Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-210

Space Based Infrared System High (SBIRS High)

As of FY 2011 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

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

Space Based Infrared System (SBIRS) High Program (SBIRS High)

DoD Component

Air Force

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References

SAR Baseline (Development Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated March 19, 1998

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated March 31, 2006

Mission and Description

The Space Based Infrared Systems (SBIRS) High program is intended to satisfy key requirements delineated in the SBIRS Operational Requirements Document (ORD) dated August 15, 1996, with Annex 1 dated July 17, 1998, within the available budget and schedule. SBIRS High is an integrated system consisting of multiple space and ground elements, with incremental deployment phasing, simultaneously satisfying requirements in the following mission areas: Missile Warning, Missile Defense, Technical Intelligence and Battlespace Awareness. The constellation architecture for SBIRS High includes Highly Elliptical Orbit (HEO) sensors and Geosynchronous Earth Orbit (GEO) satellites, in addition to the following ground elements: a Continental United States (CONUS)-based Mission Control Station and Mission Control Station Backup, overseas Relay Ground Stations, Mobile Ground Stations, and associated communication links. The first increment of the SBIRS ground system was certified for operations in December 2001 and supports mission processing of the legacy Defense Support Program system satellites and fusion of HEO monotracks and other data. The SBIRS HEO system was certified for the Integrated Tactical Warning/Attack Assessment (ITW/AA) mission in November 2008 and the technical intelligence mission in August 2009.

Executive Summary

The Space Based Infrared System (SBIRS) development team completed several key events in 2009. Significant progress was demonstrated in both the ground and space segments, while successful Highly Elliptical Orbit (HEO) certification and Geosynchronous Earth Orbit (GEO) satellite system tests validated the functionality of the delivered products. Both the GEO 1 and GEO 2 space vehicles are moving through the integration, assembly and test procedures. The team completed all environmental testing required to qualify the GEO 1 space vehicle for operations and also completed the mating operations for the GEO 2 bus and payload. The ground software deliveries completed on schedule and a rigorous test verified the software prior to delivery to the System Engineering, Integration and Test (SEIT) segment for system integration. The GEO flight software development proceeded slightly behind plan, but the initial version of the final Flight Software System (FSS) code was completed and is in the parallel activities associated with software qualification.

Defense Acquisition Executive (DAE) Reviews

The Undersecretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) and key department staff conducted several reviews in 2008 to discuss the overhead persistent infrared enterprise activities. Major focus areas included the SBIRS Follow-on Production (SFP) program and the relationship of various technology demonstrations across the enterprise. Topics included requirements, technology maturation activities, and alternative SFP acquisition strategies. On December 1, 2008, the USD(AT&L) issued an Acquisition Decision Memorandum directing the contracting approach for the HEO payloads 3 and 4 and the GEO satellites 3 and 4. The Department submitted the appropriate documents to gain Congressional approval and funding authorization to start the GEO 4 long lead activities in FY 2009.

Acquisition Program Baseline (APB)

Early in 2008, the Wing submitted two program deviation reports to the Milestone Decision Authority, one acknowledging that the APB date for the HEO certification would not be met, and another reporting the GEO satellites deliveries and certification would not be achieved by the threshold date and the total procurement deviation due to the addition of funding for GEO 4 to the program. An updated APB is in coordination to reflect the revised program baseline.

HEO Activities

United States Strategic Command (USSTRATCOM) certified the HEO 1 system in December 2008. HEO 2 operational acceptance and USSTRATCOM certification occurred in August 2009. The National Geospatial Agency (NGA) also certified the HEO system for the Technical Intelligence mission in August 2009. The program office is currently pursuing initiatives to exploit and broadly disseminate HEO data. The team is executing seven projects funded through an FY 2009 Congressional budget increase of $15M. The projects emphasize utilizing HEO data to support Battlespace Awareness and other mission areas. All are on track to deliver capability to the warfighter in Spring and Summer 2010. The Space Awareness and Global Exploitation effort delivered baseline functionality into the Battlespace Awareness / Technical Intelligence Center at Buckley Air Force Base in January 2010. The HEO Environmental Data Distribution effort completed both Phase I – data translation to a new format, and Phase II - image and video creation. Several technical reports have been completed by the National Air and Space Intelligence Center under the HEO Military Utility Assessment effort.

GEO Spacecraft

The SBIRS program continues to make steady progress using a disciplined systems engineering approach. Both the GEO 1 and GEO 2 space vehicles have made significant assembly, integration and test progress. GEO 1 successfully completed all environmental testing – acoustic, pyroshock, and thermal vacuum, which validated the ability of the spacecraft to operate in the extremes of space. The team is completing necessary mechanical rework prior to the final testing required for delivery. GEO 1 readiness for launch is estimated for early 2011. The flight software subsystem is undergoing qualification testing in preparation for launch and on-orbit operations.

The GEO 2 payload completed thermal vacuum testing at Northrup Grumman in Azusa, CA and was delivered to Lockheed Martin in Sunnyvale, CA in April 2009 for integration and testing with the GEO 2 spacecraft. The GEO 2 spacecraft is 85 percent complete with its first integrated spacecraft/payload test and continues its progress towards launch in early 2012.

GEO Initial Operations (GIO)

The GIO software delivery was envisioned to be the ground segment's launch baseline when the program was reset in December 2007. However, the flight software issues have rippled into the ground segment activities and have impacted the GIO verification schedule. As a result, the GIO delivery has been divided into two delivery phases, pre- and post-launch. This strategy allows the program to maintain the launch schedule and provide a lower risk approach to delivering the needed ground software functionality prior to launch. The first phase will contain the capabilities required for launch, and the second phase will contain the capabilities required to complete GEO message certification. Formal verification of the launch-capable baseline was completed in October 2009 and the software was delivered for system testing in January 2010. The GEO message certification version will complete verification by December 2010.

