



Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-261



AEHF

As of December 31, 2011

Defense Acquisition Management
Information Retrieval
(DAMIR)

UNCLASSIFIED

Table of Contents

| | |
|-----------------------------------|----|
| Program Information | 3 |
| Responsible Office | 3 |
| References | 3 |
| Mission and Description | 4 |
| Executive Summary | 5 |
| Threshold Breaches | 7 |
| Schedule | 8 |
| Performance | 9 |
| Track To Budget | 12 |
| Cost and Funding | 13 |
| Low Rate Initial Production | 21 |
| Nuclear Cost | 22 |
| Foreign Military Sales | 22 |
| Unit Cost | 23 |
| Cost Variance | 26 |
| Contracts | 29 |
| Deliveries and Expenditures | 31 |
| Operating and Support Cost | 32 |

Program Information

Designation And Nomenclature (Popular Name)

Advanced Extremely High Frequency Satellite (AEHF)

DoD Component

Air Force

Joint Participants

Canada; Netherlands; United Kingdom

Responsible Office

Responsible Office

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Date Assigned July 19, 2010

References

SAR Baseline (Production Estimate)

Under Secretary of the Air Force (USecAF) Approved Acquisition Program Baseline (APB) dated March 3, 2005

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated June 16, 2011

Mission and Description

Advanced Extremely High Frequency (AEHF) is a joint service satellite communications system that provides global, secure, protected, and jam-resistant communications for high priority military ground, sea, and air assets. The system consists of four satellites in Geosynchronous Earth Orbit (GEO) that provides 10 times the capacity of the 1990s-era Milstar Block II satellites. This constellation provides continuous 24-hour EHF Extended Data Rate (XDR) coverage between 65 degrees north and 65 degrees south latitude. Advanced EHF allows the National Security Council and Combatant Commanders to control their tactical and strategic forces at all levels of conflict through general nuclear war and supports the attainment of information superiority.

The AEHF operational system is composed of three segments: space (the satellites), mission control with associated communications links and terminals (the users). The space segment consists of a cross-linked constellation of satellites to provide worldwide coverage. The mission control segment controls satellites on orbit, monitors satellite health, and provides communication system planning and monitoring. This segment is highly survivable, with both fixed and mobile control stations. The terminal segment includes fixed and mobile ground terminals, ship and submarine terminals, and airborne terminals.

International Cooperative Program -- Canada, The Netherlands, and the United Kingdom signed Memoranda of Understanding (MOU) in preparation for entering into a Foreign Military Sales case to purchase International Partnership variants of AEHF terminals. Canada signed the MOU on November 16, 1999. The Netherlands signed the MOU on November 8, 2002. The United Kingdom signed the MOU on September 9, 2003. The International Partners (IP) have contributed \$270.5M to the AEHF program.

Executive Summary

The Advanced Extremely High Frequency (AEHF) program has made tremendous progress this year and achieved some very significant milestones.

AEHF-1 is on station in geosynchronous orbit as of October 24, 2011, after 14 months of orbit raising and transfer operations. AEHF-1 payload activation was successfully completed on October 28, 2011. On-orbit testing started October 29, 2011, and completed on February 13, 2012.

The work to exonerate AEHF-2 from the AEHF-1 propulsion subsystem anomaly was successfully completed April 2011. Per plan, AEHF-2 was removed from storage in June 2011. In October 2011, final mechanical integration work was completed, and the payload wings were successfully stowed for the last time prior to launch. In November 2011, the solar arrays were successfully installed, and the Factory Confidence Test was successfully executed, which is the satellite's final system-level test. AEHF-2 was shipped to Cape Canaveral Air Force Station on February 13, 2012, for an April 27, 2012 launch.

The work to exonerate AEHF-3 from the AEHF-1 propulsion subsystem anomaly was successfully completed in April 2011. The AEHF-3 Final Integrated System Test (FIST) was completed in May 2011, which was approximately 1 month ahead of plan. The FIST ensures the satellite is fully functional following environmental testing and validates functional compatibility between the spacecraft and the payload. Also completed in May 2011 was a key satellite compatibility test with the Air Force Satellite Control Network. For factory efficiencies, AEHF-3 was placed in temporary storage from June 2011 through December 2011 while the final AEHF-2 work was being performed. AEHF-3 was removed from storage in December 2011 and successfully tested with the final version of software and database products. AEHF-3 is projected to be available for launch approximately eight months after the AEHF-2 launch, i.e., November/December 2012.

After contract award in December 2010, the development of AEHF-4 progressed very well throughout CY 2011. Per plan, Lockheed Martin completed the first two Mission Success Incentives, 3.5 and 6.5 months ahead of schedule, respectively. The Program Office completed the AEHF-4 Integrated Baseline Review in October 2011; the closeout memo/report finished in December 2011. Finally, development and delivery of AEHF-4 long lead and obsolescence parts development in the amount of \$291,483,439 completed in December 2011. The satellite is contracted to be available for launch in 2017.

The Milestone Decision Authority (MDA) approved the AEHF-5/6 Acquisition Strategy in December 2011. AEHF-5/6 is part of the Defense Department's Efficient Space Procurement (ESP), formerly Evolutionary Acquisition for Space Efficiency (EASE), funded in the FY 2012 President's Budget. ESP is an acquisition strategy that encompasses the following tenets: block buys of satellites, fixed price contracting, should cost/will cost reviews, stable research and development investment and a modified annual funding approach. The block buy approach will result in estimated savings that can be reinvested in research and development to further improve the performance and lower the cost of follow-on systems. In addition, the modified funding proposal stabilizes funding throughout satellite production to maintain affordability and avoid significant funding increases in specific fiscal years. Also, the Program Office awarded a contract modification for long lead and obsolescence parts development in the amount of \$227,172,500 in December 2011. The Program Office saved approximately 15% through a combination of bulk buy, savvy pricing and reduced fee levels commensurate with contractor risk efficiencies. The Program Office projects to award the AEHF-5/6 production contract in the third quarter of CY 2012, for launch availability in CY 2018 and CY 2019, respectively.

