



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



Space Based Infrared System High (SBIRS High)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

~~This document contains information that may be exempt from mandatory disclosure under the FOIA.~~

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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)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

Space Based Infrared System High (SBIRS High)

DoD Component

Air Force

This is a United States Space Force program.

Responsible Office

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References

SAR Baseline (Production Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated September 4, 2012

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated February 27, 2013

Mission and Description

The Space Based Infrared System High (SBIRS High) program is intended to satisfy key requirements delineated in the SBIRS 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-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 technical intelligence mission in August 2009. The SBIRS GEO 1 and 2 systems were ITW/AA mission certified in August 2013 and December 2013, respectively. The SBIRS GEO 3 and 4 systems Operationally Accepted in September 2018 and May 2019, respectively. These were the final deliveries required to complete the SBIRS High space constellation. Final Increment 2 Ground Architecture completed in September 2019.

The SBIRS High MDAP includes two subprograms: the Baseline subprogram, comprised of GEO satellites 1-4, HEO payloads 1-2 and associated ground elements; and the GEO 5-6 Satellites Replenishment Production "Block Buy" subprogram. The Baseline subprogram was 90% delivered by December 2015 and was last reported in the December 2015 SAR. Therefore, only the Block Buy GEO 5-6 subprogram is the subject of this SAR.

On December 20, 2019, the President of the United States established the United States Space Force which assumed the responsibility for all major space acquisition programs. This program is now a United States Space Force program.

Executive Summary

Program Highlights Since Last Report

The SBIRS Block Buy Geosynchronous Earth Orbit (GEO) 5-6 production team made significant progress this reporting period. Notable accomplishments include completion of the GEO-5 Propulsion subsystem integration work at Lockheed Martin's (LM)'s Stennis, Mississippi facility, successful delivery of the GEO-5 payload from Northrop-Grumman, mating of the payload to the GEO-5 spacecraft bus, shipment of the GEO-6 core to the Stennis facility for propulsion system integration, and completion of the Software Item Qualification Test. During the Software Acceptance Review, all Flight Software (FSW) requirements were verified. Final software documentation remains open while software engineering, Thermal-Vacuum (TVAC) testing, and preparations for final integration testing are in progress leading up to Space Vehicle (SV) delivery.

The SBIRS GEO 5-6 production contract is 76.6% complete as of December 2019, with planned procurements and fabrication continuing. Cost and schedule performance trends have remained steady.

LM's schedule recovery plan has continued to hold for the past four quarters supporting contract delivery date and the GEO-5 APB delivery schedule threshold. However, there is still significant risk of schedule overruns and failure to deliver the SVs by the contract delivery dates due to pressure in specific manufacturing and integration areas. The Air Force is closely engaged with LM leadership on the rework required for the propulsion subsystem Pressure Regulator Valve System (PRVS) issue, the SV Baseline (SVB) testing, and conduct of the SV TVAC test, which must be successfully completed to meet the delivery date for GEO-5.

LM instituted a third shift and 24/7 work schedule going forward for all GEO-5 mechanical work. The added shift is one of the last opportunities available to LM to create margin in the schedule. LM started the extra shift during SVB testing in November 2019 and they plan to continue it as long as needed to maintain the September 30, 2020 delivery date.

The government team is working to resolve additional risks with LM, including a Hydrazine Bi-propellant Thruster changeout, due to a performance shortfall, and an orificing change to address a water-hammer issue for fuel delivery to the Reaction Engine Assemblies. All work related to these issues was incorporated into the PRVS re-work. Successful completion of the SVB testing and PRVS re-work are constraints to starting TVAC testing forecasted to start in March 2020.

The PM continues to be concerned about the remaining manufacturing effort and schedule performance of the contractor. To help mitigate all issues, the Program Office is engaged on many fronts to include leadership meetings, increased audits, and surveillance and independent government analysis of technical and schedule issues.

The Space Force is addressing FSW issues as described above.

