programs	3
Program Information	5
Responsible Office	5
References	5
Mission and Description	6
Executive Summary	7
Threshold Breaches	8
Schedule	9
Performance	11
Track to Budget	15
Cost and Funding	16
Low Rate Initial Production	28
Foreign Military Sales	29
Nuclear Costs	29
Unit Cost	30
Cost Variance	33
Contracts	36
Deliveries and Expenditures	40
Operating and Support Cost	41

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
\$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
\$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
\$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

Program Information

Program Name

Mobile User Objective System (MUOS)

DoD Component

Navy

Responsible Office

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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 continues to successfully complete significant program milestones. MUOS-1 and MUOS-2 are providing reliable ultra-high frequency satellite communications capability to the warfighter. The MUOS-2 Legacy payload was accepted for early operational use by the U. S. Strategic Command and was placed into operations on July 31, 2014. The third satellite, MUOS-3, was successfully launched on January 20, 2015, and is in geosynchronous transfer orbit for on-orbit checkout and test by the contractor prior to delivery to the Navy for acceptance and additional test. The MUOS Waveform engineering version of 3.1.3 was posted to the Joint Tactical Network Information Repository on July 15, 2014 and is available to the radio development community.

USD(AT&L) issued an ADM on May 1, 2012, that directed the Navy assume responsibility for integration of the MUOS End-to-End (E2E) Capability. The E2E Strategy of conducting a series of Risk Reduction (RR) integration and test events was initiated in 2013. The final risk reduction events conducting laboratory and reliability testing are delayed. During a March 7, 2014, Program Management Review, the call reliability/completion rate of the E2E system of systems was assessed as "not sufficient" due to frequent terminal out-of-service events, high block error rates, and other related issues. As a result, contractor efforts are focused on conducting root cause analysis to determine the driving factors behind call reliability performance issues before resuming RR testing. Detailed integration plans were developed to isolate and address E2E issues in a ten-step process that included progressive capability assessments. The MUOS program is on track to perform Multi-Service Operational Test and Evaluation in November 2015.

MUOS-4 and MUOS-5 are satellites in various stages of production that are being procured via Fixed Price contract line items. Satellite deliveries are projected to meet the MUOS APB milestones "4th Satellite Ready to Ship" and "5th Satellite Ready to Ship" Threshold dates. These satellite deliveries have positive ready to ship margin to the launch dates assigned by the Air Force Current Launch Schedule Review Board. Full funding for Launch Vehicle #5 was received at the beginning of FY 2015, and procurement of the launch vehicle is in progress.

Production-related work for all MUOS ground sites was completed in December 2014. Niscemi site handover to Navy Information Dominance Forces is projected to be complete prior to June 2015.

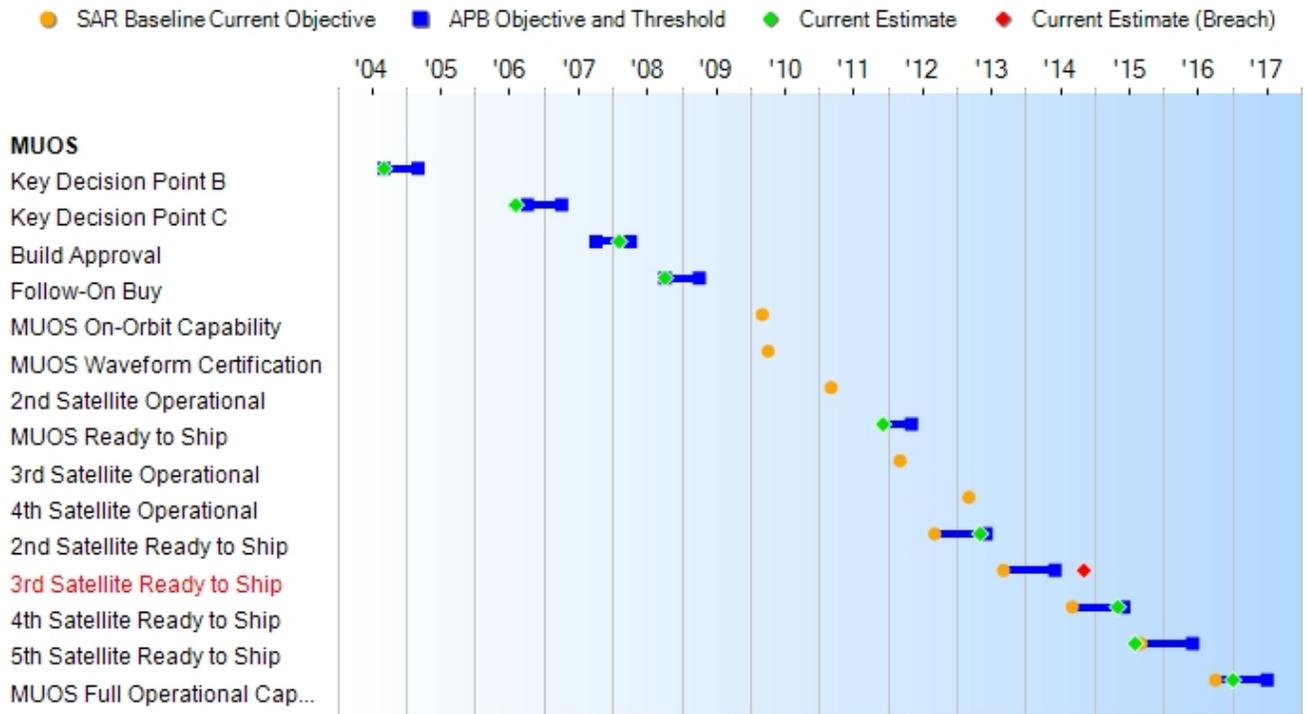
There are no significant software-related issues with this program at this time.