Combined Day-in-the-Life Test (CDITL)

The SBIRS ground system includes software and hardware necessary to perform activation, checkout, and initial operations of the GEO 1 satellite after launch. SBIRS uses "Day-in-the-Life" (DITL) test events to validate the integrated ground system once it has completed a successful verification at the segment level. The GEO Initial Operations for Launch (GIO-L) CDITL test integrated several geographically separated sites used for command and control, factory engineering support and direct interface to mission data users. Each site contributed to the observed stability, robustness and operability of the SBIRS system. The CDITL Dry Run completed on October 27, 2009. The CDITL Run for Record (RFR) occurred from November 30 through December 17, 2009. The team is completing analysis of the issues found in the dry run and the RFR. Once complete, the ground software baseline used to support the GEO 1 launch activities will be turned over for system integration in early January 2010.

Ground Replan

In 2005, the strategy to develop and field ground capabilities was defined by major software deliveries that supported HEO Initial Operations, GEO Early On-orbit Test, GIO, and GEO Full Capability (GFC). However, in 2008 the program baseline was adjusted to accommodate flight software challenges by re-aligning ground system development with system need dates. The team took this opportunity to assess the delivery strategy for the ground products and related infrastructure and worked with the stakeholders to implement a more flexible architecture and, at the same time, achieve life-cycle efficiencies. These efficiencies were gained by delivering user capabilities earlier by dividing the software delivery originally referred to as GFC into smaller deliveries. Program personnel also examined and optimized the ground facilities and reduced the number of software baselines required to operate the legacy system while developing and transitioning SBIRS' capabilities to operations. The team assessed various alternatives to ensure that the selected strategy was consistent with the required technical content, and supported the overall cost and schedule objectives. The selected incremental "block" strategy is broken into two parts: Block 10 and Block 20. This approach lowers development risk, provides earlier capabilities to the user, and delivers a secure backup mission control station capability. Block 10 establishes the initial Increment 2 capability, which provides integrated GEO, HEO, and Defense Support Program (DSP) mission capability at a single government facility and backup facility, and enables the retirement of separate Increment 1 baselines. Block 20 establishes the full Increment 2 capability, which provides automated mission processing algorithms, automated sensor cueing and tasking, enabling exploitation of both the scanning and tuned staring sensor and satisfies the 1996 Operational Requirement Document (ORD) requirements.

SBIRS Follow-on Production (SFP)

The SFP contract procures GEO satellites 3 and 4, HEO payloads 3 and 4, and associated ground modifications. The long lead activity for GEO 3 and HEO 3 was definitized in April 2009. The program office is proceeding with SFP activities and anticipates awarding the full production contract in April 2010.

Software Statement

Software issues have significantly impacted the SBIRS program and continue to be on the critical path of the program and a key focus area of program office and contractor leadership. The challenges with development of the revised FSS and subsequent recovery resulted in program delays. The revised FSS coding is complete and the flight software subsystem is undergoing qualification testing in preparation for launch and on-orbit operations.

Threshold Breaches

APB Breaches		
Schedule		☑
Performance		☐
Cost	RDT&E	☑
	Procurement	☑
	MILCON	☐
	Acq O&M	☐
O&S Cost		☑
Unit Cost	PAUC	☐
	APUC	☐

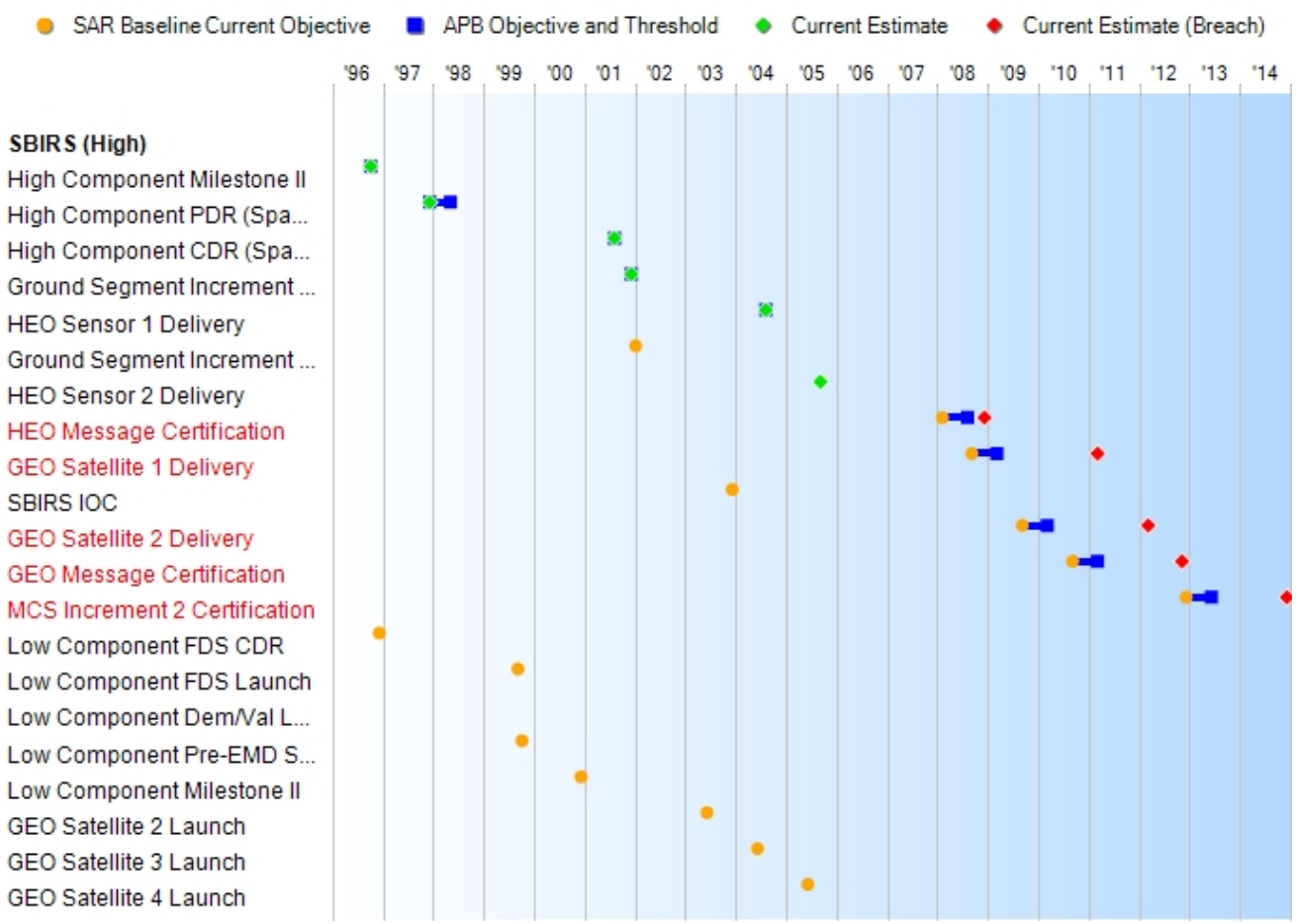
Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