In April 2011, Headquarters Air Force Space Command authorized "early use" of the AEHF ground system for command & control (C2) operations of Milstar and AEHF. This "early use" declaration allowed the Military Satellite Communications Systems Directorate and 50th Space Wing to decommission the legacy ground system that successfully served as Milstar's C2 system for the past 16 years. In June 2011, Headquarters Air Force Space Command declared Operational Acceptance (OA) and System of Record (SOR) of the Milstar/AEHF ground system (Increment 4). OA and SOR of the Milstar/AEHF ground system (Increment 4) were major program milestones and

culminated 12+ months of intense operational trial period (OTP) activities across the Protected satellite communications enterprise. In July 2011, the Milstar-to-Increment 5 testing successfully completed and Milstar/AEHF C2 operations transferred to AEHF ground segment (Increment 5) as part of OTP activities and ongoing extended data rate (XDR) transition. The AEHF ground system (Increment 5) OTP will continue through the fourth quarter CY 2012. Lastly, the Program Office accepted the final version of the AEHF ground system software (Increment 7) from Lockheed Martin in August 2011. Increment 7 software of the AEHF ground segment will undergo Program Office development test and an Operational Utility Evaluation throughout CY 2012. Increment 7 software includes the mission planning capability for AEHF's International Partners: United Kingdom, Canada and The Netherlands. Note: To minimize operational impact and garner cost efficiencies in 2006, AEHF Ground System Increment 6 requirements and functionality were incorporated into Increment 7.

In December 2011, an approximate \$312,000,000 contract was awarded to Lockheed Martin. This award is a two and a half year contract to provide sustainment of the AEHF space and ground segments, until the program reaches Initial Operational Capability (IOC) in the fourth quarter of CY 2014. After IOC, the support level of effort will transition into sustainment.

The Nunn-McCurdy certification process was completed late 2008, and an Acquisition Decision Memorandum was signed on December 29, 2008. The updated Acquisition Program Baseline (APB) was deferred due to the termination of the Transformational Satellite program in early CY 2009 and ongoing changes in the acquisition strategy for the AEHF program to include the ESP initiative contained in the FY 2012 President's Budget. The MDA approved the AEHF 1-4 APB in June 2011.

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

Threshold Breaches

| APB Breaches | |
|--------------|--|
|--------------|--|

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

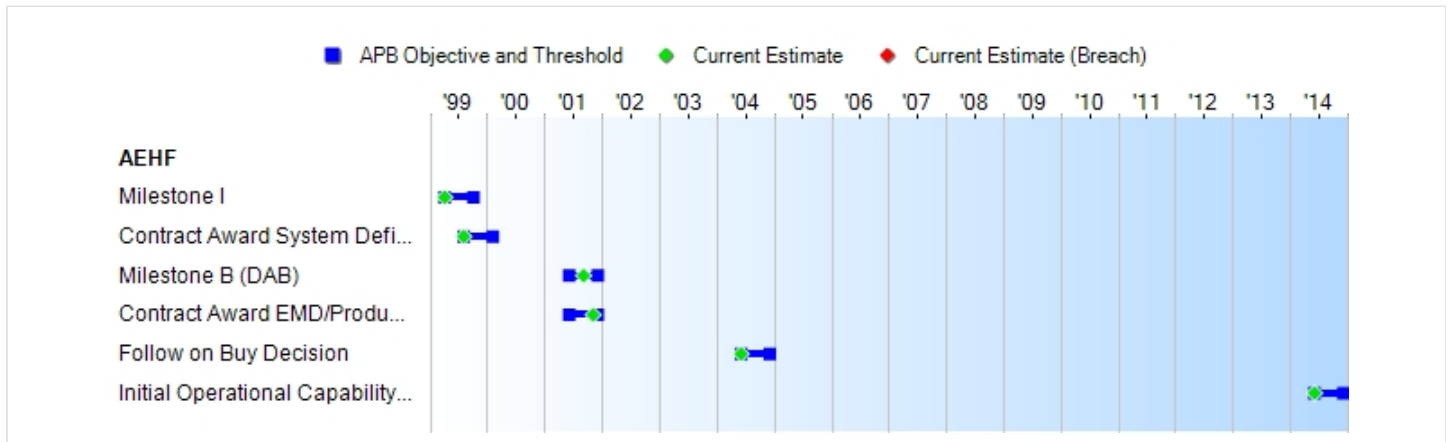
Explanation of Breach

Threshold breach: Procurement shows a breach, because the approved Acquisition Program Baseline (APB) (from June 2011) only includes four satellites. The Milestone Decision Authority (MDA) approved the AEHF 1-4 APB in June 2011. The updated APB was deferred due to ongoing changes in the acquisition strategy for the AEHF program. This SAR reflects a total of six satellites per (MDA) approved acquisition strategy and FY 2012 President's Budget. Once the block-buy for AEHF 5/6 is on contract, the APB will be updated as directed by the MDA.

| Nunn-McCurdy Breaches | |
|-----------------------|--|
|-----------------------|--|

| | | |
|------------------------------|------|------|
| Current UCR Baseline | | |
| | PAUC | None |
| | APUC | None |
| Original UCR Baseline | | |
| | PAUC | None |
| | APUC | None |

Schedule



| Milestones | SAR Baseline Prod Est | Current APB Production Objective/Threshold | | Current Estimate |
|--------------------------------------|-----------------------|--|----------|------------------|
| Milestone I | APR 1999 | APR 1999 | OCT 1999 | APR 1999 |
| Contract Award System Definition | AUG 1999 | AUG 1999 | FEB 2000 | AUG 1999 |
| Milestone B (DAB) | JUN 2001 | JUN 2001 | DEC 2001 | SEP 2001 |
| Contract Award EMD/Production | JUN 2001 | JUN 2001 | DEC 2001 | NOV 2001 |
| Follow on Buy Decision | JUN 2004 | JUN 2004 | DEC 2004 | JUN 2004 |
| Initial Operational Capability (IOC) | JUN 2010 | JUN 2014 | DEC 2014 | JUN 2014 |

Acronyms And Abbreviations

DAB - Defense Acquisition Board
 EMD - Engineering and Manufacturing Development

Change Explanations

None

Memo

IOC is met with two AEHF satellites operating at eXtended Data Rate (XDR), backward compatible to Milstar, and servicing the applicable strategic and tactical networks.