Threshold Breaches

APB Breaches		Explanation of Breach
Schedule	<input checked="" type="checkbox"/>	The schedule breach was previously reported in the December 2013 SAR.
Performance	<input type="checkbox"/>	
Cost	RDT&E	A Program Deviation Report (PDR) was signed by the PM on December 4, 2013, and was submitted to USD(AT&L) on January 21, 2014.
	Procurement	
	MILCON	
	Acq O&M	
O&S Cost	<input type="checkbox"/>	A PDR follow-up regarding the resequencing of CLINs to support Ready to Ship milestones was documented in a September 19, 2014 memorandum to USD(AT&L) signed by Assistant Secretary of the Navy (Research, Development and Acquisition).
Unit Cost	PAUC	
	APUC	

Nunn-McCurdy Breaches	
Current UCR Baseline	
PAUC	None
APUC	None
Original UCR Baseline	
PAUC	None
APUC	None

Schedule



Schedule Events				
Events	SAR Baseline Production Estimate	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	Nov 2014 ¹ (Ch-1)
4th Satellite Ready to Ship	N/A	Sep 2014	Jun 2015	May 2015 (Ch-2)
5th Satellite Ready to Ship	N/A	Sep 2015	Jun 2016	Aug 2015 (Ch-3)
MUOS Full Operational Capability	Mar 2014	Oct 2016	Jul 2017	Jan 2017

¹ APB Breach

Change Explanations

(Ch-1) The schedule breach for "3rd Satellite Ready to Ship" milestone was previously reported in the December 2013 SAR. The Current Estimate changed from October 2014 to November 2014. The "3rd Satellite Ready to Ship" milestone was met when the satellite was shipped in November 2014 and subsequently launched in January 2015.

(Ch-2) The current estimate for "4th Satellite Ready to Ship" milestone has changed from February 2015 to May 2015 due to a resequencing of the CLINs that support this milestone. In the 2013 SAR, CLIN 0003 supported this milestone and thus the 2013 current estimate was for that CLIN. However, due to the scope of the unplanned production rework needed for the CLIN 0003 satellite, it was determined that CLIN 0003 could no longer support the milestone. CLIN 0007 was designated to support the milestone "4th Satellite Ready to Ship". This current estimate is for the CLIN 0007 satellite.

(Ch-3) The current estimate for "5th Satellite Ready to Ship" milestone has changed from September 2015 to August 2015 due to a resequencing of the CLINs that supports this milestone. In the 2013 SAR, CLIN 0007 supported this milestone and thus the 2013 current estimate was for that CLIN. However, due to the scope of the unplanned production rework needed for the CLIN 0003 satellite, it was determined that CLIN 0007 would be moved to support "4th Satellite Ready to Ship" milestone and CLIN 0003 would support the "5th Satellite Ready to Ship" milestone. This current estimate is for the CLIN 0003 satellite.