Explanation of Breach

The schedule milestone deviations against the Geosynchronous Earth Orbit (GEO) Satellite 1 delivery, GEO Satellite 2 delivery, and GEO Message Certification are attributed to technical issues with the Flight Software Subsystem (FSS) and implementation of the subsequent recovery plan, as well as some hardware issues. The cost deviation against the Procurement appropriation is due to the addition of GEO Satellite 4 to the baseline program. Since the previous SAR, funding for GEO Satellite 5 and 6 was added to the program's budget. A Program Deviation Report (PDR) reporting these breaches was submitted in January 2008 and received by the Milestone Decision Authority in February 2008. A revised Acquisition Program Baseline (APB) is in coordination updating the schedule milestone objective dates and the costs for the GEO Satellite 4 into the SBIRS APB.

The schedule milestone deviation against the Mission Control Station (MCS) Increment 2 Certification is due to overall program delays. The cost deviation against the Research Development Test & Evaluation (RDT&E) appropriation is due to the additional costs required to complete the SBIRS Engineering, Manufacturing and Development (EMD) program as a result of schedule delays, including GEO Satellite 1 launch slip from December 2009 to December 2010, as well as the additional costs required to implement the revised SBIRS Ground acquisition strategy. A PDR reporting this deviation is in coordination. A revised APB is in coordination revising the APB milestones to align with the revised ground acquisition strategy and to revise the RDT&E costs.

Schedule


SAR Baseline Current Objective
APB Objective and Threshold
Current Estimate
Current Estimate (Breach)
'96
'97
'98
'99
'00
'01
'02
'03
'04
'05
'06
'07
'08
'09
'10
'11
'12
'13
'14
SBIRS (High)
High Component Milestone II
High Component PDR (Spa...
High Component CDR (Spa...
Ground Segment Increment ...
HEO Sensor 1 Delivery
Ground Segment Increment ...
HEO Sensor 2 Delivery
HEO Message Certification
GEO Satellite 1 Delivery
SBIRS IOC
GEO Satellite 2 Delivery
GEO Message Certification
MCS Increment 2 Certification
Low Component FDS CDR
Low Component FDS Launch
Low Component Dem/Val L...
Low Component Pre-EMD S...
Low Component Milestone II
GEO Satellite 2 Launch
GEO Satellite 3 Launch
GEO Satellite 4 Launch

Schedule Events					
Events	**SAR Baseline Development Estimate**	**Current APB Development Objective/Threshold**		**Current Estimate**	
High Component Milestone II	Oct 1996	Oct 1996	Oct 1996	Oct 1996	
High Component PDR (Space and Ground Increment 2)	Dec 1997	Dec 1997	May 1998	Dec 1997	
High Component CDR (Space and Ground Increment 2)	Sep 1999	Aug 2001	Aug 2001	Aug 2001	
Ground Segment Increment 1 Certification	Aug 1999	Dec 2001	Dec 2001	Dec 2001	
HEO Sensor 1 Delivery	Sep 2001	Aug 2004	Aug 2004	Aug 2004	
Ground Segment Increment 2 Certification	Jan 2002	N/A	N/A	N/A	
HEO Sensor 2 Delivery	Sep 2003	Sep 2005	Sep 2005	Sep 2005	
HEO Message Certification	N/A	Feb 2008	Aug 2008	**Dec 2008**[1]	
GEO Satellite 1 Delivery	N/A	Sep 2008	Mar 2009	**Mar 2011**[1]	(Ch-1)
SBIRS IOC	Dec 2003	N/A	N/A	N/A	
GEO Satellite 2 Delivery	N/A	Sep 2009	Mar 2010	**Mar 2012**[1]	(Ch-1)
GEO Message Certification	N/A	Sep 2010	Mar 2011	**Nov 2012**[1]	(Ch-1)
MCS Increment 2 Certification	N/A	Dec 2012	Jun 2013	**Dec 2014**[1]	(Ch-2)
Low Component FDS CDR	Dec 1996	N/A	N/A	N/A	
Low Component FDS Launch	Sep 1999	N/A	N/A	N/A	
Low Component Dem/Val Launch	TBD	N/A	N/A	N/A	
Low Component Pre-EMD Start	Oct 1999	N/A	N/A	N/A	
Low Component Milestone II	Dec 2000	N/A	N/A	N/A	
GEO Satellite 2 Launch	Jun 2003	N/A	N/A	N/A	
GEO Satellite 3 Launch	Jun 2004	N/A	N/A	N/A	
GEO Satellite 4 Launch	Jun 2005	N/A	N/A	N/A	

[1] *APB Breach*

Change Explanations

(Ch-1) The current estimate for GEO Satellite 1 Delivery has changed from December 2009 to March 2011 , the current estimate for GEO Satellite 2 Delivery has changed from December 2010 to March 2012, and the current estimate for GEO Message Certification has changed from August 2011 to November 2012 due to continued delays associated with the Flight Software System (FSS) and other mechanical issues. A Program Deviation Report (PDR) reporting the breach was submitted and received by the Milestone Decision Authority. A revised Acquisition Program Baseline (APB) is in coordination.