Performance

| Characteristics | SAR Baseline Prod Est | Current APB Production Objective/Threshold | | Demonstrated Performance | Current Estimate |
|--------------------|---|---|---|--------------------------|---|
| Capacity | 1.2 Gbps CMTW, 600 Mbps Strategic | 1.2 Gbps CMTW, 600 Mbps Strategic | Support at least 500 Mbps for CMTW Scenario and at least 350 Mbps for Strategic Scenario | TBD | 1.2 Gbps CMTW, 600 Mbps Strategic |
| Nuclear Protection | Provide assured communications to survivable nuclear forces exposed to the environment specified in NCGS-89-06, and for those critical networks that support the following critical functions: situation monitoring, decision making, force direction, force management, and planning | Provide assured communications to survivable nuclear forces exposed to the environment specified in NCGS-89-06, and for those critical networks that support the following critical functions: situation monitoring, decision making, force direction, force management, and planning | Provide assured communications to survivable nuclear forces exposed to the environment specified in NCGS-89-06, and for those critical networks that support the following critical functions: situation monitoring, decision making, force direction, force management, and planning | TBD | Provide assured communications to survivable nuclear forces exposed to the environment specified in NCGS-89-06, and for those critical networks that support the following critical functions: situation monitoring, decision making, force direction, force management, and planning |
| Access and Control | Provide users ability to plan, control, & reconfigure their apportioned resources; critical functions | Provide users ability to plan, control, & reconfigure their apportioned resources; critical functions | Provide users ability to plan, control, & reconfigure their apportioned resources; critical functions | TBD | Provide users ability to plan, control, & reconfigure their apportioned resources; critical functions |

| | | | | | |
|-----------------------------|--|--|--|-----|--|
| | such as situation monitoring, decision making, force direction, force management, & planning shall not be disrupted by communications configuration changes to noncritical functions | such as situation monitoring, decision making, force direction, force management, & planning shall not be disrupted by communications configuration changes to noncritical functions | such as situation monitoring, decision making, force direction, force management, & planning shall not be disrupted by communications configuration changes to noncritical functions | | such as situation monitoring, decision making, force direction, force management, & planning shall not be disrupted by communications configuration changes to noncritical functions |
| Interoperability | | | | | |
| AEHF Interoperability | Support joint interoperable warfighter communications among all military branches EHF terminals | Support joint interoperable warfighter communications among all military branches EHF terminals | Support joint interoperable warfighter communications among all military branches EHF terminals | TBD | Support joint interoperable warfighter communications among all military branches EHF terminals |
| Milstar Backward Compatible | Operate with the Milstar system, at all LDR and MDR terminal supported data rates, throughout the Milstar transition to the AEHF system | Operate with the Milstar system, at all LDR and MDR terminal supported data rates, throughout the Milstar transition to the AEHF system | Operate with the Milstar system, at all LDR and MDR terminal supported data rates, throughout the Milstar transition to the AEHF system | TBD | Operate with the Milstar system, at all LDR and MDR terminal supported data rates, throughout the Milstar transition to the AEHF system |

Requirements Source: Operational Requirements Document (ORD), dated October 1, 2000

Acronyms And Abbreviations

- CMTW - Combined Major Theater Warfare
- EHF - Extremely High Frequency
- Gbps - Giga bytes per second
- LDR - Low Data Rate
- Mbps - Mega bytes per second

MDR - Medium Data Rate
NCGS - Nuclear Criteria Group Secretariat
TBD - To Be Determined

Change Explanations

None

Classified Performance information is provided in the classified annex to this submission.

Track To Budget

General Memo

This report reflects Procurement funding associated with Space Vehicles (SV's) 3-6 and Research Development and Test (RDT&E) funding associated with SV's 1-2, Mission Control Segment (MCS), and Interim Contractor Support (ICS). Funding associated with AEHF Follow-on satellites is not included in this report.

RDT&E

| | | | |
|-----------|--------------|--------------|-------------|
| APPN 3600 | BA 04 | PE 0603430F | (Air Force) |
| | Project 4050 | Advanced EHF | |

Procurement

| | | | |
|-----------|------------|--------------|-------------|
| APPN 3020 | BA 05 | PE 0303604F | (Air Force) |
| | ICN ADV555 | Advanced EHF | (Shared) |

Cost and Funding

Cost Summary

Total Acquisition Cost and Quantity

| Appropriation | BY2002 \$M | | | BY2002 \$M | TY \$M | | |
|----------------|-----------------------|--|--------|---------------------|-----------------------|----------------------------------|------------------|
| | SAR Baseline Prod Est | Current APB Production Objective/Threshold | | Current Estimate | SAR Baseline Prod Est | Current APB Production Objective | Current Estimate |
| RDT&E | 5223.7 | 6430.2 | 7073.2 | 6452.0 | 5468.4 | 7044.0 | 7083.6 |
| Procurement | 577.0 | 2655.1 | 2920.6 | 5121.9 ¹ | 617.3 | 3151.1 | 6390.6 |
| Flyaway | -- | -- | -- | 5121.9 | -- | -- | 6390.6 |
| Recurring | -- | -- | -- | 5121.9 | -- | -- | 6390.6 |
| Non Recurring | -- | -- | -- | 0.0 | -- | -- | 0.0 |
| Support | -- | -- | -- | 0.0 | -- | -- | 0.0 |
| Other Support | -- | -- | -- | 0.0 | -- | -- | 0.0 |
| Initial Spares | -- | -- | -- | 0.0 | -- | -- | 0.0 |
| MILCON | 0.0 | 0.0 | -- | 0.0 | 0.0 | 0.0 | 0.0 |
| Acq O&M | 0.0 | 0.0 | -- | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 5800.7 | 9085.3 | N/A | 11573.9 | 6085.7 | 10195.1 | 13474.2 |

¹ APB Breach

Confidence Level is 50%

The Independent Cost Estimate to support AEHF Space Vehicles (SV's) 5-6 decision, like all life-cycle cost estimates previously performed by the Cost Assessment and Program Evaluation, 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. 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.