Notes

A Program Deviation Report follow-up regarding the resequencing of CLINs to support Ready to Ship milestones was documented in a September 19, 2014 memorandum from the Assistant Secretary of the Navy, Research, Development and Acquisition (ASN(RDA)) to the USD(AT&L) .

Performance

Performance Characteristics				
SAR Baseline Production Estimate	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 as link availability.	1,997 worldwide simultaneous accesses (39.2 Mbps) with 502 simultaneous theater accesses (3 Mbps)
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	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	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	Automated functionality for resource planning, allocation and prioritization have been demonstrated via test and analysis; network configuration/reconfiguration was demonstrated via Ground System test	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

within 3 seconds 90% of the time and 6 seconds 99% of the time	within 3 seconds 90% of the time and 6 seconds 99% of the time	and feedback provided to the user within 6 seconds 90% of the time and 10 seconds 99% of the time	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%)	99% of the time
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Net Ready

Fully support 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 an ATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and information assurance attributes,	Fully support 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 an ATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and information assurance attributes,	Fully support 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 issuance of an IATO by the DAA, and 5) Operationally effective information exchanges; and mission critical performance and	Letter from Joint Staff J6, dated October 30, 2007, grants interoperability and supportability certification of the Net Ready KPP; Interoperability test certification by DISA Joint Interoperability Test Command will conclude following on-orbit testing of MUOS Satellite #2	Fully support 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 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
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data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views	data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views	information assurance attributes, data correctness, data availability, and consistent data processing specified in the applicable joint and system integrated architecture views		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 communications on the move when and where needed in all environments while engaged in combat operations	Support communications on the move when and where needed in all environments while engaged in combat operations	Support communications on the move when and where needed in all environments while engaged in combat operations	Demonstrated via analysis that service requirements can be met in all required environments	Support communications 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 Reference

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
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
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Navy 1319 07 0303109N

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

Procurement

Appn	BA	PE
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Navy 1507 02 0303109N

Line Item	Name
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2433 Fleet Satellite Communications Follow-On

MILCON

Appn	BA	PE
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Navy 1205 01 0301376N

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

Acq O&M

Appn	BA	PE
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Navy 1804 04 0303109N

Project	Name
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4A6M Servicewide Communications (Shared) (Sunk)

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2004 \$M			BY 2004 \$M	TY \$M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold	4052.4	Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	3245.2	3684.0	4052.4	3757.5	3636.2	4138.2	4276.3
Procurement	2460.3	2354.2	2589.6	2328.1	3104.1	2896.3	2945.1
Flyaway	--	--	--	2328.1	--	--	2945.1
Recurring	--	--	--	2328.1	--	--	2945.1
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	6141.6	6810.6	7095.9	7282.8

Confidence Level

Confidence Level of cost estimate for current APB: 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.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	2	2	2
Procurement	4	4	4
Total	6	6	6

Quantity Notes

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 Summary									
FY 2016 President's Budget / December 2014 SAR (TY\$ M)									
Appropriation	Prior	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	To Complete	Total
RDT&E	3959.8	12.2	16.2	11.6	12.4	12.7	13.0	238.4	4276.3
Procurement	1824.3	206.7	39.9	10.1	10.2	10.6	10.8	832.5	2945.1
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 2016 Total	5845.5	218.9	56.1	21.7	22.6	23.3	23.8	1070.9	7282.8
PB 2015 Total	5846.5	221.0	50.8	22.0	22.9	23.6	50.5	1027.7	7265.0
Delta	-1.0	-2.1	5.3	-0.3	-0.3	-0.3	-26.7	43.2	17.8

Quantity Summary										
FY 2016 President's Budget / December 2014 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	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 2016 Total	2	3	0	0	0	0	0	0	1	6
PB 2015 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							
1319 RDT&E Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
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	--	--	--	--	--	--	34.9
2015	--	--	--	--	--	--	12.2
2016	--	--	--	--	--	--	16.2
2017	--	--	--	--	--	--	11.6
2018	--	--	--	--	--	--	12.4
2019	--	--	--	--	--	--	12.7
2020	--	--	--	--	--	--	13.0
2021	--	--	--	--	--	--	47.2
2022	--	--	--	--	--	--	100.0
2023	--	--	--	--	--	--	20.4
2024	--	--	--	--	--	--	20.8
2025	--	--	--	--	--	--	21.2
2026	--	--	--	--	--	--	21.5
2027	--	--	--	--	--	--	7.3
Subtotal	2	--	--	--	--	--	4276.3