(Ch-2) The current estimate for MCS Increment 2 Certification has changed from December 2012 to December 2014 due to overall program delays, as well as the implementation of the revised ground acquisition strategy. A Program Deviation Report (PDR) reporting the breach is in coordination. An APB is in coordination to update the schedule milestones to align with the revised Ground acquisition strategy, which will provide Initial Increment 2 capability (Block 10) in the first ground facility in December 2014. Full Increment 2 Operational capability (Block 20) will be provided in a subsequent delivery.

Notes

GEO Satellite Delivery is defined as a Wing-accepted satellite ready for shipment to the launch facility.

Acronyms and Abbreviations

CDR - Critical Design Review
GEO - Geosynchronous Earth Orbit
HEO - Highly Elliptical Orbit
IOC - Initial Operational Capability
MCS - Mission Control Station
PDR - Preliminary Design Review

Performance

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

Track to Budget

RDT&E

Appn	BA	PE
Air Force	3600 05	0640441F

Project	Name
3616	SBIR High Element EMD/SBIRS High EMD

Procurement

Appn	BA	PE
Air Force	3080 03	0305915F

Line Item	Name
836720	SBIR High Other Procurement

Appn	BA	PE
Air Force	3020 05	0305915F

Line Item	Name
MSSBIR	SBIR High Missile Procurement

MILCON

Appn	BA	PE
Air Force	3300	0640441F

Project	Name
	SBIRS ARCHI-EMD (SPACE) Military Contruction

Acq O&M

Appn	BA	PE
Air Force	3400	0350915F

Project	Name
	SBIRS Operation and Maintenance

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 1995 $M			BY 1995 $M	TY $M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	3016.6	7018.1	7719.9	**8156.0**[1]	3386.5	8192.5	9740.2
Procurement	496.7	1342.8	1477.1	**3881.0**[1]	584.5	1723.2	5157.3
Flyaway	--	--	--	3446.1	--	--	4583.5
Recurring	--	--	--	2830.3	--	--	3770.0
Non Recurring	--	--	--	615.8	--	--	813.5
Support	--	--	--	434.9	--	--	573.8
Other Support	--	--	--	434.9	--	--	573.8
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	26.0	52.0	57.2	52.0	28.5	57.0	57.0
Acq O&M	140.2	156.4	172.0	137.5	147.8	185.9	161.1
Total	3679.5	8569.3	N/A	12226.5	4147.3	10158.6	15115.6

[1] *APB Breach*

Total Quantity			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	3	2	2
Procurement	2	1	4
Total	5	3	6

Quantity Notes

The above quantity represents six Geosynchronous Earth Orbit (GEO) satellites.

Cost and Funding

Funding Summary

Appropriation Summary									
FY 2011 President's Budget / December 2009 SAR (TY$ M)									
Appropriation	Prior	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	To Complete	Total
RDT&E	7302.2	521.2	530.0	504.4	389.2	313.3	179.9	0.0	9740.2
Procurement	1778.4	175.5	972.8	1316.7	768.7	75.2	70.0	0.0	5157.3
MILCON	57.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.0
Acq O&M	125.9	10.2	11.5	13.5	0.0	0.0	0.0	0.0	161.1
PB 2011 Total	9263.5	706.9	1514.3	1834.6	1157.9	388.5	249.9	0.0	15115.6
PB 2009 Total	9156.3	633.3	1077.9	351.8	335.2	0.0	0.0	0.0	11554.5
Delta	107.2	73.6	436.4	1482.8	822.7	388.5	249.9	0.0	3561.1

Quantity Summary										
FY 2011 President's Budget / December 2009 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	To Complete	Total
Development	2	0	0	0	0	0	0	0	0	2
Production	0	1	0	1	1	1	0	0	0	4
PB 2011 Total	2	1	0	1	1	1	0	0	0	6
PB 2009 Total	2	1	0	1	0	0	0	0	0	4
Delta	0	0	0	0	1	1	0	0	0	2

Cost and Funding

Annual Funding By Appropriation

Annual Funding 3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1995	--	--	--	--	--	--	113.0
1996	--	--	--	--	--	--	164.0
1997	--	--	--	--	--	--	193.0
1998	--	--	--	--	--	--	337.9
1999	--	--	--	--	--	--	502.6
2000	--	--	--	--	--	--	400.0
2001	--	--	--	--	--	--	550.1
2002	--	--	--	--	--	--	524.5
2003	--	--	--	--	--	--	782.9
2004	--	--	--	--	--	--	621.8
2005	--	--	--	--	--	--	587.1
2006	--	--	--	--	--	--	706.6
2007	--	--	--	--	--	--	693.0
2008	--	--	--	--	--	--	583.3
2009	--	--	--	--	--	--	542.4
2010	--	--	--	--	--	--	521.2
2011	--	--	--	--	--	--	530.0
2012	--	--	--	--	--	--	504.4
2013	--	--	--	--	--	--	389.2
2014	--	--	--	--	--	--	313.3
2015	--	--	--	--	--	--	179.9
Subtotal	2	--	--	--	--	--	9740.2