This report reflects Procurement funding associated with SV's 3-6 and Research Development and Test (RDT&E) funding associated with SV's 1-2, Mission Control Segment (MCS), and Interim Contractor Support (ICS). Funding associated with AEHF Follow-on satellites is not included in this report.

| Quantity | SAR Baseline Prod Est | Current APB Production | Current Estimate |
|-----------------|----------------------------------|-----------------------------------|-------------------------|
| RDT&E | 2 | 2 | 2 |
| Procurement | 1 | 2 | 4 |
| Total | 3 | 4 | 6 |

Cost and Funding**Funding Summary**

**Appropriation and Quantity Summary
FY2013 President's Budget / December 2011 SAR (TY\$ M)**

| Appropriation | Prior | FY2012 | FY2013 | FY2014 | FY2015 | FY2016 | FY2017 | To Complete | Total |
|----------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------------|--------------|
| RDT&E | 6528.7 | 276.7 | 175.6 | 64.4 | 38.2 | 0.0 | 0.0 | 0.0 | 7083.6 |
| Procurement | 2899.0 | 551.5 | 557.2 | 543.0 | 487.8 | 471.2 | 792.7 | 88.2 | 6390.6 |
| MILCON | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Acq O&M | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| PB 2013 Total | 9427.7 | 828.2 | 732.8 | 607.4 | 526.0 | 471.2 | 792.7 | 88.2 | 13474.2 |
| PB 2012 Total | 9509.3 | 832.3 | 715.7 | 606.8 | 524.3 | 464.1 | 773.3 | 88.2 | 13514.0 |
| Delta | -81.6 | -4.1 | 17.1 | 0.6 | 1.7 | 7.1 | 19.4 | 0.0 | -39.8 |

| Quantity | Undistributed | Prior | FY2012 | FY2013 | FY2014 | FY2015 | FY2016 | FY2017 | To Complete | Total |
|-----------------|----------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------------|--------------|
| Development | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Production | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| PB 2013 Total | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| PB 2012 Total | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Delta | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Cost and Funding

Annual Funding By Appropriation

Annual Funding TY\$

3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force

| 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 |
|-----------------|----------|-----------------------------------|---------------------------------------|------------------------------|----------------------|----------------------|----------------------|
| 1995 | -- | -- | -- | -- | -- | -- | 23.1 |
| 1996 | -- | -- | -- | -- | -- | -- | 31.0 |
| 1997 | -- | -- | -- | -- | -- | -- | 32.3 |
| 1998 | -- | -- | -- | -- | -- | -- | 34.2 |
| 1999 | -- | -- | -- | -- | -- | -- | 54.6 |
| 2000 | -- | -- | -- | -- | -- | -- | 89.8 |
| 2001 | -- | -- | -- | -- | -- | -- | 229.8 |
| 2002 | -- | -- | -- | -- | -- | -- | 494.8 |
| 2003 | -- | -- | -- | -- | -- | -- | 832.6 |
| 2004 | -- | -- | -- | -- | -- | -- | 872.7 |
| 2005 | -- | -- | -- | -- | -- | -- | 652.2 |
| 2006 | -- | -- | -- | -- | -- | -- | 647.7 |
| 2007 | -- | -- | -- | -- | -- | -- | 599.3 |
| 2008 | -- | -- | -- | -- | -- | -- | 659.1 |
| 2009 | -- | -- | -- | -- | -- | -- | 440.7 |
| 2010 | -- | -- | -- | -- | -- | -- | 456.2 |
| 2011 | -- | -- | -- | -- | -- | -- | 378.6 |
| 2012 | -- | -- | -- | -- | -- | -- | 276.7 |
| 2013 | -- | -- | -- | -- | -- | -- | 175.6 |
| 2014 | -- | -- | -- | -- | -- | -- | 64.4 |
| 2015 | -- | -- | -- | -- | -- | -- | 38.2 |
| Subtotal | 2 | -- | -- | -- | -- | -- | 7083.6 |

Annual Funding BY\$**3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force**

| Fiscal Year | Quantity | End Item Recurring Flyaway BY 2002 \$M | Non End Item Recurring Flyaway BY 2002 \$M | Non Recurring Flyaway BY 2002 \$M | Total Flyaway BY 2002 \$M | Total Support BY 2002 \$M | Total Program BY 2002 \$M |
|--------------------|-----------------|---|---|--|----------------------------------|----------------------------------|----------------------------------|
| 1995 | -- | -- | -- | -- | -- | -- | 25.0 |
| 1996 | -- | -- | -- | -- | -- | -- | 33.0 |
| 1997 | -- | -- | -- | -- | -- | -- | 33.9 |
| 1998 | -- | -- | -- | -- | -- | -- | 35.7 |
| 1999 | -- | -- | -- | -- | -- | -- | 56.4 |
| 2000 | -- | -- | -- | -- | -- | -- | 91.4 |
| 2001 | -- | -- | -- | -- | -- | -- | 230.5 |
| 2002 | -- | -- | -- | -- | -- | -- | 491.1 |
| 2003 | -- | -- | -- | -- | -- | -- | 815.2 |
| 2004 | -- | -- | -- | -- | -- | -- | 833.7 |
| 2005 | -- | -- | -- | -- | -- | -- | 607.5 |
| 2006 | -- | -- | -- | -- | -- | -- | 585.6 |
| 2007 | -- | -- | -- | -- | -- | -- | 528.0 |
| 2008 | -- | -- | -- | -- | -- | -- | 569.2 |
| 2009 | -- | -- | -- | -- | -- | -- | 375.6 |
| 2010 | -- | -- | -- | -- | -- | -- | 383.9 |
| 2011 | -- | -- | -- | -- | -- | -- | 312.3 |
| 2012 | -- | -- | -- | -- | -- | -- | 224.2 |
| 2013 | -- | -- | -- | -- | -- | -- | 139.9 |
| 2014 | -- | -- | -- | -- | -- | -- | 50.5 |
| 2015 | -- | -- | -- | -- | -- | -- | 29.4 |
| Subtotal | 2 | -- | -- | -- | -- | -- | 6452.0 |

The Research and Development (3600) Appropriation funding profile identified in this SAR differs from budget data in that it includes \$270.5M in International Partners (IP) funding and does not include \$119M (FY 2003 - FY 2009) for Production and Qualification (P&Q) of Radiation Hardened Components.