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	Significant Development Description
December 2008	DAE directed the SBIRS Wing to negotiate undefinitized contract options that included a Geosynchronous Earth Orbit (GEO)-5 option that planned for an advanced procurement in FY 2011, and a GEO-6 option with Lockheed Martin (LM) that planned for an advanced procurement in FY 2012.
February 2011	Program office team met twice with the Secretary of the Air Force for Acquisition (SAF/AQ) to review the GEO 5-6 acquisition strategy. The team gained agreement on the approach.
July 2011	Satellite Replenishment Production (SRP) sole source Justification Review Documents signed by the Service Acquisition Executive (SAE) provided approval to procure the GEO-5 and GEO-6 satellite vehicles from LM. A new fixed price incentive firm target (FPIF) contract established for this SRP effort.
October 2011	GEO 5-6 Acquisition Strategy Document (ASD) approved by the SAE. SBIRS Block Buy Program initiated and first year's funding began in 2011.
January 2012	Under Secretary of Defense (Acquisition, Technology and Logistics) (USD/AT&L) signed ADM authorizing increase to the SBIRS Program of Record quantity for the GEOs 5 and 6 satellites and \$75M of advance procurement funds for these satellites. DAE signed an updated SBIRS High APB that reset cost and schedule parameters and incorporated the GEO-4 satellite into the program baseline. The previously reported APB deviations against schedule and Research, Development, Test & Evaluation costs were resolved. The procurement cost remained in deviation due to a quantity difference between the APB (four units) and the DAES (six units). The USD(AT&L) directed GEO-5 and GEO-6 production be established as a major sub-program to SBIRS High. Upon implementation of the sub-program, the procurement cost deviation was resolved through early release of incremental funds to LM.
February 2012	USD(AT&L) approved the ASD for the SBIRS 5-6 production contract.
August 2012	DAE signed an ADM following the July 2012 DAB, allowing the release of the Request for Proposal (RFP) for the SBIRS GEO-5 and GEO-6 SRP contract. The RFP was released September 11, 2012, to support a mid-2013 contract award. The ADM directed the Air Force to update the SBIRS Operations and Support (O&S) cost estimate to include all manpower costs and the costs resulting from the addition of GEO 5-6 subprogram.
February 2013	USD(AT&L) signed an updated SBIRS High APB establishing the O&S costs for the newly established SBIRS Block Buy (GEOs 5-6) subprogram. It also incorporated a revised O&S cost estimate for the SBIRS Baseline (GEOs 1-4, Highly Elliptical Orbits 1-2 and Ground) subprogram.
March 2013	LM submitted the GEO-5 and GEO-6 Production proposal.
June 2014	Air Force Space Command/Space and Missile Systems Center (AFSPC/SMC) awarded the \$1.86B SRP contract to LM for production of the GEO-5 and GEO-6 satellites. GEO 5-6 production activity was added as a modification to the Advanced Procurement Contract. Through the block buy and disciplined pursuit of affordability initiatives, the Air Force saved 37%, a substantial reduction from the early estimate for two separate space vehicle buys.
June 2015	GEO 5-6 Technology Refresh (TR) Engineering Change Proposal approved. This major contract modification converted the SBIRS-unique A2100 satellite bus to a modernized and modular A2100 TR bus.
January 2016	System-level delta Preliminary Design Review (PDR) completed.
March 2016	Flight Software PDR completed.