Annual Funding 3600 | RDT&E | Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 1995 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1995	--	--	--	--	--	--	111.3
1996	--	--	--	--	--	--	158.7
1997	--	--	--	--	--	--	184.3
1998	--	--	--	--	--	--	320.6
1999	--	--	--	--	--	--	471.9
2000	--	--	--	--	--	--	370.0
2001	--	--	--	--	--	--	501.7
2002	--	--	--	--	--	--	473.3
2003	--	--	--	--	--	--	696.9
2004	--	--	--	--	--	--	540.0
2005	--	--	--	--	--	--	497.2
2006	--	--	--	--	--	--	580.9
2007	--	--	--	--	--	--	555.1
2008	--	--	--	--	--	--	458.1
2009	--	--	--	--	--	--	420.5
2010	--	--	--	--	--	--	399.9
2011	--	--	--	--	--	--	401.4
2012	--	--	--	--	--	--	375.9
2013	--	--	--	--	--	--	285.2
2014	--	--	--	--	--	--	225.7
2015	--	--	--	--	--	--	127.4
Subtotal	2	--	--	--	--	--	8156.0

The funding profile above includes the FY 2010 Congressional increase for Space Based Infrared System (SBIRS) data exploitation.

Annual Funding 3020 | Procurement | Missile Procurement, Air Force							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	--	173.1	--	91.2	264.3	6.8	271.1
2009	1	1076.6	--	300.2	1376.8	18.1	1394.9
2010	--	128.8	--	15.8	144.6	28.9	173.5
2011	1	760.2	18.5	125.0	903.7	44.3	948.0
2012	1	965.3	--	255.6	1220.9	56.4	1277.3
2013	1	647.5	--	25.7	673.2	70.8	744.0
2014	--	--	--	--	--	71.6	71.6
2015	--	--	--	--	--	65.0	65.0
Subtotal	4	3751.5	18.5	813.5	4583.5	361.9	4945.4

Annual Funding 3020 | Procurement | Missile Procurement, Air Force							
Fiscal Year	Quantity	BY 1995 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	--	135.1	--	71.2	206.3	5.3	211.6
2009	1	829.5	--	231.3	1060.8	13.9	1074.7
2010	--	98.1	--	12.0	110.1	22.0	132.1
2011	1	570.7	13.9	93.8	678.4	33.3	711.7
2012	1	712.8	--	188.8	901.6	41.6	943.2
2013	1	470.2	--	18.7	488.9	51.3	540.2
2014	--	--	--	--	--	51.1	51.1
2015	--	--	--	--	--	45.6	45.6
Subtotal	4	2816.4	13.9	615.8	3446.1	264.1	3710.2

The Missile Procurement Air Force (MPAF) funding profile above represents funding for Geosynchronous Earth Orbit (GEO) satellites 3 through 6. MPAF funds for Highly Elliptical Orbit (HEO) 3 and 4 payloads are excluded. HEO 3 and 4 payloads are replenishment payloads and are baselined separately.

Cost Quantity Information 3020 | Procurement | Missile Procurement, Air Force		
Fiscal Year	**Quantity**	**End Item Recurring Flyaway (Aligned With Quantity) BY 1995 $M**
2008	--	--
2009	1	882.2
2010	--	--
2011	1	608.7
2012	1	730.7
2013	1	594.8
2014	--	--
2015	--	--
Subtotal	4	2816.4

Annual Funding 3080 | Procurement | Other Procurement, Air Force							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2004	--	--	--	--	--	96.4	96.4
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	3.6	3.6
2007	--	--	--	--	--	6.5	6.5
2008	--	--	--	--	--	4.0	4.0
2009	--	--	--	--	--	1.9	1.9
2010	--	--	--	--	--	2.0	2.0
2011	--	--	--	--	--	24.8	24.8
2012	--	--	--	--	--	39.4	39.4
2013	--	--	--	--	--	24.7	24.7
2014	--	--	--	--	--	3.6	3.6
2015	--	--	--	--	--	5.0	5.0
Subtotal	--	--	--	--	--	211.9	211.9

Annual Funding 3080 | Procurement | Other Procurement, Air Force							
Fiscal Year	Quantity	BY 1995 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2004	--	--	--	--	--	84.1	84.1
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	3.0	3.0
2007	--	--	--	--	--	5.2	5.2
2008	--	--	--	--	--	3.1	3.1
2009	--	--	--	--	--	1.5	1.5
2010	--	--	--	--	--	1.5	1.5
2011	--	--	--	--	--	18.8	18.8
2012	--	--	--	--	--	29.4	29.4
2013	--	--	--	--	--	18.1	18.1
2014	--	--	--	--	--	2.6	2.6
2015	--	--	--	--	--	3.5	3.5
Subtotal	--	--	--	--	--	170.8	170.8

$78 million in FY 2009 Other Procurement Air Force (OPAF) funds for Highly Elliptical Orbit (HEO) 3 ground modifications are excluded. It is a replenishment program and is baselined separately.

Annual Funding 3300 | MILCON | Military Construction, Air Force	
Fiscal Year	**TY $M** **Total Program**
1997	14.5
1998	14.0
1999	--
2000	--
2001	2.8
2002	18.8
2003	6.9
Subtotal	57.0

Annual Funding 3300 | MILCON | Military Construction, Air Force	
Fiscal Year	**BY 1995 $M** **Total Program**
1997	13.7
1998	13.1
1999	--
2000	--
2001	2.5
2002	16.7
2003	6.0
Subtotal	52.0

Annual Funding 3400 | Acq O&M | Operation and Maintenance, Air Force	
Fiscal Year	TY $M Total Program
1998	10.4
1999	17.0
2000	15.6
2001	17.6
2002	18.2
2003	0.3
2004	6.9
2005	7.0
2006	5.4
2007	7.6
2008	9.7
2009	10.2
2010	10.2
2011	11.5
2012	13.5
Subtotal	161.1

Annual Funding 3400 | Acq O&M | Operation and Maintenance, Air Force	
Fiscal Year	BY 1995 $M
	Total Program
1998	9.9
1999	16.0
2000	14.4
2001	16.1
2002	16.4
2003	0.3
2004	6.0
2005	5.9
2006	4.4
2007	6.1
2008	7.6
2009	7.9
2010	7.8
2011	8.7
2012	10.0
Subtotal	137.5

Low Rate Initial Production

The Space Based Infrared System (SBIRS) Program does not have Low Rate Initial Production.