The yearly breakout of the IP funding is as follows:

| IP Funds (\$M) | |
|----------------|------|
| FY 2002 | 35.2 |
| FY 2003 | 44.0 |
| FY 2004 | 91.0 |
| FY 2005 | 67.0 |
| FY 2006 | 28.5 |
| FY 2007 | 3.0 |
| FY 2008 | 1.8 |

Total 270.5

The yearly breakout of the P&Q of Radiation Hardened Components funding is as follows:

P&Q (\$M)

| | |
|---------|------|
| FY 2003 | 19.0 |
| FY 2004 | 19.0 |
| FY 2005 | 21.0 |
| FY 2006 | 20.0 |
| FY 2007 | 21.0 |
| FY 2009 | 19.0 |

| | |
|-------|-------|
| Total | 119.0 |
|-------|-------|

Annual Funding TY\$
3020 | Procurement | Missile Procurement, Air Force

| 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 |
|--------------------|-----------------|--|--|-------------------------------------|-----------------------------|-----------------------------|-----------------------------|
| 2005 | -- | 78.2 | -- | -- | 78.2 | -- | 78.2 |
| 2006 | 1 | 521.7 | -- | -- | 521.7 | -- | 521.7 |
| 2007 | -- | -- | -- | -- | -- | -- | -- |
| 2008 | -- | 141.3 | -- | -- | 141.3 | -- | 141.3 |
| 2009 | -- | 181.2 | -- | -- | 181.2 | -- | 181.2 |
| 2010 | 1 | 1719.7 | -- | -- | 1719.7 | -- | 1719.7 |
| 2011 | -- | 256.9 | -- | -- | 256.9 | -- | 256.9 |
| 2012 | 2 | 551.5 | -- | -- | 551.5 | -- | 551.5 |
| 2013 | -- | 557.2 | -- | -- | 557.2 | -- | 557.2 |
| 2014 | -- | 543.0 | -- | -- | 543.0 | -- | 543.0 |
| 2015 | -- | 487.8 | -- | -- | 487.8 | -- | 487.8 |
| 2016 | -- | 471.2 | -- | -- | 471.2 | -- | 471.2 |
| 2017 | -- | 792.7 | -- | -- | 792.7 | -- | 792.7 |
| 2018 | -- | 58.2 | -- | -- | 58.2 | -- | 58.2 |
| 2019 | -- | 30.0 | -- | -- | 30.0 | -- | 30.0 |
| Subtotal | 4 | 6390.6 | -- | -- | 6390.6 | -- | 6390.6 |

Annual Funding BY\$

3020 | Procurement | Missile Procurement, Air Force

| Fiscal Year | Quantity | End Item Recurring Flyaway BY 2002 \$M | Non End Item Recurring Flyaway BY 2002 \$M | Non Recurring Flyaway BY 2002 \$M | Total Flyaway BY 2002 \$M | Total Support BY 2002 \$M | Total Program BY 2002 \$M |
|-----------------|----------|---|---|--------------------------------------|------------------------------|------------------------------|------------------------------|
| 2005 | -- | 72.0 | -- | -- | 72.0 | -- | 72.0 |
| 2006 | 1 | 467.1 | -- | -- | 467.1 | -- | 467.1 |
| 2007 | -- | -- | -- | -- | -- | -- | -- |
| 2008 | -- | 121.2 | -- | -- | 121.2 | -- | 121.2 |
| 2009 | -- | 153.2 | -- | -- | 153.2 | -- | 153.2 |
| 2010 | 1 | 1428.1 | -- | -- | 1428.1 | -- | 1428.1 |
| 2011 | -- | 209.5 | -- | -- | 209.5 | -- | 209.5 |
| 2012 | 2 | 442.1 | -- | -- | 442.1 | -- | 442.1 |
| 2013 | -- | 439.2 | -- | -- | 439.2 | -- | 439.2 |
| 2014 | -- | 420.7 | -- | -- | 420.7 | -- | 420.7 |
| 2015 | -- | 371.2 | -- | -- | 371.2 | -- | 371.2 |
| 2016 | -- | 352.2 | -- | -- | 352.2 | -- | 352.2 |
| 2017 | -- | 582.1 | -- | -- | 582.1 | -- | 582.1 |
| 2018 | -- | 42.0 | -- | -- | 42.0 | -- | 42.0 |
| 2019 | -- | 21.3 | -- | -- | 21.3 | -- | 21.3 |
| Subtotal | 4 | 5121.9 | -- | -- | 5121.9 | -- | 5121.9 |

Cost Quantity Information

3020 | Procurement | Missile Procurement, Air Force

| Fiscal Year | Quantity | End Item Recurring Flyaway (Aligned with Quantity) BY 2002 \$M |
|-----------------|----------|--|
| 2005 | -- | -- |
| 2006 | 1 | 857.9 |
| 2007 | -- | -- |
| 2008 | -- | -- |
| 2009 | -- | -- |
| 2010 | 1 | 1383.8 |
| 2011 | -- | -- |
| 2012 | 2 | 2880.2 |
| 2013 | -- | -- |
| 2014 | -- | -- |
| 2015 | -- | -- |
| 2016 | -- | -- |
| 2017 | -- | -- |
| 2018 | -- | -- |
| 2019 | -- | -- |
| Subtotal | 4 | 5121.9 |

Low Rate Initial Production

This program has no LRIP

Foreign Military Sales

| Country | Date of Sale | Quantity | Total Cost \$M | Memo |
|----------------|--------------|----------|----------------|------|
| United Kingdom | 9/9/2003 | | 84.0 | |
| Netherlands | 11/8/2002 | | 39.8 | |
| Canada | 11/16/1999 | | 146.2 | |

International Cooperative Program - Canada, The Netherlands and the United Kingdom signed Research and Development (R&D) and Operations and Sustainment (O&S) Memoranda of Understanding for cooperation in the AEHF program. The International Partners have contributed \$270.5M to the AEHF Program in R&D funds and will contribute \$114.3M in O&S funds.