Annual Funding 1319 RDT&E Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2004 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
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	--	--	--	--	--	--	330.0
2012	--	--	--	--	--	--	185.9
2013	--	--	--	--	--	--	115.3
2014	--	--	--	--	--	--	28.2
2015	--	--	--	--	--	--	9.7
2016	--	--	--	--	--	--	12.7
2017	--	--	--	--	--	--	8.9
2018	--	--	--	--	--	--	9.3
2019	--	--	--	--	--	--	9.4
2020	--	--	--	--	--	--	9.4
2021	--	--	--	--	--	--	33.5
2022	--	--	--	--	--	--	69.6
2023	--	--	--	--	--	--	13.9
2024	--	--	--	--	--	--	13.9
2025	--	--	--	--	--	--	13.9
2026	--	--	--	--	--	--	13.8
2027	--	--	--	--	--	--	4.6
Subtotal	2	--	--	--	--	--	3757.5

Annual Funding 1507 Procurement Weapons Procurement, Navy								
Fiscal Year	Quantity	TY \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
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	--	206.7	--	--	206.7	--	206.7	
2016	--	39.9	--	--	39.9	--	39.9	
2017	--	10.1	--	--	10.1	--	10.1	
2018	--	10.2	--	--	10.2	--	10.2	
2019	--	10.6	--	--	10.6	--	10.6	
2020	--	10.8	--	--	10.8	--	10.8	
2021	--	11.1	--	--	11.1	--	11.1	
2022	--	66.9	--	--	66.9	--	66.9	
2023	1	695.3	--	--	695.3	--	695.3	
2024	--	17.1	--	--	17.1	--	17.1	
2025	--	16.0	--	--	16.0	--	16.0	
2026	--	16.3	--	--	16.3	--	16.3	
2027	--	9.8	--	--	9.8	--	9.8	
Subtotal	4	2945.1	--	--	2945.1	--	2945.1	

Annual Funding 1507 Procurement Weapons Procurement, Navy							
Fiscal Year	Quantity	BY 2004 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	--	179.0	--	--	179.0	--	179.0
2009	1	294.1	--	--	294.1	--	294.1
2010	1	434.2	--	--	434.2	--	434.2
2011	1	413.2	--	--	413.2	--	413.2
2012	--	195.9	--	--	195.9	--	195.9
2013	--	17.3	--	--	17.3	--	17.3
2014	--	13.5	--	--	13.5	--	13.5
2015	--	162.0	--	--	162.0	--	162.0
2016	--	30.7	--	--	30.7	--	30.7
2017	--	7.6	--	--	7.6	--	7.6
2018	--	7.6	--	--	7.6	--	7.6
2019	--	7.7	--	--	7.7	--	7.7
2020	--	7.7	--	--	7.7	--	7.7
2021	--	7.7	--	--	7.7	--	7.7
2022	--	45.8	--	--	45.8	--	45.8
2023	1	466.2	--	--	466.2	--	466.2
2024	--	11.2	--	--	11.2	--	11.2
2025	--	10.3	--	--	10.3	--	10.3
2026	--	10.3	--	--	10.3	--	10.3
2027	--	6.1	--	--	6.1	--	6.1
Subtotal	4	2328.1	--	--	2328.1	--	2328.1

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	433.3
2011	1	437.3
2012	--	--
2013	--	--
2014	--	--
2015	--	--
2016	--	--
2017	--	--
2018	--	--
2019	--	--
2020	--	--
2021	--	--
2022	--	--
2023	1	1011.1
2024	--	--
2025	--	--
2026	--	--
2027	--	--
Subtotal	4	2328.1

Annual Funding 1205 MILCON Military Construction, Navy and Marine Corps	
Fiscal Year	TY \$M
	Total Program
2007	26.1
2008	8.5
Subtotal	34.6

Annual Funding 1205 MILCON Military Construction, Navy and Marine Corps	
Fiscal Year	BY 2004 \$M
	Total Program
2007	23.3
2008	7.5
<hr/>	
Subtotal	30.8

Annual Funding 1804 Acq O&M Operation and Maintenance, Navy	
Fiscal Year	TY \$M
	Total Program
2002	4.2
2003	4.6
2004	4.5
2005	--
2006	--
2007	--
2008	4.6
2009	5.0
2010	3.9
Subtotal	26.8

Annual Funding 1804 Acq O&M Operation and Maintenance, Navy	
Fiscal Year	BY 2004 \$M
	Total Program
2002	4.3
2003	4.6
2004	4.4
2005	--
2006	--
2007	--
2008	4.1
2009	4.4
2010	3.4
Subtotal	25.2

Low Rate Initial Production

There is no LRIP for this program.