Foreign Military Sales

None

Nuclear Costs

None

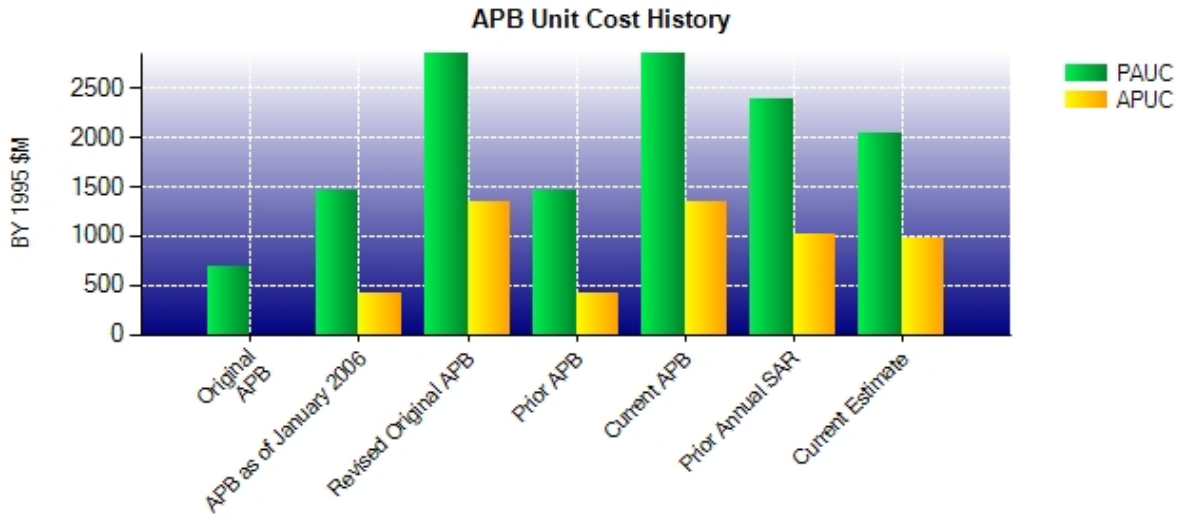
Unit Cost

Unit Cost Report

Item	BY 1995 $M Current UCR Baseline (Mar 2006 APB)	BY 1995 $M Current Estimate (Dec 2009 SAR)	% Change
Program Acquisition Unit Cost			
Cost	8569.3	12226.5	
Quantity	3	6	
Unit Cost	2856.433	2037.750	-28.66
Average Procurement Unit Cost			
Cost	1342.8	3881.0	
Quantity	1	4	
Unit Cost	1342.800	970.250	-27.74

Item	BY 1995 $M Revised Original UCR Baseline (Mar 2006 APB)	BY 1995 $M Current Estimate (Dec 2009 SAR)	% Change
Program Acquisition Unit Cost			
Cost	8569.3	12226.5	
Quantity	3	6	
Unit Cost	2856.433	2037.750	-28.66
Average Procurement Unit Cost			
Cost	1342.8	3881.0	
Quantity	1	4	
Unit Cost	1342.800	970.250	-27.74

Unit Cost History



Item	Date	BY 1995 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Oct 1996	693.980	N/A	732.340	N/A
APB as of January 2006	Sep 2002	1467.640	420.500	1684.180	499.133
Revised Original APB	Mar 2006	2856.433	1342.800	3386.200	1723.200
Prior APB	Sep 2002	1467.640	420.500	1684.180	499.133
Current APB	Mar 2006	2856.433	1342.800	3386.200	1723.200
Prior Annual SAR	Dec 2007	2389.675	1014.300	2888.625	1337.350
Current Estimate	Dec 2009	2037.750	970.250	2519.267	1289.325

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY $M)									
Initial PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
829.460	-4.050	172.641	93.383	84.400	1247.350	0.000	96.083	1689.807	2519.267

Current SAR Baseline to Current Estimate (TY $M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
292.250	-3.450	358.375	-0.175	0.000	498.200	0.000	144.125	997.075	1289.325

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone I	N/A	N/A	N/A	N/A
Milestone II	N/A	Oct 1996	N/A	Oct 1996
Milestone III	N/A	N/A	N/A	N/A
IOC	N/A	Dec 2003	N/A	N/A
Total Cost (TY $M)	2670.3	4147.3	N/A	15115.6
Total Quantity	N/A	5	N/A	6
PAUC	N/A	829.460	N/A	2519.267

Cost Variance

Summary TY $M					
Item	**RDT&E**	**Procurement**	**MILCON**	**Acq O&M**	**Total**
SAR Baseline (Development Estimate)	3386.5	584.5	28.5	147.8	4147.3
Previous Changes					
Economic	+19.3	+20.5	-1.4	+2.6	+41.0
Quantity	-152.7	-146.1	--	--	-298.8
Schedule	+561.0	-0.7	--	--	+560.3
Engineering	+514.2	--	+7.8	-15.6	+506.4
Estimating	+4327.0	+2093.7	+22.1	+32.7	+6475.5
Other	--	--	--	--	--
Support	--	+122.8	--	--	+122.8
Subtotal	+5268.8	+2090.2	+28.5	+19.7	+7407.2
Current Changes					
Economic	-30.3	-34.3	--	-0.7	-65.3
Quantity	--	+2164.1	--	--	+2164.1
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	+1115.2	-100.9	--	-5.7	+1008.6
Other	--	--	--	--	--
Support	--	+453.7	--	--	+453.7
Subtotal	+1084.9	+2482.6	--	-6.4	+3561.1
Total Changes	+6353.7	+4572.8	+28.5	+13.3	+10968.3
Current Estimate	9740.2	5157.3	57.0	161.1	15115.6