Canada, The Netherlands and the United Kingdom have Foreign Military Sales (FMS) cases with the Army and Navy for AEHF terminals.

The costs associated with each country are satellite resources only and DO NOT include terminals.

Nuclear Cost

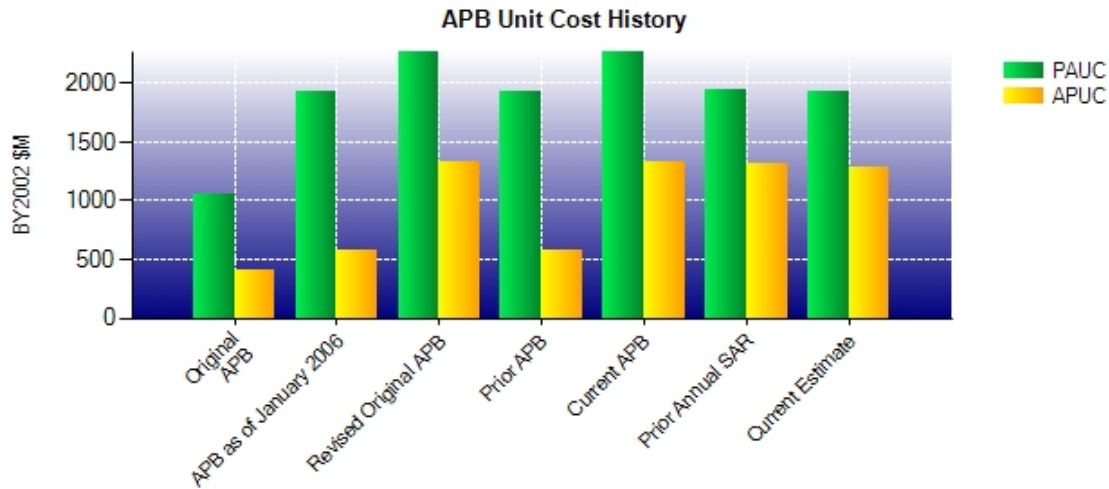
None

Unit Cost**Unit Cost Report**

| | BY2002 \$M | BY2002 \$M | |
|--------------------------------------|---|------------------------------------|----------------|
| Unit Cost | Current UCR Baseline (JUN 2011 APB) | Current Estimate (DEC 2011 SAR) | BY % Change |
| Program Acquisition Unit Cost (PAUC) | | | |
| Cost | 9085.3 | 11573.9 | |
| Quantity | 4 | 6 | |
| Unit Cost | 2271.325 | 1928.983 | -15.07 |
| Average Procurement Unit Cost (APUC) | | | |
| Cost | 2655.1 | 5121.9 | |
| Quantity | 2 | 4 | |
| Unit Cost | 1327.550 | 1280.475 | -3.55 |

| | BY2002 \$M | BY2002 \$M | |
|--------------------------------------|---|------------------------------------|----------------|
| Unit Cost | Revised Original UCR Baseline (JUN 2011 APB) | Current Estimate (DEC 2011 SAR) | BY % Change |
| Program Acquisition Unit Cost (PAUC) | | | |
| Cost | 9085.3 | 11573.9 | |
| Quantity | 4 | 6 | |
| Unit Cost | 2271.325 | 1928.983 | -15.07 |
| Average Procurement Unit Cost (APUC) | | | |
| Cost | 2655.1 | 5121.9 | |
| Quantity | 2 | 4 | |
| Unit Cost | 1327.550 | 1280.475 | -3.55 |

Unit Cost History



| | Date | BY2002 \$M | | TY \$M | |
|------------------------|----------|------------|----------|----------|----------|
| | | PAUC | APUC | PAUC | APUC |
| Original APB | OCT 2001 | 1055.840 | 401.667 | 1129.060 | 460.133 |
| APB as of January 2006 | MAR 2005 | 1933.567 | 577.000 | 2028.567 | 617.300 |
| Revised Original APB | JUN 2011 | 2271.325 | 1327.550 | 2548.775 | 1575.550 |
| Prior APB | MAR 2005 | 1933.567 | 577.000 | 2028.567 | 617.300 |
| Current APB | JUN 2011 | 2271.325 | 1327.550 | 2548.775 | 1575.550 |
| Prior Annual SAR | DEC 2010 | 1945.067 | 1310.050 | 2252.333 | 1617.500 |
| Current Estimate | DEC 2011 | 1928.983 | 1280.475 | 2245.700 | 1597.650 |

SAR Unit Cost History

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

| Initial PAUC Dev Est | Changes | | | | | | | | PAUC Prod Est |
|-------------------------|---------|---------|---------|-------|---------|-------|--------|---------|------------------|
| | Econ | Qty | Sch | Eng | Est | Oth | Spt | Total | |
| 1129.060 | -35.225 | 547.082 | 262.425 | 0.000 | 125.500 | 0.000 | -0.275 | 899.507 | 2028.567 |

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

| PAUC Prod Est | Changes | | | | | | | | PAUC Current Est |
|------------------|---------|----------|---------|--------|---------|-------|-------|---------|---------------------|
| | Econ | Qty | Sch | Eng | Est | Oth | Spt | Total | |
| 2028.567 | 30.550 | -419.333 | 211.200 | 26.983 | 367.733 | 0.000 | 0.000 | 217.133 | 2245.700 |

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

| Initial APUC Dev Est | Changes | | | | | | | | APUC Prod Est |
|-------------------------|---------|--------|--------|-------|--------|-------|--------|---------|------------------|
| | Econ | Qty | Sch | Eng | Est | Oth | Spt | Total | |
| 460.133 | -3.250 | 54.067 | 88.600 | 0.000 | 18.300 | 0.000 | -0.550 | 157.167 | 617.300 |