August 2016	SBIRS Bootstrap CDR completed.
September 2016	SBIRS 5-6 Payload Delta CDR completed.
November 2016	Ground PDR (to cover design changes due to the modernized TR bus) completed.
March 2017	SBIRS Bus Flight Software CDR completed.
May 2017	Space Vehicle CDR completed.
July 2017	A2100 TR Bus Flight Software completed the version 1.1 software acceptance review as the final baseline for the SBIRS Bus Flight Software development. The SBIRS Bootstrap, or initialization software, completed with the Software Acceptance Review. The Ground CDR completed.
September 2017	LM conducted the System-level CDR for the GEO 5-6 program culminating an 18-month effort of lower-level subsystem and segment-level CDRs. Four significant liens levied against the review. The review chairs approved continuation of the production contract in concert with liens work-off.
April 2018	Payload Sensor integration began at Northrop Grumman Azusa facility with delivery scheduled in May 2019.
September 2018	LM Flight Software team conducted 'bottom-up' review and analysis of the Flight Software progress and plan. The software item qualification testingslipped from April 2019 to November 2019. System CDR liens were closed.
October 2018	Delivery of the GEO-5 Core to Stennis for Propulsion Sub-System installation and integration.
February 2019	The Propulsion Sub-System (PSS) risk was lowered after successful install of all tanks and thrusters. The GEO-5 PSS passed the Acceptance Test Procedure and completed Ship Readiness Review. The GEO-5 PSS core shipped from Stennis to Sunnyvale for next level assembly. The completion of PSS integration and shipment to Sunnyvale represented completion of a major milestone on the GEO-5 production critical path. The PSS install was completed in 4 months which was 2 months faster than originally planned.
May 2019	Northrop-Grumman successfully delivered the GEO-5 Payload to LM-Sunnyvale. This delivery was on-schedule and efficiently executed with all parties.
June 2019	LM encountered a failure of an A2100 TR propulsion Pressure Regulator Valve (PRV) system on another A2100 program. LM determined there was reach-back to the SBIRS GEO 5-6 program. Root cause and corrective actions were determined via a LM Senior Management Review Board. This failure and required re-work presented a significant risk to the completion of Space Vehicle Baseline testing and delivery to the GEO-5 Space Vehicle contract date (also the APB threshold date). PRV system re-work is forecast to complete December 2019.
July 2019	LM successfully mated the Northrop-Grumman Payload to the GEO-5 spacecraft bus and began initial power-on testing.
November 2019	LM Flight Software (FSW) Team completed the Software Item Qualification Test to establish version 1.0 for the GEO 5-6 Space Vehicles. Bus FSW qualification software acceptance was successfully completed which verified all flight software requirements.

Threshold Breaches

APB Breaches

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

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
GEO Satellite 5 Available for Delivery	Sep 2019	Sep 2019	Sep 2020	Sep 2020
GEO Satellite 6 Available for Delivery	Sep 2020	Sep 2020	Sep 2021	Jul 2021

Change Explanations

None

Notes

GEO Satellite "Available for Delivery" is defined as the GEO satellite successfully completing Final Integrated System Test and the satellite is available such that if operational priorities require the satellite to launch at the earliest opportunity, then the satellite will continue Final Install processing to proceed to a Consent-to-Ship Review. If operational priorities indicate a later manifest, then the satellite will be configured for storage.

GEO 5 and 6 contract delivery dates are September 30, 2020, and July 31, 2021, respectively, as of June 2014 production contract award.

The one-year period between the objective and threshold values addresses the schedule risk inherent in the first-time production under a fixed price contract for a SBIRS satellite.

Performance

No performance characteristics exist for Block Buy (GEO 5-6).

Notes

Performance characteristics were addressed in the Baseline (Geosynchronous Earth Orbit 1-4, Highly Elliptical Earth Orbit 1-2, and Ground) subprogram. Performance assessment is based on the full Space Based Infrared System constellation and Ground Segment.

Track to Budget

General Notes

In December 2019, the Office of Management and Budget directed the DoD to establish new Space Force RDT&E and procurement appropriations. Beginning in FY 2021, space-related RDT&E funding, formerly under 3600F (RDT&E, Air Force) is contained in 3620SF (RDT&E, Space Force) and space procurement funding formerly under 3021F (Space Procurement, Air Force) is contained in 3022SF (Procurement, Space Force).

Procurement

Appn	BA	PE	
Air Force	3020	05	0305915F
	Line Item	Name	
	MSSBIR	SBIRS High Missile Procurement (Sunk)	
Air Force	3021	01	0305915F
	Line Item	Name	
	MSSBIR	SBIRS High (Space) (Sunk)	
Air Force	3021	01	1203915F
	Line Item	Name	
	MSSBIR	SBIRS High (Space) (Shared) (Sunk)	
Air Force	3022	01	1203915SF
	Line Item	Name	
	MSSBIR	SBIRS High (Space) (Shared)	

Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
SBIRS GEO 5-6 Block Buy Authority To Proceed Decision (June 2015)	
1.	Flight Software -- Zero schedule margin to Spacecraft assembly and program transition issues from Ada coding language to C++ coding language. Mix of heritage SBIRS and Common Product code.
2.	Integration & Test -- Schedule slips due to late delivery of subsystems, costs of extended schedule. New communication layout integration, new facility & ground support equipment.
Current Estimate (December 2019)	
1.	Geosynchronous Earth Orbit (GEO)-5 Space Vehicle Integration and Test execution is at risk of being late due to remaining manufacturing tasks (Propulsion Sub-System re-work) and could result in Space Vehicle delivery delay.
2.	GEO-5 mechanisms and deployables (antenna wing assembly, deployable light-shade, and solar array wing assembly) manufacturing, test, or integration are at risk of delays and the program may not meet the GEO-5 vehicle-level Acoustic Testing need date and could result in Space Vehicle delivery delay.
3.	Independent Research and Development and SBIRS unique bus flight software may not progress on schedule due to under-estimation of work and defect discoveries; this could drive a software development cost increase and slip to Space Vehicle delivery date.

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (February 2013)	
1.	GEO 5-6 production Contract Line Item Number (CLINs) are a fixed price contract with a cost share ratio until the price ceiling is reached. The program has greater risk within the CLINs that are on a CPIF contract if a slip occurs.
Original Baseline Estimate (September 2012)	
1.	There are no known risks with this program at this time.
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (December 2019)	
1.	GEO 5-6 production CLINs are fixed price with a cost share ratio until the price ceiling is reached. Cost risk exposure resulting from production CLIN issues such as software, structures and electronics, and other potential hardware elements would be limited by this ceiling amount. Any additional cost risks above this amount would result from realized risks to cost-plus CLINs or other government costs. The remaining effort on cost plus CLINs are for Non-End Item activities such as Launch and Early On-Orbit Support, Contractor Operation Support, and Launch Vehicle Integration.

Low Rate Initial Production

Notes

There is no LRIP for this program.

Foreign Military Sales

None

Nuclear Costs

None

Cost Variance

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	--	3865.4	--	3865.4
Previous Changes				
Economic	--	+63.7	--	+63.7
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-354.9	--	-354.9
Other	--	--	--	--
Support	--	-264.2	--	-264.2
Subtotal	--	-555.4	--	-555.4
Current Changes				
Economic	--	-1.4	--	-1.4
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-27.4	--	-27.4
Other	--	--	--	--
Support	--	-27.1	--	-27.1
Subtotal	--	-55.9	--	-55.9
Total Changes	--	-611.3	--	-611.3
Current Estimate	--	3254.1	--	3254.1

Summary BY 1995 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	--	2681.6	--	2681.6
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-244.5	--	-244.5
Other	--	--	--	--
Support	--	-173.6	--	-173.6
Subtotal	--	-418.1	--	-418.1
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-17.9	--	-17.9
Other	--	--	--	--
Support	--	-17.3	--	-17.3
Subtotal	--	-35.2	--	-35.2
Total Changes	--	-453.3	--	-453.3
Current Estimate	--	2228.3	--	2228.3

Previous Estimate: December 2018

Procurement		\$M	
Current Change Explanations		Base Year	Then Year
Revised escalation indices. (Economic)		N/A	-1.4
Adjustment for current and prior escalation. (Estimating)		+0.9	+1.2
Revised estimate due to reallocation from support to flyaway in FY 2017 - FY2021 (SPAF). (Estimating)		+17.2	+27.1
Revised estimate in FY 2017 - FY 2020 due to reallocation of funds in PE (SPAF). (Estimating)		-31.6	-48.7
Funds transferred within program from Space Procurement, Air Force Procurement appropriation to newly added Space Force, Air Force Procurement appropriation (SPAF). (Estimating)		-64.6	-104.9
Funds transferred within program from Space Procurement, Air Force Procurement appropriation to newly added Space Force, Air Force Procurement appropriation (PSPAF). (Estimating)		+64.7	+104.9
Revised estimate due to Congressional reduction in FY 2020 (SPAF). (Estimating)		-4.4	-7.0
Revised estimate due to Air Force-wide funding adjustments (SPAF). (Estimating)		-0.1	-0.1
Revised estimate due to Air Force-wide inflation adjustment. (Estimating)		-0.1	-0.1
Revised estimate to reflect application of new outyear indices (SPAF). (Estimating)		+0.1	+0.2
Adjustment for current and prior escalation. (Support)		-0.1	0.0
Revised estimate due to reallocation from support to flyaway in FY 2017 - FY2020 (SPAF). (Support)		-24.9	-39.6
Revised estimate due to reallocation from support to flyaway in FY 2021 (PSPAF). (Support)		+7.7	+12.5
Procurement Subtotal		-35.2	-55.9