Summary BY 1995 $M					
Item	**RDT&E**	**Procurement**	**MILCON**	**Acq O&M**	**Total**
SAR Baseline (Development Estimate)	3016.6	496.7	26.0	140.2	3679.5
Previous Changes					
Economic	--	--	--	--	--
Quantity	-128.4	-115.8	--	--	-244.2
Schedule	+416.6	-115.1	--	--	+301.5
Engineering	+460.5	--	+6.8	-13.5	+453.8
Estimating	+3571.0	+1660.1	+19.2	+15.1	+5265.4
Other	--	--	--	--	--
Support	--	+102.7	--	--	+102.7
Subtotal	+4319.7	+1531.9	+26.0	+1.6	+5879.2
Current Changes					
Economic	--	--	--	--	--
Quantity	--	+1593.2	--	--	+1593.2
Schedule	--	--	--	--	--
Engineering	--	--	--	--	--
Estimating	+819.7	-73.0	--	-4.3	+742.4
Other	--	--	--	--	--
Support	--	+332.2	--	--	+332.2
Subtotal	+819.7	+1852.4	--	-4.3	+2667.8
Total Changes	+5139.4	+3384.3	+26.0	-2.7	+8547.0
Current Estimate	8156.0	3881.0	52.0	137.5	12226.5

Previous Estimate: December 2007

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-30.3
Adjustment for current and prior escalation. (Estimating)	+5.6	+7.7
Revised estimate due to Flight Software System recovery. (Estimating)	+12.1	+15.1
Congressional increase for Highly Elliptical Orbit (HEO) data exploitation. (Estimating)	+11.7	+15.0
Congressional General Reduction. (Estimating)	-3.1	-4.0
Revised estimate due to update to program office support. (Estimating)	-25.0	-33.9
Revised estimate due to Geosynchronous Earth Orbit (GEO) 1 launch delay from December 2009 to December 2010 and subsequent program extension. (Estimating)	+275.5	+372.8
Reprogramming due to higher headquarters priorities. (Estimating)	-15.3	-20.4
Revised estimate due to non fuel purchase inflation adjustment. (Estimating)	-47.1	-63.7
Revised estimate due to implementation of revised Ground acquisition strategy. (Estimating)	+289.4	+393.8
Congressional increase for ground development. (Estimating)	+10.6	+13.8
Revised estimate due to the Commercially Hosted Infrared Payload (CHIRP) effort. (Estimating)	+26.3	+35.0
Revised estimate due to incorporation of the technology maturation/parts obsolescence effort. (Estimating)	+279.0	+384.0
RDT&E Subtotal	+819.7	+1084.9

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-34.3
Quantity change due to the addition of Geosynchronous Earth Orbit (GEO) satellite 5 and 6. (Quantity)	+1593.2	+2164.1
Correction to align support and flyaway. (Subtotal)	0.0	0.0
(Estimating)	(+0.1)	(+0.1)
(Support)	(-0.1)	(-0.1)
Adjustment for current and prior escalation. (Estimating)	+11.8	+15.4
Revised estimate due to updated support requirements. (Estimating)	0.0	+0.1
Revised estimate due to reallocation of costs between GEO 3 and Highly Elliptical Orbit (HEO) 3. (Estimating)	-26.5	-33.9
Revised estimate to support two years of GEO 4 long lead procurement. (Estimating)	+92.4	+120.0
Congressional General Reductions. (Estimating)	-2.7	-3.5
Revised estimate due to reallocation of costs from end item related to support and revised program office estimate for out years. (Estimating)	-148.1	-199.1
Increase in Other Support (Air Force) due to inclusion of Electromagnetic Pulse Hardening (HEMP) effort, Space Based Infrared System (SBIRS) Survivable Endurable Evolution (S2E2) and the Ultra High Frequency (UHF) ARC-210 radio upgrade. (Support)	+68.2	+91.9
Increase in Other Support (Air Force) due to realignment of Missile Procurement (Air Force) support costs to the support category, which were previously reported in end item, and revised program office estimate. (Support)	+264.1	+361.9
Procurement Subtotal	+1852.4	+2482.6

Acq O&M	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-0.7
Adjustment for current and prior escalation. (Estimating)	+0.3	+0.2
Revised estimate due updated program office requirement. (Estimating)	-4.6	-5.9
Acq O&M Subtotal	-4.3	-6.4

Contracts

Contract Identification

Appropriation: RDT&E
Contract Name: SBIRS High EMD Mod
Contractor: Lockheed Martin Corporation
Contractor Location: Sunnyvale, CA 94089
Contract Number: F04701-95-C-0017
Contract Type: Cost Plus Award Fee (CPAF)
Award Date: November 08, 1996
Definitization Date: November 08, 1996

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
1590.1	N/A	2	5442.1	N/A	2	8018.7	8894.8

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/29/2009)	-188.6	-53.6
Previous Cumulative Variances	-67.7	-28.8
Net Change	-120.9	-24.8

Cost and Schedule Variance Explanations

General Contract Variance Explanation

The net unfavorable cost variance of $120.9M is primarily due to technical issues associated with the Space Vehicle (SV) $53.3M, Software Product $56.6M, and Integrated Ground Products $16.5M.

The cumulative schedule variance was reset in December 2007. The cumulative and net unfavorable schedule variance of $53.6M and $24.8M, respectively, since the reset is primarily due to difficulties with the SV $33.0M, Software Product $4.5M, Operations and Support $7.8M, and Systems Engineering, Integration and Test (SEIT) $5.2M.