Foreign Military Sales

None

Nuclear Costs

None

Unit Cost

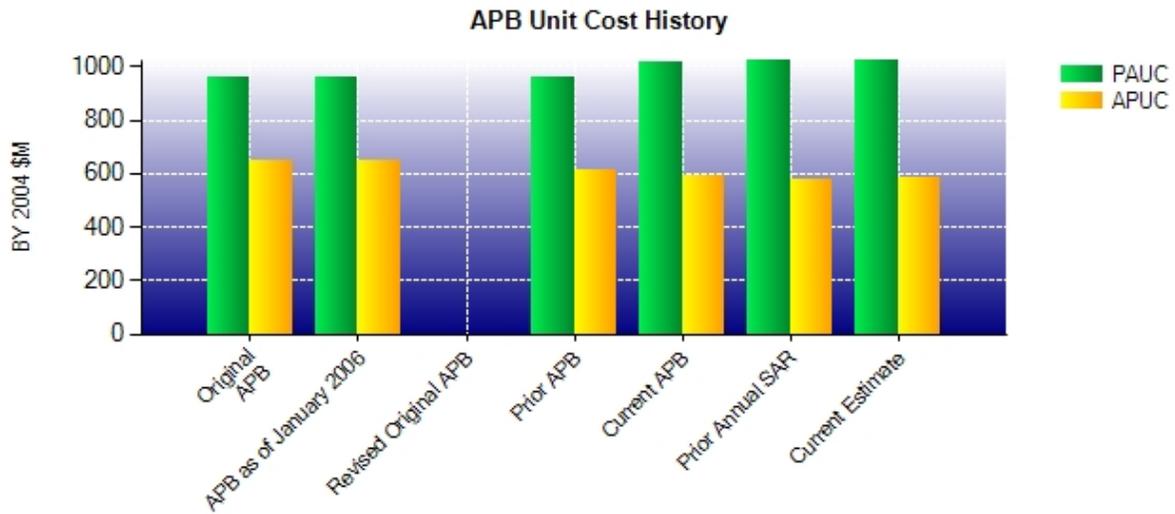
Unit Cost Report

Item	BY 2004 \$M	BY 2004 \$M	% Change
	Current UCR Baseline (Jul 2012 APB)	Current Estimate (Dec 2014 SAR)	
Program Acquisition Unit Cost			
Cost	6094.2	6141.6	
Quantity	6	6	
Item	1015.700	1023.600	+0.78
Average Procurement Unit Cost			
Cost	2354.2	2328.1	
Quantity	4	4	
Unit Cost	588.550	582.025	-1.11

Item	BY 2004 \$M	BY 2004 \$M	% Change
	Original UCR Baseline (Dec 2004 APB)	Current Estimate (Dec 2014 SAR)	
Program Acquisition Unit Cost			
Cost	5738.0	6141.6	
Quantity	6	6	
Unit Cost	956.333	1023.600	+7.03
Average Procurement Unit Cost			
Cost	2591.0	2328.1	
Quantity	4	4	
Unit Cost	647.750	582.025	-10.15

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



Item	Date	BY 2004 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Dec 2004	956.333	647.750	1080.183	776.025
APB as of January 2006	Dec 2004	956.333	647.750	1080.183	776.025
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Mar 2008	961.483	615.075	1135.100	776.025
Current APB	Jul 2012	1015.700	588.550	1182.650	724.075
Prior Annual SAR	Dec 2013	1021.733	580.800	1210.833	733.225
Current Estimate	Dec 2014	1023.600	582.025	1213.800	736.275

SAR Unit Cost History

Initial SAR Baseline to Current SAR Baseline (TY \$M)									
Initial PAUC Development Estimate	Changes								PAUC Production Estimate
	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 Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
1135.100	-14.583	0.000	8.217	34.450	50.616	0.000	0.000	78.700	1213.800

Initial SAR Baseline to Current SAR Baseline (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Production Estimate
	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 Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
776.025	-18.625	0.000	11.950	0.000	-33.075	0.000	0.000	-39.750	736.275

SAR Baseline History					
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current 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	7282.8	
Total Quantity	N/A	6	6	6	
PAUC	N/A	1080.183	1135.100	1213.800	

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 5000.02.