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	December 06, 2018
Source of Estimate:	POE
Quantity to Sustain:	1
Unit of Measure:	Integrated System
Service Life per Unit:	35.00 Years
Fiscal Years in Service:	FY 1999 - FY 2033

Operating and Support (O&S) costs are incurred for the continued operations, maintenance, sustainment, and support of the SBIRS High System, including ground equipment and facilities at worldwide sites. The on-orbit space vehicles and sensors are supported from their respective factories including: anomaly resolution support, on-orbit maintenance, operational product development/checkout, and flight software/database maintenance. The ground segment consists of the Mission Control Station, the Mission Control Station Backup, Relay Ground Stations, Relocatable (Mobile) Terminals, and the Communications Network. Costs include both government and contractor manpower, supplies, equipment (primarily commercial-off-the-shelf hardware and software), travel/transportation, and communications circuits.

Originally, estimated O&S costs for the total SBIRS High program spanned both the Baseline (not required to report after December 2015 SAR) and Geosynchronous Earth Orbit (GEO) 5-6 Block Buy subprogram. O&S costs for the GEO 5-6 Block Buy subprogram covers FY 2029 through FY 2033 based upon operational acceptance and design life. The Quantity to Sustain one integrated system encompasses four GEO satellites, two Highly Elliptical Earth Orbit (HEO) payloads and the associated ground infrastructure. The mission related O&S costs are not assigned to individual satellites. All on-orbit and ground components together are required to meet the mission.

Ground Rules and Assumptions: The 35-year service life start date (FY 1999) is based upon increment one entry into Development Test/Operational Test, and end date (FY 2033) is based upon final GEO-6 satellite and 12-year design life.

During this time-period, the Next Generation Overhead Persistent Infrared (Next Gen OPIR) program is scheduled to have assets on-orbit and will be operated by the same units using the same ground segment. O&S costs in the following tables reflect sustainment of SBIRS Block Buy (GEO 5-6) and Next Gen OPIR program additional types of on-orbit assets. Sustainment costs are allocated based upon SBIRS constellation per the APB (4 GEO + 2 HEO) and Next Gen OPIR on-orbit assets / launch schedule per Cost Analysis Requirement Document version 19.2 from FY 2029 to FY 2033.

Sustainment Strategy

The current SBIRS sustainment strategy employs an organizational and depot maintenance concept with organic and contractor workload at both levels. Contractor Logistics Support is provided under one contract and includes organic depot partnership. There is also direct organic support of the Mobile Terminal vehicles and equipment.

Antecedent Information

The Antecedent System is the Defense Support Program. Comparable O&S cost estimates for this system are not available.

Annual O&S Costs BY1995 \$M			
Cost Element	Block Buy (GEO 5-6) Average Annual Cost Per Integrated System	Defense Support Program (Antecedent) N/A	
Unit-Level Manpower	33.200		0.000
Unit Operations	7.300		0.000
Maintenance	67.700		0.000
Sustaining Support	26.300		0.000
Continuing System Improvements	11.000		0.000
Indirect Support	11.800		0.000
Other	0.000		0.000
Total	157.300		--

Annual O&S Costs reflect the average SBIRS share over the FY2029-2033 timeframe in order to match the time-period used to compute the Objective, Threshold, and Current Estimate in the next table. Annual O&S Costs in prior versions of this report were based upon the entire 35-year service life of the SBIRS System.

Item	Total O&S Cost \$M			
	Block Buy (GEO 5-6)			Defense Support Program (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	795.3	874.8	786.4	N/A
Then Year	1551.1	N/A	1548.4	N/A

Equation to Translate Annual Cost to Total Cost

Total O&S Cost Share from FY2029-2033 of \$786.4M / 5 years = \$157.3M.

O&S Cost Variance		
Category	BY 1995 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2018 SAR	786.4	
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	786.4	

Disposal Estimate Details

SBIRS High

December 2019 SAR

Date of Estimate:

Source of Estimate:

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

Disposal costs have not been estimated at this time.