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

| APUC Prod Est | Changes | | | | | | | | APUC Current Est |
|------------------|---------|---------|---------|-------|---------|-------|-------|---------|---------------------|
| | Econ | Qty | Sch | Eng | Est | Oth | Spt | Total | |
| 617.300 | 14.275 | 429.450 | -15.450 | 0.000 | 552.075 | 0.000 | 0.000 | 980.350 | 1597.650 |

SAR Baseline History

| Item/Event | SAR Planning Estimate (PE) | SAR Development Estimate (DE) | SAR Production Estimate (PdE) | Current Estimate |
|-----------------------------|----------------------------------|-------------------------------------|-------------------------------------|---------------------|
| Milestone I | APR 1999 | APR 1999 | APR 1999 | APR 1999 |
| Milestone B | FEB 2001 | JUN 2001 | JUN 2001 | SEP 2001 |
| Milestone C | FEB 2001 | JUN 2004 | JUN 2004 | JUN 2004 |
| IOC | NOV 2007 | JUL 2008 | JUN 2010 | JUN 2014 |
| Total Cost (TY \$M) | 2690.6 | 5645.3 | 6085.7 | 13474.2 |
| Total Quantity | 2 | 5 | 3 | 6 |
| Prog. Acq. Unit Cost (PAUC) | 1345.300 | 1129.060 | 2028.567 | 2245.700 |

Cost Variance**Cost Variance Summary**

| Summary Then Year \$M | | | | |
|------------------------------|------------------|-------------|---------------|--------------|
| | RDT&E | Proc | MILCON | Total |
| SAR Baseline (Prod Est) | 5468.4 | 617.3 | -- | 6085.7 |
| Previous Changes | | | | |
| Economic | +113.3 | -6.4 | -- | +106.9 |
| Quantity | -- | +3569.7 | -- | +3569.7 |
| Schedule | +1329.0 | -61.8 | -- | +1267.2 |
| Engineering | +103.9 | -- | -- | +103.9 |
| Estimating | +29.4 | +2351.2 | -- | +2380.6 |
| Other | -- | -- | -- | -- |
| Support | -- | -- | -- | -- |
| Subtotal | +1575.6 | +5852.7 | -- | +7428.3 |
| Current Changes | | | | |
| Economic | +12.9 | +63.5 | -- | +76.4 |
| Quantity | -- | -- | -- | -- |
| Schedule | -- | -- | -- | -- |
| Engineering | +58.0 | -- | -- | +58.0 |
| Estimating | -31.3 | -142.9 | -- | -174.2 |
| Other | -- | -- | -- | -- |
| Support | -- | -- | -- | -- |
| Subtotal | +39.6 | -79.4 | -- | -39.8 |
| Total Changes | +1615.2 | +5773.3 | -- | +7388.5 |
| CE - Cost Variance | 7083.6 | 6390.6 | -- | 13474.2 |
| CE - Cost & Funding | 7083.6 | 6390.6 | -- | 13474.2 |

| Summary Base Year 2002 \$M | | | | |
|-----------------------------------|------------------|-------------|---------------|--------------|
| | RDT&E | Proc | MILCON | Total |
| SAR Baseline (Prod Est) | 5223.7 | 577.0 | -- | 5800.7 |
| Previous Changes | | | | |
| Economic | -- | -- | -- | -- |
| Quantity | -- | +2859.2 | -- | +2859.2 |
| Schedule | +1091.3 | -- | -- | +1091.3 |
| Engineering | +88.7 | -- | -- | +88.7 |
| Estimating | +26.5 | +1804.0 | -- | +1830.5 |
| Other | -- | -- | -- | -- |
| Support | -- | -- | -- | -- |
| Subtotal | +1206.5 | +4663.2 | -- | +5869.7 |
| Current Changes | | | | |
| Economic | -- | -- | -- | -- |
| Quantity | -- | -- | -- | -- |
| Schedule | -- | -- | -- | -- |
| Engineering | +47.4 | -- | -- | +47.4 |
| Estimating | -25.6 | -118.3 | -- | -143.9 |
| Other | -- | -- | -- | -- |
| Support | -- | -- | -- | -- |
| Subtotal | +21.8 | -118.3 | -- | -96.5 |
| Total Changes | +1228.3 | +4544.9 | -- | +5773.2 |
| CE - Cost Variance | 6452.0 | 5121.9 | -- | 11573.9 |
| CE - Cost & Funding | 6452.0 | 5121.9 | -- | 11573.9 |

Previous Estimate: December 2010

| RDT&E | \$M | |
|---|-----------|-----------|
| | Base Year | Then Year |
| Current Change Explanations | | |
| Revised escalation indices. (Economic) | N/A | +12.9 |
| Adjustment for current and prior escalation. (Estimating) | -7.8 | -9.4 |
| Decrease for Congressional General Reduction (CGR) (Section 8117, 8023 and 8024) and Secretary of the Air Force general reductions (Estimating) | -17.8 | -21.9 |
| (Estimating) | 0.0 | 0.0 |
| (Estimating) | 0.0 | 0.0 |
| Congressional Add for Capabilities Insertion Program (Engineering) | +35.5 | +43.0 |
| Increase for Crypto Key Management Infrastructure (KMI) (Engineering) | +11.9 | +15.0 |
| RDT&E Subtotal | +21.8 | +39.6 |

| Procurement | \$M | |
|---|-----------|-----------|
| | Base Year | Then Year |
| Current Change Explanations | | |
| Revised escalation indices. (Economic) | N/A | +63.5 |
| Adjustment for current and prior escalation. (Estimating) | -18.3 | -22.3 |
| Decrease for Congressional General Reduction (CGR) (Section 8117, 8023 and 8024) and Secretary of the Air Force general reductions (Estimating) | -18.8 | -23.4 |
| Decrease for Space Vehicle (SV) 4 procurement schedule efficiency (Estimating) | -97.2 | -117.0 |
| Increase to fully fund SV-5 & SV-6 Advanced Procurement (Estimating) | +16.0 | +19.8 |
| Procurement Subtotal | -118.3 | -79.4 |

Contracts

General Contract Memo

The variance between the initial contract price and the current contract price is driven by several factors including numerous Engineering Change Proposal (ECPs), schedule delays, replan, and overrun.