Build Approval was authorized February 2008.

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

Cost Variance

Summary TY \$M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Production Estimate)	3636.2	3104.1	34.5	35.8	6810.6
Previous Changes					
Economic	-8.3	-64.6	+0.1	+0.1	-72.7
Quantity	--	--	--	--	--
Schedule	--	+27.3	--	--	+27.3
Engineering	+200.7	--	--	--	+200.7
Estimating	+442.1	-133.9	--	-9.1	+299.1
Other	--	--	--	--	--
Support	--	--	--	--	--
Subtotal	+634.5	-171.2	+0.1	-9.0	+454.4
Current Changes					
Economic	-4.9	-9.9	--	--	-14.8
Quantity	--	--	--	--	--
Schedule	+1.5	+20.5	--	--	+22.0
Engineering	+6.0	--	--	--	+6.0
Estimating	+3.0	+1.6	--	--	+4.6
Other	--	--	--	--	--
Support	--	--	--	--	--
Subtotal	+5.6	+12.2	--	--	+17.8
Total Changes	+640.1	-159.0	+0.1	-9.0	+472.2
CE - Cost Variance	4276.3	2945.1	34.6	26.8	7282.8
CE - Cost & Funding	4276.3	2945.1	34.6	26.8	7282.8

Summary BY 2004 \$M					
Item	RDT&E	Procurement	MILCON	Acq O&M	Total
SAR Baseline (Production Estimate)	3245.2	2460.3	30.7	32.7	5768.9
Previous Changes					
Economic	--	--	--	--	--
Quantity	--	--	--	--	--
Schedule	--	+2.5	--	--	+2.5
Engineering	+140.2	--	--	--	+140.2
Estimating	+365.8	-139.6	+0.1	-7.5	+218.8
Other	--	--	--	--	--
Support	--	--	--	--	--
Subtotal	+506.0	-137.1	+0.1	-7.5	+361.5
Current Changes					
Economic	--	--	--	--	--
Quantity	--	--	--	--	--
Schedule	-0.4	--	--	--	-0.4
Engineering	+4.7	--	--	--	+4.7
Estimating	+2.0	+4.9	--	--	+6.9
Other	--	--	--	--	--
Support	--	--	--	--	--
Subtotal	+6.3	+4.9	--	--	+11.2
Total Changes	+512.3	-132.2	+0.1	-7.5	+372.7
CE - Cost Variance	3757.5	2328.1	30.8	25.2	6141.6
CE - Cost & Funding	3757.5	2328.1	30.8	25.2	6141.6

Previous Estimate: December 2013

RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-4.9
Adjustment due to delay of Non-Recurring Engineering for the 6th satellite from FY 2021 to FY 2022. (Schedule)	-0.4	+1.5
Engineering Change Proposal to improve Electromagnetic Interference mitigation. (Engineering)	+4.7	+6.0
Adjustment for current and prior escalation. (Estimating)	+0.6	+0.6
Revised estimate for miscellaneous budget adjustments from FY 2014 through FY 2027 (Estimating)	+1.4	+2.4
RDT&E Subtotal	+6.3	+5.6

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-9.9
Stretch out of Procurement buy profile from FY 2022 to FY 2023 for the 6th Satellite due to program development delays. (Schedule)	0.0	+20.5
Adjustment for current and prior escalation. (Estimating)	+1.6	+1.9
Revised estimate for miscellaneous budget adjustments from FY 2016 through FY 2027 (Estimating)	+3.3	-0.3
Procurement Subtotal	+4.9	+12.2

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: MUOS RRDD AOS Contract - CLIN 3
Contractor: Lockheed Martin (LMSSC)
Contractor Location: 1111 Lockheed Martin Way
 Sunnyvale, CA 94089-1212
Contract Number: N00039-04-C-2009/3
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: September 24, 2004
Definitization Date: September 24, 2004

Contract Price							
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.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/28/2014)	-6.1	-22.8
Previous Cumulative Variances	-5.5	-27.6
Net Change	-0.6	+4.8

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to unplanned, in scope rework attributed to the Output Multiplexer (OMUX) failure including program management efforts, issue resolution, and regression testing. Also, a retroactive baseline change was implemented that resequenced the space vehicle from supporting the milestone "3rd Satellite Ready to Ship" to supporting the milestone "5th Satellite Ready to Ship".