Notes

The SBIRS High program incorporated the Flight Software Subsystem (FSS) replan into the Integrated Master Schedule (IMS) in January 2008. An Over Target Baseline (OTB) was conducted and reflected in the January 2008 Contract Performance Report (CPR). Cumulative schedule variance was reset to zero as of December 2007. The cumulative cost variance was not reset. An Integrated Baseline Review (IBR) was completed in September 2008 to validate that all aspects of the FSS replan were fully incorporated into the IMS and performance baseline.

The current Engineering, Manufacturing and Development contract Estimated Price at Completion, as reported in the November 2009 CPR is $8,018.7M, compared to $7,174.5M in the previous SAR. The $844.2M increase is the result of a one year contract extension, added contractual scope and award fee for Contractor Logistics Support in FY 2009 and FY 2010 and the Ground Block 10 replan. Contract variances associated with the 2008 OTB and cost growth also contributed to the increase. The Program Manager's Estimated Price at Completion is $8,894.8M, and is based on the comprehensive Program Office Estimate at Completion, which includes FSS impacts, Ground Block 10 and 20, associated fee, and assumes a Geosynchronous Earth Orbit (GEO) satellite1 launch in November 2011.

The increase from the initial target contract price to the current contract target price is largely due to multiple program restructures and program extensions.

Due to additional program issues and delays, the program is currently planning to implement an OTB in Spring 2010, pending required approvals. An IBR will follow to validate the revised baseline.

Contract Identification

Appropriation: Procurement
Contract Name: SBIRS Follow-on Production
Contractor: Lockheed Martin Corporation
Contractor Location: Sunnyvale, CA 94089
Contract Number: FA8810-08-C-0002
Contract Type: Cost Plus Fixed Fee (CPFF), Cost Plus Award Fee (CPAF)
Award Date: March 14, 2008
Definitization Date: April 08, 2009

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
370.0	N/A	0	370.0	N/A	0	2119.9	2119.9

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/29/2009)	+6.4	-10.9
Previous Cumulative Variances	--	--
Net Change	+6.4	-10.9

Cost and Schedule Variance Explanations

General Contract Variance Explanation

The net favorable cost variance of $6.4M is primarily due to material efficiencies in the Geosynchronous Earth Orbit (GEO) payload. The favorable cost variance is offset by technical issues in the GEO and Highly Elliptical Orbit (HEO) payload Pointing and Control Assembly (PCA), and overrun on the GEO 3 long lead effort due to support to the Undefinitized Contract Action (UCA) and production proposal development efforts.

The net unfavorable schedule variance of $10.9M is due to late receipt of materials in several areas and technical issues in the HEO PCA effort.

Notes

The SBIRS Follow-on Production contract was awarded via letter contract in March 2008 to procure long lead items associated with Geosynchronous Earth Orbit (GEO) satellite 3 and Highly Elliptical Orbit (HEO) payload 3. This effort was definitized in April 2009. Two additional efforts have subsequently been added via letter contract, the full production effort for GEO 3 and HEO 3, and the long lead effort for GEO 4 and HEO 4. Contract negotiations are currently ongoing and definitization of these additional efforts is expected to complete in Spring 2010. The program office is planning an Integrated Baseline Review (IBR) in Summer/Fall 2010.

Deliveries and Expenditures

Deliveries				
Delivered to Date	**Planned to Date**	**Actual to Date**	**Total Quantity**	**Percent Delivered**
Development	0	0	2	0.00%
Production	0	0	4	0.00%
Total Program Quantity Delivered	0	0	6	0.00%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	15115.6	Years Appropriated	16
Expended to Date	7877.7	Percent Years Appropriated	76.19%
Percent Expended	52.12%	Appropriated to Date	9970.4
Total Funding Years	21	Percent Appropriated	65.96%

Operating and Support Cost

Assumptions and Ground Rules

Operations and Maintenance funds support the activation of the SBIRS High System, including Component ground operating and training facilities at worldwide sites. SBIRS Increment 1 ground system became operational in December 2001. These funds support the procurement of temporary facilities, minor construction, office equipment, furniture, travel, supplies, and communication links necessary for the activation of the SBIRS Mission Control Station, the Mission Control Station Backup, Outside Continental United States Relay Ground Stations, and Initial Qualification Training facility. Also supported with these funds are the repair and transportation of Government Furnished Equipment and Temporary Duty costs for training of the initial cadre of operators.

The SBIRS High profile reflects a 30-year Life Cycle Cost and is based upon the Operations and Maintenance Database jointly maintained by Headquarters, Air Force Space Command (HQ AFSPC) and the program office, reviewed and updated in January 2010.

Comparable Operating and Support cost estimates for the legacy system, Defense Support Program, are not available.

Cost Estimate Reference:
None

Sustainment Strategy:
None
Antecedent Information:
None

Unitized O&S Costs BY1995 $M		
Cost Element	**SBIRS (High) Avg Annual Cost For SBIRS High System**	**Defense Support Prog (Antecedent)**
Mission Pay & Allowance	2.760	--
Unit Level Consumption	3.550	--
Intermediate Maintenance	0.950	--
Depot Maintenance	1.080	--
Contractor Support	103.290	--
Sustaining Support	16.020	--
Indirect	10.970	--
Other	--	--
Total	138.620	--

Unitized Cost Comments:
None

Item	Total O&S Cost $M			
	SBIRS (High)			Defense Support Prog (Antecedent)
	Current Development APB Objective/Threshold		Current Estimate	
Base Year	843.2	927.5	**4158.4**[1]	N/A
Then Year	1097.1	N/A	6421.1	N/A

[1] *APB O&S Cost Breach*

Total O&S Cost Comment
None

Disposal Estimate Details

Date of Estimate:

Source of Estimate:

Disposal/Demilitarization Total Cost (BY 1995 $M):