Appropriation: Procurement

| | |
|-----------------------|--------------------------|
| Contract Name | SDD Contract |
| Contractor | Lockheed Martin |
| Contractor Location | Sunnyvale, CA 94089 |
| Contract Number, Type | F04701-02-C-0002/2, CPAF |
| Award Date | November 16, 2001 |
| Definitization Date | August 15, 2002 |

| Initial Contract Price (\$M) | | | Current Contract Price (\$M) | | | Estimated Price At Completion (\$M) | |
|------------------------------|---------|-----|------------------------------|---------|-----|-------------------------------------|-----------------|
| Target | Ceiling | Qty | Target | Ceiling | Qty | Contractor | Program Manager |
| 573.7 | N/A | 1 | 877.6 | N/A | 1 | 877.6 | 993.0 |

| Variance | Cost Variance | Schedule Variance |
|---|---------------|-------------------|
| Cumulative Variances To Date (11/27/2011) | +63.3 | -0.1 |
| Previous Cumulative Variances | +46.4 | +2.1 |
| Net Change | +16.9 | -2.2 |

Cost And Schedule Variance Explanations

The favorable net change in the cost variance is due to efficiencies in closing out Space Vehicle 3 (SV-3) 6400 Test Plan, updating system data base, and fewer than planned Bus hardware issues.

The unfavorable net change in the schedule variance is due to the extension of the SV-3 launch schedule.

Contract Comments

The difference between the initial contract price target and the current contract price target is due to several factors including numerous Engineering Change Proposal (ECPs), schedule delays, replan, and overrun. The estimated price at completion is based on the contractor Most Likely latest revised estimate.

Appropriation: Procurement

| | |
|-----------------------|--------------------------|
| Contract Name | SDD Contract |
| Contractor | Lockheed Martin |
| Contractor Location | Sunnyvale, CA 94089 |
| Contract Number, Type | F04701-02-C-0002/3, CPAF |
| Award Date | November 16, 2001 |
| Definitization Date | August 15, 2002 |

| Initial Contract Price (\$M) | | | Current Contract Price (\$M) | | | Estimated Price At Completion (\$M) | |
|------------------------------|---------|-----|------------------------------|---------|-----|-------------------------------------|-----------------|
| Target | Ceiling | Qty | Target | Ceiling | Qty | Contractor | Program Manager |
| 123.9 | N/A | 1 | 1710.5 | N/A | 1 | 1710.5 | 1801.3 |

| Variance | Cost Variance | Schedule Variance |
|---|---------------|-------------------|
| Cumulative Variances To Date (11/28/2011) | +17.0 | +9.8 |
| Previous Cumulative Variances | +3.2 | -3.7 |
| Net Change | +13.8 | +13.5 |

Cost And Schedule Variance Explanations

The favorable net change in the cost variance is due to favorable negotiations with vendors and completion of parts orders earlier than planned.

The favorable net change in the schedule variance is due to completion of sub-assembly builds earlier than planned.

Contract Comments

The difference between the initial contract price target and the current contract price target is due to several factors including numerous Engineering Change Proposal (ECPs), schedule delays, replan, and overrun. The estimated price at completion is based on the contractor Most Likely latest revised estimate.

Deliveries and Expenditures

| Deliveries To Date | Plan To Date | Actual To Date | Total Quantity | Percent Delivered |
|---|---------------------|-----------------------|-----------------------|--------------------------|
| Development | 2 | 1 | 2 | 50.00% |
| Production | 0 | 0 | 4 | 0.00% |
| Total Program Quantities Delivered | 2 | 1 | 6 | 16.67% |

| Expenditures and Appropriations (TY \$M) | | | |
|---|---------|----------------------------|---------|
| Total Acquisition Cost | 13474.2 | Years Appropriated | 18 |
| Expenditures To Date | 7472.1 | Percent Years Appropriated | 72.00% |
| Percent Expended | 55.45% | Appropriated to Date | 10255.9 |
| Total Funding Years | 25 | Percent Appropriated | 76.12% |

Operating and Support Cost

Assumptions And Ground Rules

The Operating and Support (O&S) cost estimate includes Space Vehicles (SV's) 1-6 (including disposal costs) through FY 2030; previous O&S estimates included only SV's 1-4 through FY 2024.

The Milstar cost estimate is based on validated requirements in the Air Force Space Command (AFSPC) Logistics Support Requirements Brochures built for the FY 2004 President's Budget Request. The Milstar O&S costs cover all operational activities for both the space segment (5 satellites) and ground segment for FY 2009 - FY 2018. These estimates were finalized on April 15, 2003 with the AFSPC's budget request to Headquarters Air Force. The estimates assume that AEHF and Milstar will be operated in parallel by the 4th Space Operations Squadron at Schriever Air Force Base.

The Financial Management Procedures Document (FMDP) provides the specific details of the transfer of funds from the Ministry of Defence (MOD), Secretary of State for Defence of the United Kingdom of Great Britain and Northern Ireland, Minister of Defence (MOD), of the Kingdom of the Netherlands and Department of National Defence of Canada (DND) to the Department of Defense (DoD) in accordance with paragraph 5.2 of the Memorandum of Understanding (MOU) between the Secretary of Defense on behalf of the Department of Defense of the United States of America and the aforementioned Departments concerning Operations and Support of Advanced Extremely High Frequency (AEHF) Military Satellite communications (MILSATCOM).

| Costs BY2002 \$M | | |
|--|--|--|
| Cost Element | AEHF Annual Average Cost for Constellation | Milstar Annual Average for Constellation |
| Unit-Level Manpower | 19.420 | 16.900 |
| Unit Operations | 0.053 | 13.200 |
| Maintenance | 14.294 | 3.900 |
| Sustaining Support | 54.956 | 39.000 |
| Continuing System Improvements | 34.611 | 0.000 |
| Indirect Support | 3.220 | 7.200 |
| Other | -- | 0.000 |
| Total Unitized Cost (Base Year 2002 \$) | 126.554 | 80.200 |

| Total O&S Costs \$M | AEHF | Milstar |
|---------------------|--------|---------|
| Base Year | 2024.8 | 801.5 |
| Then Year | 3047.4 | 899.8 |