The favorable net change in the schedule variance is due to the restart of Single Line Flow after the replacement OMUX was installed on the satellite, which allowed for some recovery to the baseline plan.

Notes

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.

CLIN 0003 supports the milestone "5th Satellite Ready to Ship".

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

Contract Identification

Appropriation: Procurement
Contract Name: MUOS RRDD AOS Contract – CLIN 5
Contractor: Lockheed Martin (LMSSC)
Contractor Location: 1111 Lockheed Martin Way
 Sunnyvale, CA 94089-1212
Contract Number: N00039-04-C-2009/5
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: September 24, 2004
Definitization Date: September 24, 2004

Contract Price							
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.

Contract Variance			
Item	Cost Variance		Schedule Variance
Cumulative Variances To Date (12/28/2014)	+1.1		-10.7
Previous Cumulative Variances	+26.1		-12.3
Net Change	-25.0		+1.6

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to the need for additional resources for post-Thermal Vacuum test troubleshooting and repair and replacement efforts by Space Assembly, Integration and Test; as well as the incurrence of Systems Engineering and Integration Team level of effort task cost late to the baseline plan.

The favorable net change in the schedule variance is due to tasks being completed which were late to the baseline plan due to the overall launch schedule delays.

Notes

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.

CLIN 0005 supports the "3rd Satellite Ready to Ship" milestone.

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

Contract Identification

Appropriation: Procurement
Contract Name: MUOS RRDD AOS Contract – CLIN 7
Contractor: Lockheed Martin (LMSSC)
Contractor Location: 1111 Lockheed Martin Way
 Sunnyvale, CA 94089-1212
Contract Number: N00039-04-C-2009/7
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: September 24, 2004
Definitization Date: September 24, 2004

Contract Price							
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	332.4	339.6

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/28/2014)	+20.1	-12.1
Previous Cumulative Variances	+24.1	-9.3
Net Change	-4.0	-2.8

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to 1) unplanned rework associated with Solar Array Deployment mechanisms and the Ka Antenna de-bonding issue; 2) Digital Receiver Unit failure and the associated troubleshooting and repair and replacement effort; and 3) Assembly, Integration, and Test (AI&T) Troubleshooting and post-Environmental Test processing inefficiencies.

The unfavorable net change in the schedule variance is due to the late start of AI&T Single Line Flow activities, as well as Systems Engineering and Integration Team and Launch Base activities now late to the baseline plan.

Notes

CLIN 0007 supports the "4th Satellite Ready to Ship" milestone.

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

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	2	2	2	100.00%
Production	3	0	4	0.00%
Total Program Quantity Delivered	5	2	6	33.33%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	7282.8	Years Appropriated	16
Expended to Date	5430.6	Percent Years Appropriated	57.14%
Percent Expended	74.57%	Appropriated to Date	6064.4
Total Funding Years	28	Percent Appropriated	83.27%

The above data is current as of January 31, 2015.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	July 24, 2012
Source of Estimate:	POE
Quantity to Sustain:	6
Unit of Measure:	Vehicle
Service Life per Unit:	10.00 Years
Fiscal Years in Service:	FY 2011 - FY 2027

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).

Sustainment Strategy

The MUOS sustainment strategy is based on a Performance Based Logistics plan to optimize total system availability while minimizing cost and logistics footprint. The majority of sustainment work is focused on the sustainment of the MUOS Ground system (hardware and software) through the program lifecycle (end FY 2027).

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.

Annual O&S Costs BY2004 \$M		
Cost Element	MUOS Average Annual Cost Per Vehicle	UFO (Antecedent) 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	--

Item	Total O&S Cost \$M			
	MUOS			UFO (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	379.9	417.9	387.5	N/A
Then Year	508.2	N/A	518.2	N/A

Equation to Translate Annual Cost to Total Cost

The unitized annual costs reflect the total O&S cost divided by six satellites and 17 years (FY 2011 through FY 2027).

O&S Cost Variance		
Category	BY 2004 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2013 SAR	387.5	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	387.5	

Disposal Estimate Details

Date of Estimate: July 24, 2012
Source of Estimate: POE
Disposal/Demilitarization Total Cost (BY 2004 \$M): Total costs for disposal of all Vehicle are 0.0

Satellites will be disposed on-orbit using on-board fuel paid for during the procurement phase of the program. Ground stations will not be disposed of and will be utilized and sustained by follow on program.